



IPv6 Readiness of Servers

Developing a prototype software to
measure the IPv6 readiness of
Internet servers

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Client Name: Dr. Sebastian Zander
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Executive Summary

In week 3, we were authorized to conduct a project from the unit coordinator at Murdoch University, Western Australia. In this project we will develop a piece of prototype software which can measure the performance of Internet servers by probing them with different kinds of information. These servers are chosen as samples which are capable of communicating using both IPv4 addresses and IPv6 addresses. Information collected from probing state will be stored in a database and will be presented with charts in order to reflect the level of implementation of IPv6 in this world. The purpose of this management plan is to analyze this project with different knowledge areas of project management in order to keep the project within scheduled time, cost, scope and quality. Different areas of knowledge in project management will be used here including scope, time, quality, communication, integration, human resources, risk, cost and procurement. Each knowledge area will be briefly described and followed by description of how the knowledge area is used in this project. Process-related deliverables include requirement analysis document, project management plan, deliverable task breakdown statement and self and peer evaluation sheet.

1 Introduction

1.1 The Authorization

In week 3, our client Dr. Sebastian Zander from Murdoch University authorized us to develop a piece of software to measure the IPv6 readiness of current Internet servers. As the Internet grows, the IP address space for IPv4 will soon be drained out. IPv6 has been introduced by Internet Engineering Task Force (IETF) since 1998. (IPv6, n. d.). However, the implementation of IPv6 is still growing slowly. The problem behind this is the cooperation of IPv6 addresses with the prevailing IPv4 Internet and the performance problems resulting from this. In order to measure and display the level of IPv6 readiness in today's network, the client requested us to conduct this project.

1.2 The Document

This document analyzes the project using different areas of knowledge in project management. Throughout this document, one should clearly see the scope of the project referring to the functions of the product; know how to manage the changes during the project; see how the requirements are divided into feasible tasks; produce a schedule that can maintain the team members to be on schedule; know how to determine if the product is successful; know how to communicate with the clients and each other efficiently; know whom to resort to should conflicts arise; prepare for possible threats that may endanger the project; see if this project is profitable and know the process of procurement.

1.3 The Project

The project includes managing the team members during the process of the project, assigning tasks to them, maintaining everyone to be on schedule, making sure the product is developed within the scope and requirements of the client, dealing with any threats and making changes to the plan. In this project we will develop a piece of software that is capable of measuring the performance of Internet servers using both IPv4 and IPv6 protocols and displaying statistical information about the performance of these servers. During the process of the project we will gather requirements from the clients, assign

tasks to our team members and deal with the changes.

1.4 The Product

The software will be able to collect the information by probing these sample servers from all over the world. The information will be gathered by measuring the performance of these servers when using IPv4 and IPv6 protocols differently. Probing methods include sending Internet Control Message Protocol Version 4 (ICMPv4) and ICMPv6, sending Hyper Text Transfer Protocol (HTTP) GET request to these servers using IPv4 and IPv6, sending various types of messages with different sizes to them via different ports using Transport Control Protocol (TCP) and querying Domain Name Service (DNS) records using both IPv4 and IPv6. The performance is basically measured using network latency. Data of the measurements as well as the information of the servers will be stored in database. On users' side, they will be able to see statistical analysis using charts to represent the difference of using IPv4 and IPv6 to access these servers.

1.5 Terms of Reference

The project means the aggregation of managing the team members and developing the software. The product refers to the software we developed during the initial project provided to the team. During this project both the client and supervisor are the same person. Because it is a project given by the university to be undertaken by the students, there is no major cost or process of procurement in this project. This document is not protected by any copyright so anyone can reference this. If referenced, please include the name of the organization.

1.6 Acknowledgements

The author would like to thank these people who helped us during the development of this project:

Dr. Sebastian Zander, *Client & Supervisor, Murdoch University*

2 Method

2.1 *Online Research*

The author went through several webpages to look for information related to the topic of the project and related programming skills.

2.2 *Group Discussion*

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

2.3 *Project Management Tools*

Team members used project management tools to develop the project plan including:

- Microsoft Word 2013
- Microsoft Excel 2013
- Microsoft Project 2013

3 Integration Management

3.1 Introduction

Project integration management is the process of integrating all aspects of the project management into a whole body. A good project integration management ensures all elements of the project adapt to the standards defined and are contiguous throughout the project's life in order to complete the project successfully. (Schwalbe, 2014, p.140) Without integration management, it is impossible to coordinate all aspects of the project including making decisions, communicating with key stakeholders and so on. All aspects of project management need to be integrated including coding, planning, designing, communicating and so on. These are all done via project integration management. Project integration ensures the project manager looks at problems in the context of the entire project and not just individual parts. In the following sections we will discuss the overall plan of how to manage the project, how to manage the changes that may take place in the project and project management methodologies.

3.2 Overall Plan

The project will be conducted by means of prototyping, which is designing key parts of the software first and then after gaining the acceptance of the client all other remaining parts can be started. If there is conflict, the supervisor will be the judge. At the beginning, the requirements from the client will be identified and documented. At this stage, the team members will be assigned tasks to develop the requirements document. After the requirements have been approved, all kinds of analysis concerning project management including stakeholder, scope, time, quality, communication, human resource, risk and cost will be conducted. Project team members will be assigned tasks to do different kinds of researches related to different aspects of knowledge in project management. Finally a work breakdown structure will be developed and the schedule will be confirmed. Tasks finished by different team members will be coordinated by communicating with one another during the regular week meeting to discuss further approaches of the rest of the project.

During the project, different team members will be assigned different tasks according to the

schedule. The due dates of the tasks will be specified in the schedule. During the development of the product, if there is change that needs to be made to the project, it will be identified, proposed, approved and then adopted. Each team members are in charge of different processes in this situation. Project team members will also review the requirement document and the project management plan regularly to make sure the project and the product is within the scope and time frame. After the product is finished and fully tested, the client will be asked to test it. If the functions are not as well as expected, the product will be redesigned and redeveloped until it conforms to the client's requirements.

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 in **Appendix E**.

4 Scope Management

4.1 Introduction

Scope management defines what kind of deliverables the project will produce including product-related deliverables and process-related deliverables. It defines and controls what needs to be done in the project and the boundary of the project. All stakeholders including the team members and the client must agree with the deliverables and the process of producing these deliverables. (Schwalbe, 2014, p.188) It is also the process of defining requirements from the clients and dividing the work into acceptable tasks. Without scope management the scope of the project cannot be controlled, clients may be dissatisfied with the product or the reports and the requirements are impossible to be fulfilled. In the following sections we will discuss the project goals, project benefits and project deliverables inside the scope statement. A Work Breakdown Structure (WBS) will also be provided.

4.2 Scope Statement

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

Project Title: Create prototype that measures IPv6 readiness of internet servers	
Date: August 21	Prepared by: Leslie Vundu, Secretary, Leslievundu@gmail.com
<p>Project Summary and Justification: Dr. Sebastian Zander from Murdoch University tasked us to develop software to measure the IPv6 readiness of the current Internet Servers. The main goal of the project is for the prototype to measure and collect data for IPv6 readiness and present results in graphical or tabular form. IPv6 and IPv4 will run concurrently with each other, thereby providing statistics of which internet infrastructure is IPv6 ready, and show the difference in performance of the IPv4 and IPv6 on different server types and within different countries.</p> <p>The project will not incur any cost because free online software's were used in the buildup of the IPV6 test prototype. All the requirements of the client have been met within the set timeframe with relevant professional documentation.</p>	
<p>Project Characteristics and Requirements:</p> <ol style="list-style-type: none"> 1. Probing servers across the Internet: Probe a sample subset of the Internet servers using different kind of methods to test their performances via IPv4 addresses and IPv6 addresses; 2. Processing the raw data and storing them into database: The measurement data as well as the servers' data will be pre-processed before being stored into the database; 3. Searching the database: The database will provide searching functions according to the keywords input by the user and present the related information about the server; 4. Graphically representing the data: The stored data can be presented graphically to indicate the IPv6 performance and implementation level for these servers; 	

5. Diagnosis toward IPv6 unavailable networks: When a server can't be reached using IPv6 addressing, a diagnosis can be conducted to indicate where the problem lies.
6. Import & export database: The database can be exported as a backup file and imported from a backup file.
7. Tables & charts export: Tables and charts displayed by the program can be exported to be saved as files with different formats.

