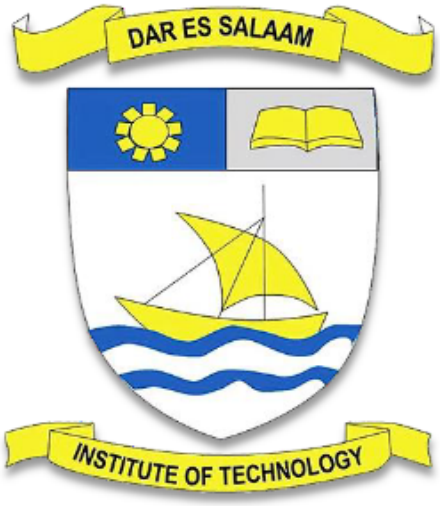
DAR ES SALAAM INSTITUTE OF TECHNOLOGY



DEPARTMENT OF COMPUTER STUDIES

BACHELOR OF ENGINEERING IN COMPUTER ENGINEERING

NTA LEVEL 8

ACADEMIC YEAR - 2022/2023

SENIOR PROJECT I

PROJECT TITLE	:	**DESIGN AND IMPLEMENTATION OF IP TELEPHONY AND WEB PORTAL CONFIGURATION**
PROJECT TYPE	:	**PROBLEM SOLVING**
CASE STUDY	:	**DAR-ES-SALAAM INSTITUTE OF TECHNOLOGY**
CANDIDATE NAME	:	**SIAKA THOMAS SHIRIMA**
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SUPERVISOR	:	**MR. NOEL MAGANGA**

February, 2023. Change the month february to March 2023

DECLARATION

I, SIAKA THOMAS SHIRIMA, declare that this project report is a work done by me under the supervision of MR. NOEL MAGANGA leading to its current stage. I further declare that this work has not been used or published anywhere, in any institute before for similar awards.

CANDIDATE NAME	**SIGNATURE**	**DATE**
SIAKA .T. SHIRIMA	……	.....
SUPERVISOR NAME	**SIGNATURE**	**DATE**
MR. NOEL MAGANGA	……	……

ABSTRACT

Many companies tend to use a lot of expenses to pay for telephone services plus maintaining the infrastructures that come with it. The expenses include the monthly bills and payments for obtaining extra call services from the providers. The current technology used is old and an analog way which hasn't evolved in years. Apart from the expenses, Traditional phone services are also not reliable and cannot offer extra services in today's digital world of communication. These all bring about loss of funds that are allocated into a technique that can be solved at a lower cost.

In the wake of solving the highlighted challenges above, this project aims at introducing the idea of Voice over IP for Telephone services in networked companies. A web portal will also be present, hosted by a web server, which will contain each employee's phone extension or address to be used for calls. Addresses will help any employee to make a call and simplify the process of obtaining them since it is not practical to remember each address before making a call.

Therefore, Voice over IP introduces a more modern way of communicating with fewer cables since it acts like a soft phone. A local server will be installed in the network that will have the capability of routing calls from one host to another in a more efficient and less cost manner. This means that a single network infrastructure will have the capabilities of handling both network and telephone functions rather than using two different infrastructures for performing two different functions those being a network and telephone infrastructure.

This approach will help companies save a lot of costs that could be allocated in performing other functions and raise their profits. Also calls in a digital manner simplifies its manipulation where employees will be able to save calls, send calls through emails, record calls and bring easy management to the network administrators over the operations. Others services like call forwarding are also free in this service.

During the project, a lot of new ideas have been acquired from my supervisor, lecturers and advice from friends. Apart from the new ideas achieved, there are also some challenges the emerged since no journey can be perfect. Time has been the big challenge together with financial obstacles.

ACKNOWLEDGEMENT

First and foremost, I would carefully like to take this valuable opportunity to thank Almighty God, the creator of this world and all within it, for the gift of life, strength and wisdom during the whole time of working of this project. Then, special gratitude to the Government for providing us with the opportunities to undertake engineering courses in its institutes and giving us comfortable environment for learning.