Summary of Project Deliverables

Project management-related deliverables: Project charter, scope statement, requirement analysis, Work Breakdown Structure, chain of command, Gantt chart, stakeholder analysis, risk factors, Probability/Impact Matrix, risk mitigation strategies, agendas, minutes, deliverable task breakdown statements, self and peer assessment sheets, final report and presentation.

Product-related deliverables:

1. Software installation file: A compiled installation file that will install the software when executed on the computer;
2. Installation files of related software: During the development of the product, there are a number of software that are used as prerequisites of developing product and conducting the tests. The installation files of these software will be included;
3. Design document: The detailed design document including the diagrams that are used to design the product will be included.
4. User manual: A detailed document that will guide the user to install and use the software without the help of the developers.
5. Test plan: A detailed document that records all the details of the tests conducted towards the software.

All of the above items are going to be submitted.

<p>Project Success Criteria: Our goal is to complete the project within 2 months without any cost. The project supervisor, Dr. Sebastian Zander, has emphasized that the project should be completed within the current networking environment of Murdoch University which does not and will not support IPv6 addresses at all. It is also important for the project to stay within the time frame. To meet this requirement, we must strengthen the negotiation with the client on how best to come up with a prototype that meets all the requirements, develop a proper project plan that can anticipate all the possible situations we may encounter, assign appropriate tasks to the team members within a time frame, coordinate the tasks finished by the team members and allocate enough time to communicate with one another. If the product can't be finished before the due date, the documents can't be submitted on time, the product is not as ideal as expected or the product has some functions that may incur legal issues, the project fails.</p>
<p>Boundaries: The purpose of the project is to create software that will check IPv6 readiness on different server types in different countries. The IPv6 test software will only gather information of the IPv6 readiness of server. The software cannot be used to log in to the servers remotely. It cannot change the configuration files or execute commands on remote servers either. The traffic for testing is minimal so it won't cause excessive traffic either in local network or remote networks. It is used as a prototype for testing usage only and should not be used as a commercial product. The project is a student project which is not funded by the school at all. All costs incurred during the project are subject to the project team members including printing paper. The project team isn't responsible if the software is abused.</p>

Table 1 - Scope statement (Schwalbe, 2014, p. 107)

4.3 Work Breakdown Structure

The WBS provides the detailed tasks that need to be assigned to team members in order to complete the project within the defined scope. It lists all the key milestones that need to be completed in the project and divides them into acceptable tasks using hierarchical structure. The WBS is based on the requirement points which have been agreed to by the client and all the branches are expanded so that when all tasks are completed the project will stay within the scope. In the WBS all the atomic tasks will be explained sufficiently so that team members assigned with the tasks understand the gist without falling out of the scope. The WBS is task-oriented so the atomic tasks are assigned to team members. The WBS is included in **Appendix B**.

5 Time Management

5.1 *Introduction*

Project time management is the process of managing the project in order to complete the project within the scheduled time frame. It includes defining activities from WBS, sequencing activities with dependencies, estimating activity resources including human resources and equipment, estimating approximate activity durations, developing the schedule and controlling the schedule. (Schwalbe, 2014, p.188) It is an important method of keeping team members up to the schedule of the project. Without time management, there is no schedule for the project. Team members would not know what their roles are, what they need to do, what tasks must be done before the important dates and deadlines. By defining the schedule, one can also learn the current progress of the project in order to estimate if the project should be continued and find out what tasks have been left behind.

5.2 *Gantt chart*

The Gantt chart is a diagram that comes from the WBS with detailed dependencies, responsible team members, scheduled start date and finish date for each activity and durations. It is a detailed schedule for the project. It also points out the commencing date and finishing date of the project. By following the Gantt chart team members can be easily assigned tasks to ensure the project is completed in time. The Gantt chart is developed using Microsoft Project 2013 and inserted in **Appendix B**.

6 Quality Management

6.1 Introduction

Project quality management is the process of developing methods to ensure the quality of the product satisfies the client. The criteria for achieving the required quality is the satisfaction of the client. The product must conform to the requirements defined by the client and it should be used as was intended. (Schwalbe, 2014, p.314) Without quality management, there is no way to test if the product conforms to the requirements defined by the client. The software may be versatile, but if it is not tested systematically, it may not achieve the main tasks required by the user or even impedes the main functions. In the following sections we will list the components of the product and develop the metrics that determine if the development of each component is successful.

6.2 Product components

The product includes following components:

- **Probing servers using different kinds of methods:** Internet servers will be tested with performances using different kinds of network protocols using both IPv4 and IPv6 addresses;
- **Processing the raw measurement data and storing them into the database:** measurement errors will be removed and data along with the server's information will be stored into the database;
- **Searching the database:** the database can be searched with keywords from the users that will return the information about the server in table form;
- **Presenting the data:** data stored in the database will be represented in charts to represent the level of IPv6 readiness in today's network using different criteria;
- **Diagnosing reachability problems:** servers that can't be reached using IPv6 will be diagnosed and users will be informed of what kind of problem is.
- **Import & export database:** database can be imported from backup file or exported to a backup file.

- **Tables & charts export:** Tables and charts displayed can be exported to files for future use.

6.3 *Successful criteria*

The components will be tested in the following aspects: (Schwalbe, 2014, p.318)

- **Functionality:** The software must be able to provide stated mandatory functions from the client. It measures how well the program can perform these functions. For probing function, it is expected the list of servers will be probed successfully. For searching function, related and only related records about the related server should be displayed in an acceptable form. For presenting function the charts should be easily understood by the user to represent the level of IPv6 deployment. For diagnosis function, it is optional but the ideal state is to point out the location of the problem correctly. For import & export database and tables & charts export functions, it is ideal to correctly export and import all the data as well as exporting the correct table and charts.
- **System outputs:** System output defines how easily the user can interpret the output from the software. In probing function, the software should return the feedback regarding to whether the probing was successful or not. In searching function, the output of the required information should be displayed in a table format that clearly identify different kinds of information relating to the servers. In presenting function, the output should be the charts that can be easily recognized by the users. In diagnosis function, the output should clearly state where the problem is without any confusing messages.
- **Performance:** Performance refers to the degree to which a product can perform its tasks excellently. The software should be able to handle a number of records more than 500. It is not designed as multi-tasking so at one time only one user can use one function of the software. The software can run on any 32 bit or 64 bit CPU and Microsoft Windows operating system including the Windows 8 tablet firmware. The response time for the software under normal circumstances (RAM & CPU usage less than 50%) is one second for feedback and 15 seconds for network timeout, under high CPU & RAM usage situation (either more than 75%) or network congestion the response time is expected to be 15 seconds for feedback and 25 seconds

for network timeout.

- **Reliability:** Reliability states how reliable the product is under normal conditions. To remain reliable, the user is advised to use the software by following the instructions. It is anticipated that in no circumstance the software will crash after fully tested under general conditions.
- **Maintainability:** It defines how easy a product can be maintained after it is implemented. After the product is developed, it may still have a lot of unexpected problems. The project team should be responsible for the maintenance of the software after it has been released. Clients can reflect the problem to the project manager using the contact E-mail stating the phenomenon and steps that caused the problem and the error prompts. The project manager will consult the programmer immediately, who is expected to solve the problems or errors within 48 hours primarily. The problem will be fixed in next version of the software.

6.4 Test plan

After the product is completed, a series of tests will be conducted onto the functions of the software systematically including:

- **Testing by the programmer:** the initial test stage will be conducted by the programmer in the developmental environment;
- **Testing by the team members:** the second test stage will be conducted by the team members to test the software in their own network environment. If any problem is found, a full description of the time, network type, server name, steps and the phenomenon will be provided to the programmer for further debugging;
- **Testing by the client:** in the third stage the client will be invited to test the software by himself before the product can be released. The client is required to provide information listed in the above if problem is found in the software to improve the program.

The testing methods conducted by the programmer and the team members include:

- **Normal functions testing:** test the software for normal functions required by the client;

- **Error testing:** test the software's ability of handling errors in case the input is invalid.

7 Communication Management

7.1 Introduction

The communication management ensures the information of the project is generated, collected, disseminated, stored and disposed of properly and timely. It includes determining the information and communication needs of all the stakeholders, managing and controlling the communication using determined methods. (Schwalbe, 2014, p.407) The biggest possibility of the failure of a project is the unclear statement of requirements and scope which can be attributed to poor communication among stakeholders. If the communication can be managed well, the information flow among all the stakeholders will be fluent and uncorrupted. Otherwise there will be all kinds of conflicts rising during the project.

7.2 Stakeholder communication analysis

This section of the document will identify the communication analysis between the stakeholders. Any information regarding what needs to be communicated, when to communicate and whom to communicate to will be found in the communication matrix.

Stakeholder	Influence	Role	Communication type	Communication Method	Timing/ Frequency
Client	High	Sponsor	Verbal & written	In person & emails	Monthly
Supervisor	High	Supervise	Verbal & written	In person & emails	Weekly
Unit coordinator	Medium	Guide	Written	Emails	Weekly
Project Manager	High	Overall Responsibility	Verbal & written	In person, Emails, phone calls	Daily
Secretary	Medium	Support chair or Manager	Verbal & written	In person	Weekly or as needed
Designers	High	Design structure	Written, non-verbal	In person	Weekly
Programmer	High	Implement Design	Verbal & written	Verbal & emails	Weekly

Table 2 - Stakeholder communication analysis

The communications conducted between Team members, client, supervisor and unit coordinator will be done as follows

Meetings

An Agenda will be distributed at least 2 days prior to the scheduled meeting and participants are expected to review the agenda beforehand for any clarifications or additions to be made. The time keeper will ensure that the group adheres to the time stated on the agenda and recorded action items will be then formally distributed to the team members.

Emails

All emails should be distributed to the right project participant in accordance to the communication matrix. The project manager must be included on any mail involving the IPv6 test software.

Informal communications

Any issues, concerns or updates of the IPv6 test prototype discussed informally between members of the project must be communicated to the project manager or project supervisor so that action can be taken. In circumstances where project manager or supervisor cannot resolve a case it should then be taken to the unit coordinator.

8 Human Resource Management

8.1 Introduction

Human resource management is the process of developing a plan for assigning team members to individual activities in order to achieve efficient use of man power. All stakeholders are involved in this. In human resource management the roles and responsibilities will be identified and documented, team members will be trained about the necessary skills to finish the assigned tasks and their status of performance will be monitored regularly. (Schwalbe, 2014, p.363) It also includes motivating the team members by different kinds of means. Without human resource management, the project will not be finished as scheduled because all team members may not be able to finish the assigned tasks either resulting from incapability or deliberate intention. In the following section we will discuss the organizational chart in this project and the responsibility assignment matrix that correlates the tasks with the responsible and performing members. We will also discuss possible additional meetings and methods for resolving conflicts.

8.2 Chain of Command

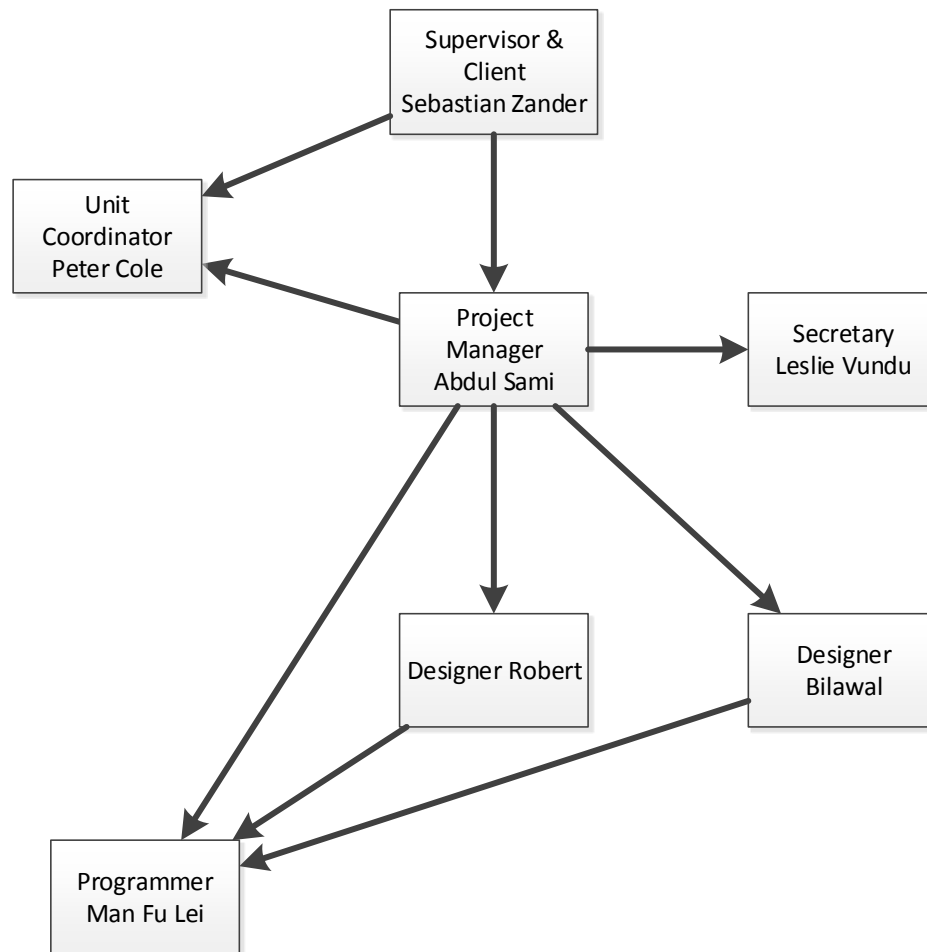


Figure 1 - Chain of command

The supervisor and client sits on top of the hierarchy and listens to the report from manager. The unit coordinator communicates with the project manager and the supervisor about anything related to the project. The manager instates the secretary to prepare for documents related to the project. The programmer and the designers will communicate with the project manager to listen to latest brief from the client and unit coordinator. The programmer can communicate with the designers to discuss the methods used in realizing the functions of the product. In general the superior is in charge of its subordinates in the chain of command.

8.3 Responsibility Assignment Matrix

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

Team Members →

R: Responsible Unit
P: Performing Unit

WBS Activities	WBS Item	Abdul Sami	Leslie Vundu	Man Fu Lei	Robert Smart	Bilawal Mushtaq	Deadline	Scheduled Duration (day)
↓	1.1 Acquire the project	R P	R P	R P	R P	R P	N/A	1
	1.2.1 Define requirements	R P	P	P			Aug 25	15
	1.2.3 Submit the requirement document	R P	R P	R P	R P	R P	Aug 27	3
	1.2.4 Develop project charter	R P		R P			Aug 24	1
	1.2.5 Define scope		P	R P			Aug 24	3

	2.1	Risk management		P	R P		P	Aug 24	1
	2.2	Human resource management	R P			P	P	Aug 24	6
	3.1	Time management		P	R P			Aug 23	1
	3.2	Communication management	R P				P	Aug 25	13
	3.3	Quality management	R P					Aug 24	2
	3.4	Cost management				R P		Aug 24	2
	3.5	Develop project management plan	R P	P	R P			Aug 26	15
	4.1	Preliminary design	R P		P			Aug 22	1
	4.2	Detailed design			R P			Sep 1	12
	5.1.1	Create the database	R P	P		P	P	Aug 27	2
	5.1.3	Develop the probing module	P		R P		P	Aug 30	5

5.1.5	Develop the processing and storing module	R P				P	Aug 30	4
5.1.7	Develop the searching module	P		R P		P	Sep 4	11
5.1.9.1	presenting the percentages in each continent		P	R P	P		Sep 7	8
5.1.9.2	presenting the percentages in each country	R P	P			P	Sep 7	8
5.1.9.3	presenting the percentages for different server types	P		R P	P		Sep 7	8
5.1.9.4	presenting the performance of individual server		P	R	P	P	Sep 7	8
5.1.11	Develop additional modules	P	P	R		P	Sep 25	21
5.2	Test the software	P		R P	P		Sep 30	35
5.4	Probe Internet servers		P	R		P	Oct 9	10

5.5.1	Initial testing	P		R	P		Oct 9	1
5.5.2	Secondary testing		P	R	P	P	Oct 12	3
5.5.3	Testing by client			R			Oct 21	7
6.1	Validate scope	R P	R P	R P	R P	R P	N/A	Thursday
6.2	Review project plan	R P	R P	R P	R P	R P	N/A	Thursday
6.3	Status Report	R P	R P	R P	R P	R P	N/A	Thursday
6.4	Report performance	R P	R P	R P	R P	R P	N/A	Thursday
6.5.1.1	Identify possible changes	R			P		N/A	1
6.5.1.2	Determine the change	R	P				N/A	1
6.5.1.3	Approve the change	R P					N/A	2
6.5.1.4	Apply changes	R		P			N/A	4

7.1	Prepare for program submission			R P			Oct 26	6
7.3	Prepare final project report	R P					Oct 26	6
7.4	Present final project	R P	R P	R P	R P	R P	Nov 2	8

Table 3 - Responsibility assignment matrix

In the matrix above, the responsible units and performing units are identified for each task. The deadline for specific activity and the scheduled duration are also specified. For recurring activities, the duration is not available and the scheduled action day is Thursday which is also the same day as the regular meeting with the supervisor.