Again, I won't forget the Computer Department starting with its Head of Department, staffs, lecturers and technicians, together with all students in the department for the support throughout the time that I have been in the institute. I have learned a lot from the lecturers that have helped me in accomplishing the project. Their contributions have facilitated much in the step that I have reached.

My sincere acknowledges also goes to my Institute Project supervisor, Mr. Noel Maganga, who has helped me largely in accomplishing this work. I appreciate his ideas, challenges and the time he has spent in helping me reach this level.

I, also express my special thanks again to my project coordinator, Madam Happiness Munissi for spending her time in guiding and helped me in knowing all the principles concerning with project as well as exposing the weaknesses of my project so as to make this project successful.

Last but not least, I am deeply grateful to my beloved parents, siblings, relatives, and friends for their endless and unconditional love, prayers and support in my study duration so far. They have been encouraging me and challenging me with different thoughts. I will always remember them.

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LIST OF SYMBOLS

System 

Process 

Flow of Information 

LIST OF ABBREVIATION

ABBREVIATION	LONG TERMS
CLI	Command Line Interface
IP	Internet Protocol
IPv4/v6	Internet Protocol version 4/6
LAN	Local Area Network
MSC	Mobile Switching Center
OSI	Open Systems Interconnection
POTS	Plain Old Traditional System
PSTN	Public Switched Telephone Network
RAD	Rapid Application Development
RJ	Registered Jack
UC2	Unified Communications and Collaboration
UCC	Unified Communications and Collaboration
UTP	Unshielded Twisted Pair
VOIP	Voice Over IP
WebRTC	Web Real-Time Communication

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CHAPTER 1

1.0 INTRODUCTION

A lot of companies use the traditional telephone system for intercommunication between employees positioned at different places in the organization's scope. The companies experience the spending of cost in paying for monthly bills to enable the service and also utilization of a lot of resources in maintaining the telephone infrastructure. The main goal of communication between employees is to facilitate sharing of information between them in a more reliable and convenient manner possible. Many of the companies have a network infrastructure together with a telephone infrastructure which means both infrastructures are to be maintained and stay in operation. This brings about high-cost utilization since only one infrastructure which is the network one, could help in providing both the services efficiently and in a more digital manner. Lack of enough knowledge in more modern technologies causes most of the above stated inconveniences.

1.1 BACKGROUND INFORMATION

The Public Switched Telephone Network (PSTN) is the previous approach that is used mainly in different organizations. It is also referred as the Plain Old Traditional System (POTS). It is the aggregate of circuit-switched telephone networks that are operated by local telephone operators providing infrastructure and service for public telecommunication. It uses the exchange principle that was earlier employed in telegraph networks where each telephone is wired to a telephone exchange for a particular area and incase for communication outside the area, trunks were installed between the exchanges. PSTN has also been known to stand for Pretty Standard Telephone Network, a tongue-in-check expression referring to its low speed of communication. This technology is vastly diminishing and therefore calling for a change of technology to handle telephone and call services in commercial and governmental institutions.

1.2 PROBLEM STATEMENT

In Commercial and Governmental Institutions, organizations pay monthly bills to telephone companies for the provision of telephone services which can be achieved by a lower cost and most reliable way using network approach. The funds recovered may therefore be utilized in

other aspects such as paying wages or enhancing the existing infrastructure for providing better service and hence increase the company's output in terms of profit.

The costs discussed above are largely due to setup costs which covers the initial implementation of the infrastructure and also maintenance cost. Other costs include call costs where the company is required to pay monthly bills to telephone companies for enabling the call function per month. Calls in this technology are charged on the basis of distance. This implies that calls on a far distance or international calls are very far expensive to make and that makes it a disadvantage.

Apart from costs incurred in this technology, it also lacks important call features which can only be obtained by increase in cost. Such features include call waiting, call forwarding, blacklisting, call conferencing, blocking and caller id with few to mention. Also upgrading costs in this technology are very high since you need new dedicated lines and have to add new hardware which makes upgrading a pain.