8.4 *Conflicts resolving methods*

As every team member is very busy with their own personal life it is imperative not to affect them by adding additional meeting time. All conflicts about the project can be discussed until the adversaries understand what is right. If they still don't give in, the supervisor or the unit coordinator are the judges.

9 Risk Management

9.1 Introduction

Risk management is the process of identifying, analyzing and responding to risks throughout the project's life in order to make sure the project can be completed as scheduled. (Schwalbe, 2014, p.440) By identifying and analyzing risks the project manager can choose what project to undertake and cope with possible threats the project will meet with predefined countermeasures. It is very important to plan for the risks beforehand. Without proper risk management, the team members won't be able to deal with sudden events that happen during the progress of the project. There can also be positive risks that may have a good impact on the project. In the following section the potential risks will be given numbers, names and definitions as well as responsible persons, the analysis about the possibilities and impacts these risks can have and the countermeasures for dealing with these risks.

9.2 Risk Factors

The following are the risk factors in the project:

Number	Name	Description	Responsible Person
1	User involvement	The development of the product may not involve the client fully enough leading to client not satisfied towards the functions of the product	Man Fu Lei
2	Management support	There may be not enough executive management support such as that the supervisor doubts if the project can continue and suspends the project.	Abdul Sami
3	Requirement statement	The statement of requirements may not be clear enough for the team members to follow and go into the right direction	Leslie Vundu
4	Project planning	The planning may not be detailed enough to cope with emergencies that may be encountered during the project	Robert Smart
5	Product functions	The product may still have unexpected issues such as stability even if all of its functions can be implemented	Bilawal Mushtaq
6	Milestones	The milestones set on the project may not be small enough for team members to feel they are making progress	Man Fu Lei
7	Incompetence	The team members may not be competent enough to succeed the tasks assigned	Abdul Sami
8	Sloppiness	The team members may be sloppy and delaying their assigned tasks	Leslie Vundu
9	Teamwork	The team members may not cooperate with each other	Robert Smart

10	Document submission	The due dates of the submissions of the required documents are too early making team members busy on the documents	Bilawal Mushtaq
11	Acceptance	The client may not accept the product after it has been completely developed	Man Fu Lei
12	Network infrastructure	Network infrastructure in Murdoch University doesn't support the functions of the product	Abdul Sami
13	Time commitment	The supervisor or coordinator don't have enough time to discuss the project with the team members	Leslie Vundu
14	Feasibility of management	The methods that will be used to manage the project may prove non-feasible during the process of developing the product	Robert Smart
15	Additional cost	Additional costs may be needed during the project	Bilawal Mushtaq
16	Tools	The tools that are used including hardware and software may not be as well as expected	Man Fu Lei
17	Test	The test for the developed software may not be complete enough to cover possible circumstances in the future	Abdul Sami
18	Usefulness	The product may prove useless during the development	Leslie Vundu
19	Overloading	The team members may be overloaded to finish their assigned tasks on time	Robert Smart
20	Communication	There may be not enough communication among the team members to coordinate their respective works	Bilawal Mushtaq

Table 4 - Risk factors

9.3 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 2 - Probability/Impact matrix

9.4 Risk Mitigation Strategies

The mitigation strategies are listed in the following which describe how to mitigate the risks listed in section 9.2:

Number	Name	Mitigation Strategies	Responsible Person
1	User involvement	Hold regular meetings for gathering users' opinion on the project's progress	Man Fu Lei
2	Management support	Report the progress to the supervisor regularly in detail	Abdul Sami
3	Requirement statement	Have regular meeting with team members and explain the specification clearly	Leslie Vundu
4	Project planning	Plan the project as detailed as possible considering all possible situation	Robert Smart
5	Product functions	Involve the client to discuss this situation	Bilawal Mushtaq
6	Milestones	Set the milestones as small as possible	Man Fu Lei
7	Competence	Use the experienced members; train the team members thoroughly	Abdul Sami
8	Sloppiness	Use more diligent members; use Gantt chart to assign tasks	Leslie Vundu
9	Teamwork	Build a good team work environment during the project	Robert Smart

10	Document submission	Prepare the documents as soon as possible	Bilawal Mushtaq
11	Acceptance	Involve the client earlier by reporting the progress of the development to avoid this situation	Man Fu Lei
12	Network infrastructure	Do some research to overcome this obstacle	Abdul Sami
13	Time commitment	Prepare agendas before every meeting	Abdul Sami
14	Feasibility of management	Research the project thoroughly and discuss the best management method before starting it	Robert Smart
15	Additional cost	Find possible free substitution in this situation	Bilawal Mushtaq
16	Tools	Be familiar with the tools before getting started	Man Fu Lei
17	Test	Devise a systematic testing method and invite more members to test the system	Abdul Sami
18	Usefulness	Keep track of the trend of related technologies	Leslie Vundu
19	Overloading	Make a detailed and reasonable schedule before getting started	Robert Smart
20	Communication	Hold regular meeting among the team members	Bilawal Mushtaq

Table 5 - Risk mitigation strategies

10 Cost Management

10.1 Introduction

Cost management is the process of developing a cost plan to make sure the project can stay within the budget. It includes estimating the costs incurred by different elements of the project, determining the budget for the overall project by establishing a cost baseline and controlling the cost during the project. (Schwalbe, 2014, p.274) By identifying the budget of the project, the project manager can gain approval from the management level financially for the project to succeed. Without cost management the cost of the project may be out of control making the company lose a lot of money without finishing the project. Because this is a student project there is no considerable tangible costs so in the following section we will discuss the intangible costs.

10.2 Cost

The cost of this project is all intangible cost because it is not funded by any organization. These costs are categorized into three areas: relationship, human resource and organizational costs. The following is a table for intangible costs in this project:

Relationship Cost	Stimulate team members whenever they became anxious and sluggish;
	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 not available before critical meeting;
Organizational Cost	May require overtime working if assignments sometimes are too much;
	When a member becomes occupied with other tasks, the process is decelerated.

Table 6 – Cost categories

11 Procurement Management

11.1 Introduction

Procurement management is the process of acquiring goods and services from outside of the company. It involves selecting sellers, maintaining relationships with sellers, conducting procurement and closing of the contract. During procurement analysis, the project manager must determine if the needed materials should be made in house or bought from outside. There are different types of contracts which vary according to the level of risks for both buyers and sellers. (Schwalbe, 2014, p.480-488) Good procurement management can save significant money for the organization by selecting appropriate contract. Without procurement management the project manager doesn't know whether it is better to buy the material from outside or produce it by themselves. If it is judged incorrectly the company may lose more money than expected. As this project is not funded by any sponsor there is no procurement in this project. The members in this project will assess available products for developing the software.

12 Conclusions

The purpose of this document is to make sure every team member is clear of all the aspects of the project. This plan examines the project in different knowledge areas of project management including integration, scope, time, quality, communication, human resource, risk, cost and procurement. The project charter describes the three essential elements: scope, time and cost concisely providing a rough view on the process of the project. The author then stated the overall planning of the project. In the scope statement the author clarifies the content and boundary of the project. In the 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 quality management the author specified the metrics that will be used to measure the successfulness of the product. In communication management different methods of communication towards all the stakeholders are identified and the flow of information is specified. 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 respective mitigation strategies. In cost management the author stated the explicit and potential costs of the project and gave a baseline of the cost. The project is thus evaluated in these knowledge areas.

13 Appendices

A. Deliverable Task Breakdown Statement

Appendix A

Deliverable Task Breakdown Statement

Deliverable Name: *Project Management Plan*

Project Team Name	Team Number
<i>IPv6 Readiness (Internet Server IPv6 Readiness Measurement)</i>	<i>IT08</i>

Team Member Names	Deliverable Percentage Completed	Date	Signature
Abdul Sami	20%	27/08/15	<i>[Signature]</i>
Bilawal Mushtaq	25%	27/08/15	<i>[Signature]</i>
Leslie Vundu	20%	27/08/15	<i>[Signature]</i>
Man Fu Lei	30%	27/08/15	MAN FU LEI
Robert Smart	15%	27/08/15	<i>[Signature]</i>

Instructions:

The purpose of this statement is to provide documentary evidence of each team member's contribution to the submitted deliverable.

Please complete the information as specified above. It should list each team member's percentage contribution to the particular deliverable. This statement needs to be signed by all group members to indicate their agreement to percentage breakdown.

The completed statement should be scanned, and copied into each group deliverable as Appendix A.

This statement should at all times be as accurate as possible, being a true reflection of work performed. That is, specify percentages according to actual contribution; do not just divide percentage evenly among team members.

B. Work Breakdown Structure and Schedule

I WBS

1 Initiating

1.1 Acquire the project

1.2 Scope management

1.2.1 Define requirements

1.2.1.1 Study the client document

1.2.1.2 Enquiry the client for requirements

1.2.1.3 Finish the requirement document

1.2.1.4 Client reviews the requirement document

1.2.2 Requirement document approved

1.2.3 Submit the requirement document

1.2.3.1 Sign the Deliverable Task Breakdown Statement

1.2.3.2 Review the requirement document

1.2.3.3 Submit the requirement document

1.2.4 Develop project charter

1.2.5 Define scope

1.2.5.1 Create work breakdown structure

1.2.5.2 Create scope statement

2 Analysis

2.1 Risk management

- 2.1.1 Identify risks
 - 2.1.2 Draw Probability/Impact Matrix
 - 2.1.3 Develop risk mitigation strategies
- 2.2 Human resource management
 - 2.2.1 Develop conflict resolving plan
 - 2.2.2 Identify different roles of team members
 - 2.2.3 Drawing Responsibility Assignment Matrix
- 3 Planning
 - 3.1 Time management
 - 3.1.1 Identify the dependencies among activities
 - 3.1.2 Develop the Gantt chart
 - 3.2 Communication management
 - 3.2.1 Analyze communication requirements of the stakeholders
 - 3.2.2 Determine communication methods and the flow of information
 - 3.3 Quality management
 - 3.3.1 Identify product functions
 - 3.3.2 Define successful criteria for the product
 - 3.4 Cost management
 - 3.4.1 Identify intangible costs in terms of labor hours
 - 3.5 Develop project management plan
 - 3.6 Project management plan finished
 - 3.7 Submit Project management plan

4 Designing

4.1 Preliminary design

4.1.1 Draw Data Flow Diagrams

4.1.2 Draw E-R diagram

4.2 Detailed design

4.2.1 Draw Detailed Data Flow Diagrams

4.2.2 Draw Detailed E-R diagram

4.2.3 Finish design document

4.3 Submit design document

5 Executing

5.1 Develop the software

5.1.1 Create the database containing

5.1.1.1 server details

5.1.1.2 service details

5.1.1.3 probing test details

5.1.1.4 IP address details

5.1.2 Database created

5.1.3 Develop the probing module using

5.1.3.1 ICMPv4

5.1.3.2 ICMPv6

5.1.3.3 HTTP GET request using IPv4 addresses

5.1.3.4 HTTP GET request using IPv6 addresses

- 5.1.3.5 SMTP connection towards IPv4 addresses
- 5.1.3.6 SMTP connection towards IPv6 addresses
- 5.1.3.7 DNS query towards IPv4 addresses
- 5.1.3.8 DNS query towards IPv6 addresses
- 5.1.3.9 implementing connection timeout and error handling
- 5.1.3.10 implementing the function of reading a list of servers
- 5.1.4 Probing module finished
- 5.1.5 Develop the processing and storing module by
 - 5.1.5.1 storing server and measurement data
 - 5.1.5.2 removing measurement errors
- 5.1.6 Processing and storing module finished
- 5.1.7 Develop the searching module by
 - 5.1.7.1 capturing the keywords
 - 5.1.7.2 searching the keywords in database
 - 5.1.7.3 presenting the data in the window
- 5.1.8 Searching module finished
- 5.1.9 Develop the presenting module by
 - 5.1.9.1 presenting the percentages of IPv6 available servers in each continent by
 - 5.1.9.1.1 sending the query to database
 - 5.1.9.1.2 calculating the numbers in the database
 - 5.1.9.1.3 presenting the result in pie chart
 - 5.1.9.2 presenting the percentages of IPv6 available servers in each country by

5.1.9.2.1 sending the query to database

5.1.9.2.2 calculating the numbers in the database

5.1.9.2.3 presenting the result in pie chart

5.1.9.3 presenting the percentages of IPv6 available servers for different server types by

5.1.9.3.1 sending the query to database

5.1.9.3.2 calculating the numbers in the database

5.1.9.3.3 presenting the result in column chart

5.1.9.4 presenting the performance of individual server when probed using IPv4 or IPv6 by