When the network infrastructure alone is used to handle telephone and network functions, a lot of above-described costs will be reduced and can be allocated in other areas of the company's implementations.

1.3 OBJECTIVES

This project has the following objectives;

1.3.1 MAIN OBJECTIVE

The main objective of this project is to design and implement IP Telephony and web portal configuration.

1.3.2 SPECIFIC OBJECTIVES

The following are the specific objectives that the project will cover in my project.

i. To design and configure a local area network for the company.
ii. To configure IP telephony enabling server.
iii. To create a web portal for the staffs in their respective departments.
iv. To configure a Linux server (CLI) to host the web portal.
v. To configure access control lists in the network.
vi. To configure network protocols in the network.

vii. To setup network monitoring systems and tools.

1.4 SIGNIFICANCE OF THE PROJECT

The project has the following benefits/ importance to the company once completed.

i. The company will be able to save telephone issued costs and allocate them in other needy elements of the organization.
ii. The company may keep track of the utilized number of calls and limit the calls to be within the organization.
iii. IP Telephony is much reliable since it is digital and evolving and cannot be affected by external factors such as weather.
iv. This form of networked telephone is easier to troubleshoot and easier to handle.
v. A single network infrastructure can be used to handle both network and telephone functions rather than having two different infrastructures.
vi. The company will be able to obtain some call features for free without extra costs charged.

1.5 SCOPE AND LIMITATION OF THE PROJECT

The project will only do the prototype part of how the project works. Furthermore, the web portal will only contain some of the phone addresses for demonstration.

CHAPTER 2

2.0 LITERATURE REVIEW

A literature review is an evaluative report of information found in the literature related to your selected area of study. The review should describe, summarize, evaluate and clarify this literature. It should give a theoretical base for the research and help you, the author, determine the nature of your research [1]. The review comprises of the study on the existing system together with its disadvantages and also a study on the proposed system together with its advantages as well.

The purposes of the literature review are as follows;

i. Gives an elaboration on the existing system.
ii. It tells what the current system is missing and what the proposed system intends to fill
iii. Gives an elaboration of the proposed system.
iv. Gives block diagrams for better understanding of the systems.

2.1 RELATED WORKS

In recent years, there has been a growing interest in the integration of IP telephony and web portals. This integration allows for the seamless integration of voice and web-based communication, as well as the ability to access a wide range of information and services through a single portal.

One example of a project that has integrated IP telephony and a web portal is the "Unified Communications and Collaboration (UC2) Platform" developed by Cisco Systems (Cisco, 2011). This platform integrates various forms of communication, including IP telephony, instant messaging, video conferencing, and email, into a single web-based portal [2]. The UC2 platform also includes a range of collaboration tools, such as document sharing and collaboration, and the ability to schedule and join virtual meetings.

Another example is the "Unified Communications and Collaboration (UCC) Platform" developed by Microsoft (Microsoft, 2020). This platform also integrates various forms of communication and collaboration into a single web-based portal. The UCC platform includes

features such as instant messaging, voice and video calls, and the ability to schedule and join virtual meetings [3]. Additionally, it also includes an integrated calendar and email client, as well as the ability to share documents and collaborate on them in real-time.

A more recent example is the "WebRTC-based IP Telephony and Web Portal" developed by (Kopano, 2018) which is an open-source alternative to commercial solutions, this platform also includes features such as instant messaging, voice and video calls, and the ability to schedule and join virtual meetings [4]. Additionally, it also includes an integrated calendar and email client, as well as the ability to share documents and collaborate on them in real-time.

In addition to these examples, there are many other projects and commercial solutions that have integrated IP telephony and web portals. These solutions are designed to provide users with a range of communication and collaboration tools, as well as access to information and services, through a single, easy-to-use portal.