5.1.9.4.1 sending the query to database

5.1.9.4.2 calculating the numbers in the database

5.1.9.4.3 presenting the result in multi-series column chart

5.1.10 Presenting module finished

5.1.11 Develop the diagnosis module by

5.1.11.1 developing import & export database module

5.1.11.2 developing tables export module

5.1.11.3 developing charts export module

5.1.12 Diagnosis module finished

5.2 Test the software by testing

5.2.1 probing functions

5.2.2 data processing

5.2.3 data storage

5.2.4 searching functions

5.2.5 data presenting function

5.2.6 additional function

5.3 Software testing completed

5.4 Probe Internet servers

5.4.1 Get a list of IPv6 available servers

5.4.2 Probe these servers at regular time interval

5.4.3 Probing finished

5.5 Test the database and presentation function

5.5.1 Initial testing

5.5.2 Secondary testing

5.5.3 Testing by client

5.6 Full test completed

6 Controlling

6.1 Validate scope

6.1.1 Make sure the product is within the scope

6.2 Review project plan

6.2.1 Ensure the schedule is maintained

6.3 Status Report

6.3.1 Regular report about the progress

6.4 Report performance

6.4.1 Regular report about the performance

6.5 Control changes

6.5.1 Control changes 1

6.5.1.1 Identify possible changes

6.5.1.2 Determine if change is necessary

6.5.1.3 Approve the change

6.5.1.4 Apply change in the product and the documents

6.5.2 Control changes 2

6.5.2.1 Identify possible changes

6.5.2.2 Determine if change is necessary

6.5.2.3 Approve the change

6.5.2.4 Apply change in the product and the documents

6.5.3 Control changes 3

6.5.3.1 Identify possible changes

6.5.3.2 Determine if change is necessary

6.5.3.3 Approve the change

6.5.3.4 Apply change in the product and the documents

6.5.4 Control changes 4

6.5.4.1 Identify possible changes

6.5.4.2 Determine if change is necessary

6.5.4.3 Approve the change

6.5.4.4 Apply change in the product and the documents

6.5.5 Control changes 5

6.5.5.1 Identify possible changes

6.5.5.2 Determine if change is necessary

6.5.5.3 Approve the change

6.5.5.4 Apply change in the product and the documents

6.5.6 Control changes 6

6.5.6.1 Identify possible changes

6.5.6.2 Determine if change is necessary

6.5.6.3 Approve the change

6.5.6.4 Apply change in the product and the documents

6.5.7 Control changes 7

6.5.7.1 Identify possible changes

6.5.7.2 Determine if change is necessary

6.5.7.3 Approve the change

6.5.7.4 Apply change in the product and the documents

7 Closing

7.1 Prepare for program submission

7.2 Submit the software

7.3 Prepare final project report

7.3.1 Finalize the project report

7.3.2 Submit the final report

7.4 Present final project

7.4.1 Prepare the slides for presentation

7.4.2 Prepare the scripts for presentation

7.4.3 Prepare the software for presentation

7.4.4 Present the project

7.5 Project completed

II Gantt chart

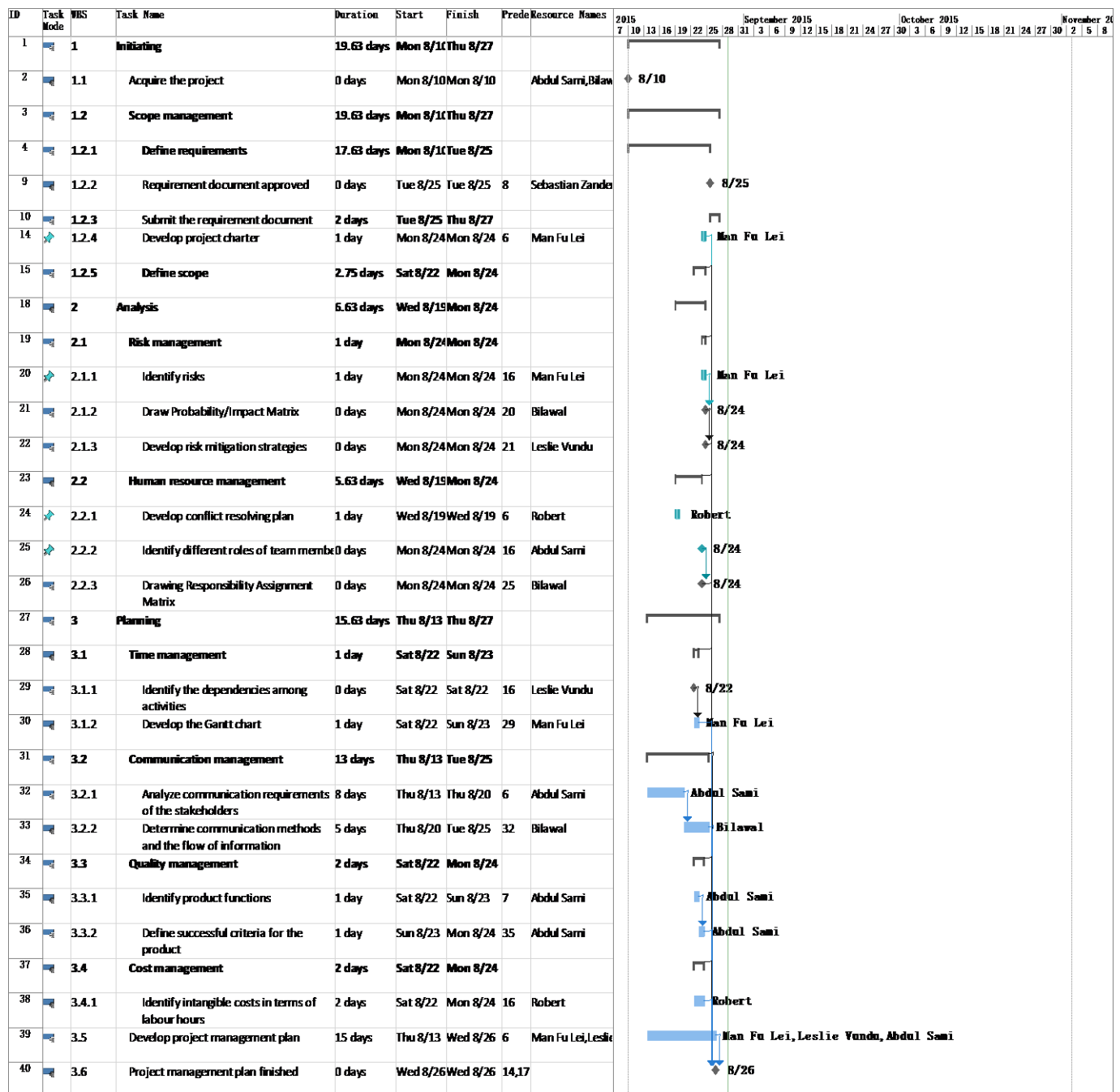


Figure 3 - Gantt chart (1-40)

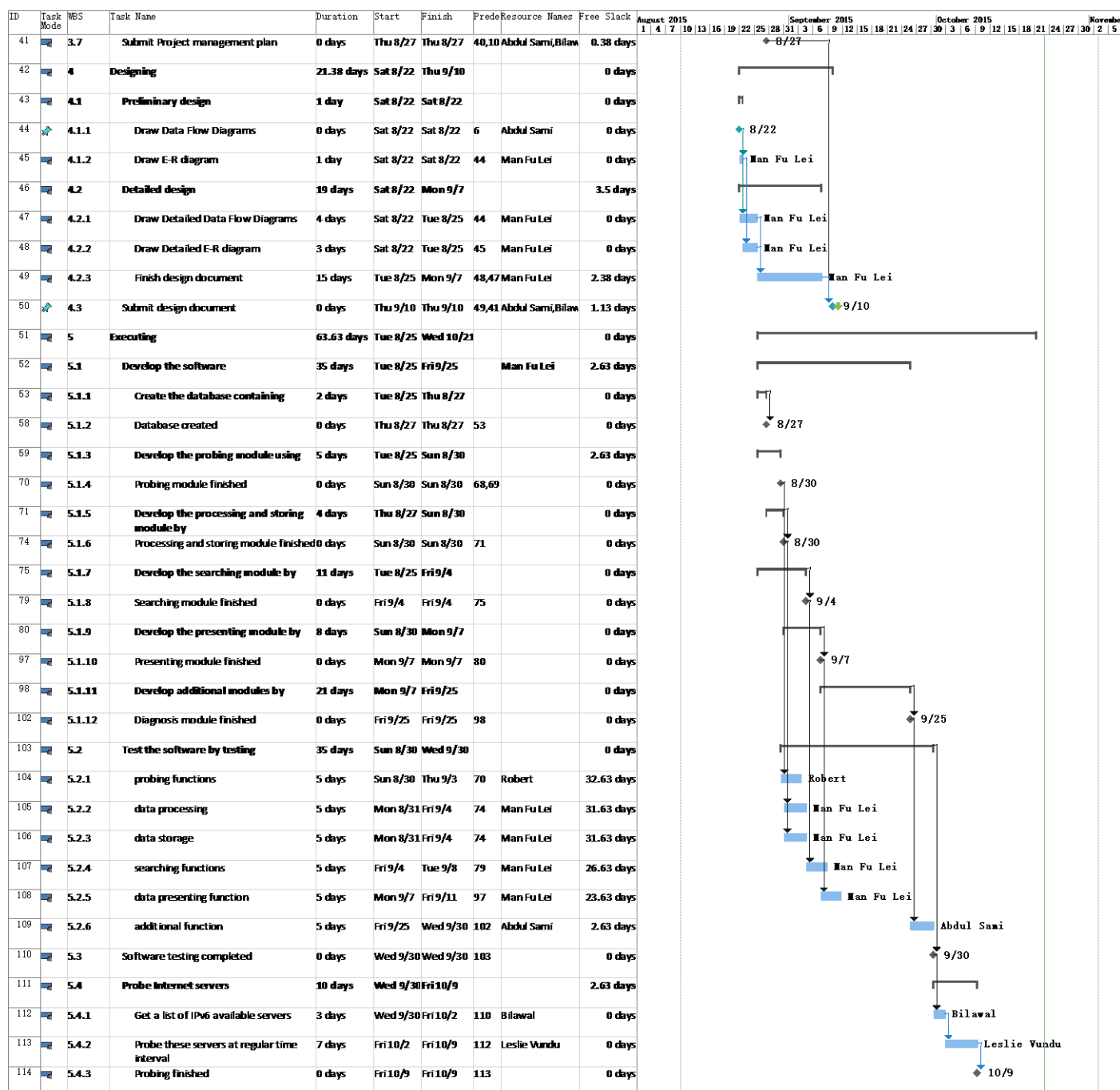


Figure 4 - Gantt chart (41-114)

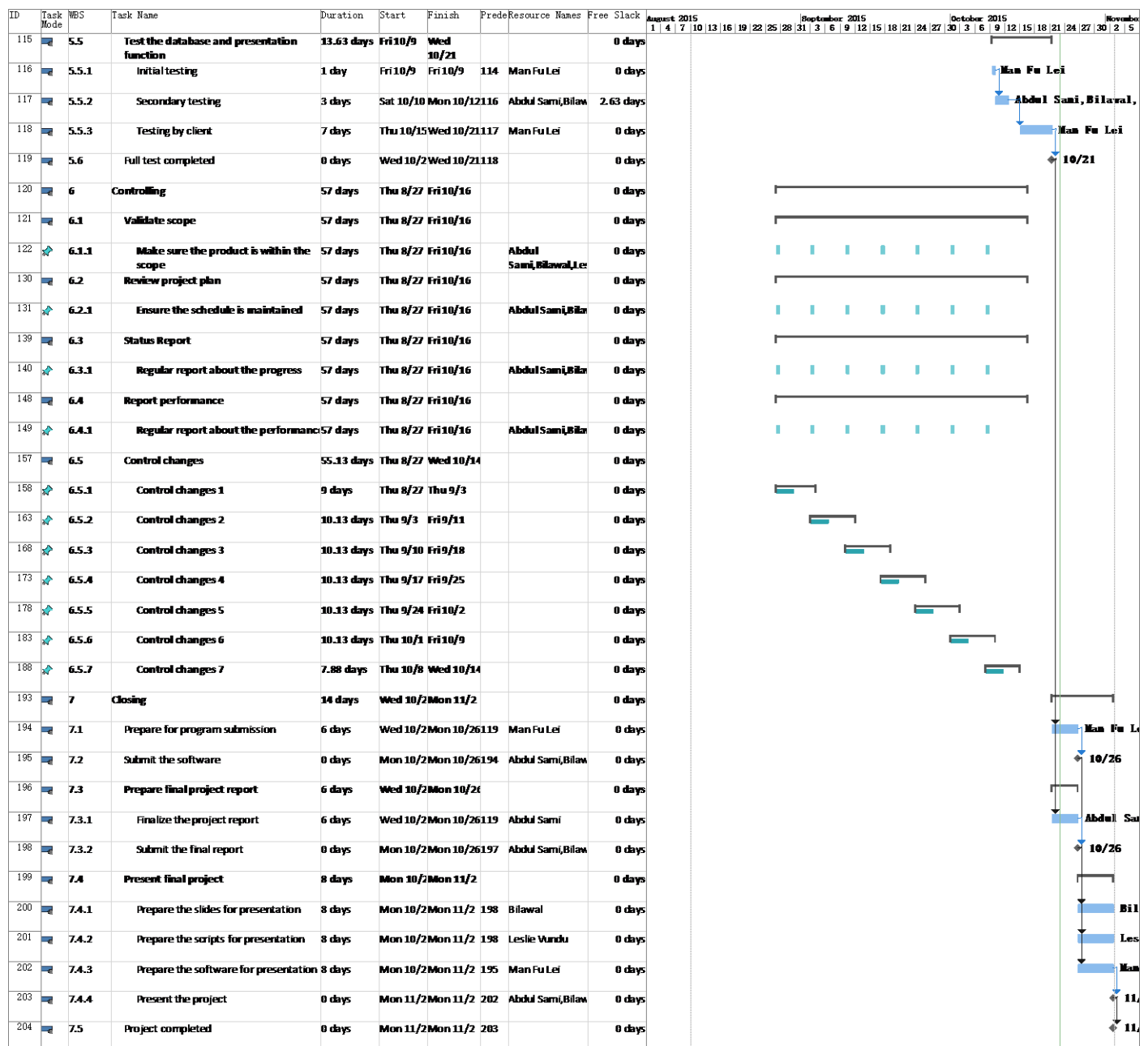


Figure 5 - Gantt chart (115-204)

C. Project/Team charter

Project Title	IPv6 Measurement Software Development		
Start Date	Aug 10, 2015	Finish Date	November 3, 2015
Project Manager	Abdul Sami	Email	abdulsami_91@hotmail.co.uk

Key Schedule Milestones:

- Requirement document approved by August 25
- Project management plan finished by August 26
- Database created by August 27
- Probing module finished by August 30
- Processing and storing module finished by August 30
- Design document finished by September 1
- Searching module developed by September 4
- Presenting module completed by September 7
- Diagnosis module finished by September 10
- Software testing completed by September 15
- Server probing finished by September 23
- Full test of the software completed by October 2
- Software submitted by October 22
- Final report submitted by October 22
- Project is presented on November 3

Budget Information: The organization didn't allocate any money for this project. All costs including the printing materials are subject to the team members. Only intangible costs in terms of labor hours are involved in this project.

Project Objectives: Develop a prototype software that can probe the Internet servers with various kinds of methods using both IPv4 addresses and IPv6 addresses in order to present the users the level of IPv6 readiness in today's world. It will also provide the function of searching server's information in the database using keywords from the users and the function of diagnosis when a server can't be reached using IPv6 address. The representation of the data should be in forms of charts that are nice and easy to be understood. The user interface should provide buttons to control the kind of outputs.

Main Project Success Criteria: The project can be finished before the end of this semester, the functions of the product are tested as expected and the presentation presents sufficient information that the client needs to know.

Approach:

- Develop a snippet of code that represent the key functions of the software before commencing the project officially to research the skills in developing the software;
- Frequently research related topic on the Internet to find out the best methods to realize the required functions;
- Assign adequate tasks matching the skills of the team members to them in order to avoid overloading specific persons;
- Coordinating tasks finished by different team members in order to make sure the product is developed consistently;
- Hold regular meetings with the team members and the supervisors to report the progress of the project and the performances of the team members.
- Design all kinds of methods to test the new product after it is finished.

ROLES AND RESPONSIBILITIES

Name	Role	Position	Contact Information
Dr.Dr.Sebastian Zander	Client & Supervisor	Lecturer	s.zander@murdoch.edu.au
Abdul Sami	Project Manager	Student	abdulsami_91@hotmail.co.uk
Man Fu Lei	Programmer	Student	george10282006@hotmail.com
Leslie Vundu	Secretary	Student	leslievundu@gmail.com
Robert	Designer	Student	bobwinbw@yahoo.fr
Bilawal	Designer	Student	bilawalmushtaq@gmail.com

Sign-off: *Dr.Dr.Sebastian Zander, Man Fu Lei, Abdul Sami, Leslie Vundu, Robert Smart,*

Bilawal Mushtaq

Comments: *"All team members should get on to their assigned tasks." ----- Man Fu Lei*

Table 7 - Project charter (Schwalbe, 2014, p. 98)

D. Agenda and minutes of all meetings**IT08, IPv6 Readiness Group****Agenda****Meeting date:** 13th August 2015 (Week 3)**Chairperson:** Sebastian**Apologies:**

n/a

Meeting purpose

- extract the requirements from Sebastian as client
- get to know each other and talk about the plan to tackle the project with Sebastian as supervisor

Item No.	Description of Item	Introduced by	Approx. time for item
1.	Introducing each other	Sebastian	5 min
2.	Q&A: What kind of information should we gather from the servers?		5 min
	What would be the minimum expectation of what you need this project to achieve, what's unacceptable for you		done
3.	Q&A: How do you define a server which is IPv6 readiness?		5 min
4.	Q&A: Can you explain what is "measuring baseline performance with IPv4"?		5 min

5.	Q&A: Do you mean server type is OS type?		2 min
6.	Q&A: Do you mean performance is network latency?		2 min
7.	Other questions	Team members	10 min
8	What method of access do you require for the database?		
9	What must the sample provide, the majority of servers in a country that has IPV4, in contrast to IPV6? The performance difference between the two. Or would a percentage of servers be sufficient.		
.	Write down key points of the requirements		15 min
.			
.			

IT08, IPv6 Readiness Group

Agenda

Meeting date: 20th August 2015 (Week 4)

Chairperson: Sebastian

Apologies:

1. Robert Smart

Meeting purpose

- Extract further requirements from client
- Discuss problems faced by group as team
- Discuss problems faced by team during implementation of Tunnel broker
- Further discussion on topic

Item No.	Description of Item	Introduced by	Approx. time for item
1.	Discuss what has been done and the progress so far.	Team	5 to 10 min
2.	Further requirements for Project	Team	10 min
3.	Better understanding towards implementation of R&A document	Abdul Sami	5 min
4.	Discussion on Functions used in C# programming used to develop a potential software.	Man Fu Lei	10 min
5.	Suggestions on distribution of work	Team	5 min
7.	Project needs - further needs to be implemented	Team	5 min
8.	Testing the prototype (code and program)	Team	5 min

IT08, IPv6 Readiness Group

Agenda

Meeting date: 25th August 2015 (Week 5)

Chairperson: Sebastian

Apologies:

1. n/a

2. n/a

Meeting purpose

- Discuss team progress
- Discuss R&A Document (Preliminary version)
- Discuss Project Management plan completion process
- Discuss about the operation of Software Prototype

Item No.	Description of Item	Introduced by	Approx. time for item
1.	Discuss the progress of Team members regarding the project workload	Abdul Sami	5min
2.	Discuss R&A document (Preliminary version) for approval of up to standard for client.	Team Members	10 - 15min
3.	Discuss Project Management plan progress and further clarifications if any.	Team Members	10min
4.	Discuss the operation of the software and if any suggestions on better tweaking of software.	Man Fu Lei	5min
5.	Discuss next deliverables and meeting schedules	Abdul	5min
6.	Further issues with team to be discussed with Supervisor, if any	Team Members	10min
7.	Close of meeting		

Minutes

MINUTES OF MEETING		
<u>Meeting Title:</u> Meeting Week 4		
Date: 20th August 2015	Time: 1pm	Location: SC 1.029
Meeting called by	Team Members	
Type of meeting	Discussion	
Facilitator	n/a	
Note taker	Abdul	
Timekeeper	Abdul	
Attendees	Man Fu Lei, Abdul Sami, Bilawal Mushtaq, Leslie Vundu	
Apologies	Robert Smart	
<u>1. Agenda Topic</u> Discussion on tunnelling		Time: 1:05pm - 1:20pm
Discussion: <p>As discussed with client the tunnelling process and it being an old version that we were using.</p>		
Action to be completed: <p>Try to come up with a solution to fix issue, contact tunnel broker, confirm the presence of relay</p> <p>Action to be completed by: Man Fu</p>		
<u>2. Agenda Topic</u> Discussion of Turedo Tunnelling		Time: 1:21pm 1:50pm
Discussion: <p>This topic was based on how it was a version of Microsoft and now outdated or not being in use. Making it difficult to fulfil the requirements and testing on campus</p>		

Action to be completed: Change required, introduce native or fixed tunnelling Action to be completed by: Man Fu	
3. <u>Agenda Topic</u> Discussion on designating roles	Time: 1: 50 - 2:06
Discussion: Designation of roles to each individual from the two Documents (Requirements and Analysis Document, And Project Management Plan).	
Action to be completed: Attached document with email specifies the items to be done. Each Team Member to complete the task assigned on or before the due date of 25th August 2015 Action to be completed by: Team Members (Individually)	
Conclusions: - To this meeting it was concluded the project needed more effort and the software prototype was functioning better . - Roles were assigned thus the hassle of distribution of roles has been rectified. - Better understanding of the tunnelling process.	

MINUTES OF MEETING		
<u>Meeting Title:</u> <i>Discussion on progress and Feedback</i>		
Date: 25/08/2015	Time: 12PM	Location: SC 1.029
Meeting called by	Team Members	
Type of meeting	Discussion on progress	
Facilitator	Group and Supervisor	
Note taker	Abdul Sami	
Timekeeper	Abdul Sami	
Attendees	Abdul Sami, Bilawal Mushtaq, Leslie Vundu, Robert Smart, Man Fu Lei	
Apologies	n/a	
Previous Minutes: n/a		
Moved: n/a		
Seconded: n/a		
<u>1. Agenda Topic</u> <i>Progress on R&A and Project Management Plan Documents</i>	Time: 12:03 - 12: 12	
<p>Discussion: <i>Discuss the progress of Team members regarding the project workload</i></p> <ul style="list-style-type: none">• Workout the input of team so far (Progress)• Workload been appropriately divided.• Discussion on what ever		
<u>2. Agenda Topic</u> <i>Approval of R&A document</i>	Time: 12: 18 - 1:19	

Discussion: *Discuss R&A document (Preliminary version) for approval of up to standard for client.*

- Confusion discussed between Sebastian and group members
 - Make changes to R&A document where it says it runs on one platform at one place in the document and other places it says it can run on all platforms (points 3 to 5)
 - IPv6 testing, Measurements need to be using tunnel broker and not IPv6 to IPv4 . User alternative (Hurricane Electric - works with NAT or public IP Address straight away and set up multiple tunnels. Choose regular tunnel). IPv6 to IPv4 not reliable.
- Problem with IPv6 to IPv4, relay being close will extract IPv6 to IPv4 and send the request the server will respond but not go to same relay (Not asymmetric) works on routing . There is no route to relay. Not sure about Relay being on the path or not. Relay position is unsure, close or far to the server.
- Find a Tunnel Broker. And discuss in document the problems arising.
 - For initial testing anything works. But for measurement Tunnel broker.
 - Amendments need to be done to the document mentioned below;
 - Comment as Client: Description of GUI. Change a few details
 - Comment as Client: Display of results. Not too clear Descriptions of graphical representation. Question raised about Pie Chart? Clarify what the Pie chart shows.
 - Comment as client: Executive summary, the aspect of the summary is not there or underdeveloped. Overview of document.
 - Comment as client: Section 1.4. Section 2 reference document brief explanations. Software products need to be used to run the software.
 - Comment as client: Database server. Explanation on if client needs to use the apache server or is all setup.
 - Comment as client: Section 2 needs to be in future tense. The content is available in the next session (need to be mentioned if outcome is described later)
 - Comment as client: Solution outline in requirements document Part 3. Unexpected errors “needs to be removed.
 - Comment as client : 3.3 unsure
 - Comment as client: Portable software correction needed. clarification
 - Comment as client : Risks need to be changed as per client needs.(Remove programmer)
 - Comment as client: Database section ER Model not showing any results and what is stored. Database section needs updating. Diagram 6.4 not too consistent. The outcome is missing in 6.4
 - Comment as client: 4.3 SQL statements ... need correction clarification required to client.
 - Comment as client: Performance section - mention for one machine at least. How long does probing take. Probing Should be feasible
 - Comment as client: Performance section - how long does it take to probe single

<p>server (Measure how long). Clarify if it includes per server services (on server and many services)</p> <ul style="list-style-type: none"> • Comment as client: Data Flow Diagram Figure 4 Section 6.3 or 6.2 Text book diagram. • Comment as client: network topology figure 6. Needs modification. • Discussion on relay within tunnel broker 	
3. <u>Agenda Topic</u> <i>Project Management Plan</i>	Time: 1:20 - 1:21
<p>Discussion: <i>Discuss Project Management plan progress and further clarifications if any.</i></p> <p>Send a copy to Sebastian for approval.</p>	
4. <u>Agenda Topic</u> <i>Operation of Software</i>	Time: 1:21
<p>Discussion: <i>Discuss the operation of the software and if any suggestions on better tweaking of software.</i></p> <p>Tunnel broker needs to be implemented</p>	
5. <u>Agenda Topic</u> <i>Deliverables for next meeting</i>	Time: 1:21
<p>Discussion: <i>Discuss next deliverables and meeting schedules</i></p> <ul style="list-style-type: none"> - Meeting Next week Thursday 1pm. - Get team to improve their work distribution 	
6. <u>Agenda Topic</u> <i>Team Discussion with supervisor</i>	Time: 1:22

Discussion: *Further issues with team to be discussed with Supervisor, if any*

None

14 List of References

IPv6. (n. d.). In *Wikipedia*. Retrieved August 19, 2015 from <https://en.wikipedia.org/wiki/IPv6>

Schwalbe, K. (2014). *Information technology project management*. Boston, MA: Course Technology, Cengage Learning.

15 Glossary

Database: is a collection of data that is organized so that its contents can easily be accessed, managed, and updated

Deliverables: is a term used in project management to describe a tangible or intangible object produced as a result of the project that is intended to be delivered to a customer (either internal or external)

Domain Name Service (DNS): is a hierarchical distributed naming system for computers, services, or any resource connected to the Internet or a private network

Gantt chart: is a type of bar chart, adapted by Karol Adamiecki in 1896, and independently by Henry Gantt in the 1910s, that illustrates a project schedule

HTTP GET request: Requests data from a specified resource

Hyper Text Transfer Protocol (HTTP): is an application protocol for distributed, collaborative, hypermedia information systems

Internet Control Message Protocol (ICMP): is an error-reporting protocol network devices like routers use to generate error messages

Internet Engineering Task Force (IETF): develops and promotes voluntary Internet standards, in particular the standards that comprise the Internet protocol suite

IPv4: is the fourth version in the development of the Internet Protocol (IP)

IPv6: was developed by the Internet Engineering Task Force (IETF) to deal with the long-anticipated problem of IPv4 address exhaustion

Stakeholders: is a person, group or organization that has interest or concern in an organization

Transport Control Protocol (TCP): is a standard that defines how to establish and maintain a network conversation via which application programs can exchange data

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