2.2 THE EXISTING SYSTEM

The system used at Dar es Salaam Institute of Technology is communicating through the mobile network provided by the telephone network provider. It uses mobile phone to facilitate communication between individuals. This system is widely used and generally accepted as the standard form of communication, For the voice call.

The Voice calling works via two-way devices, where the devices used are cell phones. Cell phones work by connecting to a cellular network, which people pay a subscription fee to join. The cellular network that is made up of cells that are served by transceivers called base stations. These bases are connected to the Mobile Switching Center (MSC), Allowing the calls to and from your wireless phone to be sent to any phone.

But Landlines work via circuit switching through the Public Switched Telephone Network. In order to connect one phone to another, the phone call is moved from several switches at different levels, a process known as routing. A Private Branch Exchange uses extensions from phone numbers to route the calls in the organization.

When a number is dialed from the cell phone, the cell phone set converts the sound waves into electrical signals. These signals are the transmitted to a terminal via radio frequencies. The terminal collects the electrical signals and transmits them to a base station where the calls are

routed. The calls are either routed to a mobile switching center which is responsible for routing the call to the correct destination.

When the call reaches the right person, the signals are converted back to electrical signals and then routed to a terminal. The terminal routes the call to an appropriate cell phone number and upon receiving the call, the cell phone set converts the electrical signals back to sound waves. This process is facilitated by the use of a network of switching centers.

Figure 2.1 below explains how the existing system routes the calls from the one user to another. Within a company or institute, each employee might have its own Mobile. Call sent from the caller's phone calls are routed through something called a mobile network whereby is the network of cell towers that allows the mobile phone to connect to the base station and by the help of the MSC that connects all the phone systems in the world together, the call is received.

Below is figure 2.1 illustrating more on the above-described existing system.

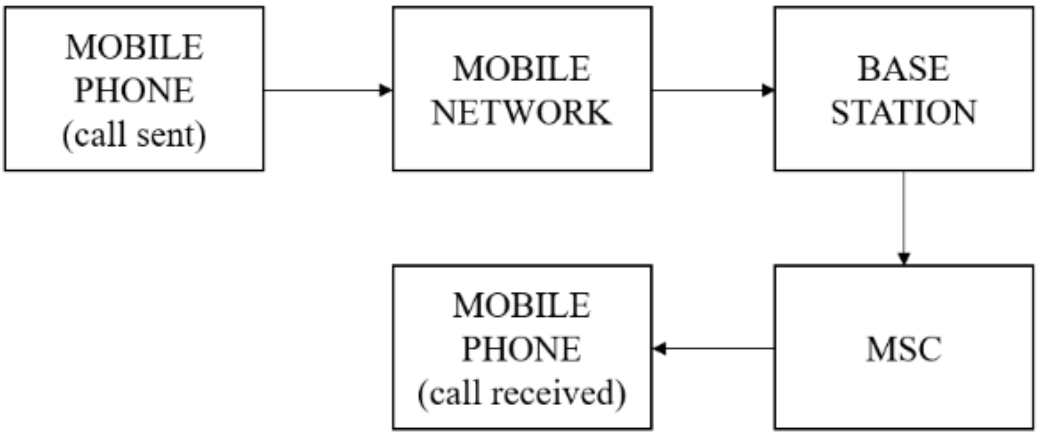

Figure 2-1 Existing system

2.2.1 DISADVANTAGES OF EXISTING SYSTEM

The current system faces many challenges that have to be corrected and mentioned below are examples of the limitations that the present system faces.

i. Charges for making calls. There are charges in making calls hence the users face charges and sometimes cannot make call when he/she does not have credits.
ii. No calls monitoring and control. The institute cannot keep track of the utilized number of calls and limit the calls to be within the organization.
iii. Dropped calls. Due to various reasons like poor signal strength, interference, and network congestion, calls may be dropped or disconnected.
iv. Security concerns. Mobile phones are vulnerable to hacking and other security threats. The sensitive information stored on them such as personal and financial details can be compromised.
v. Interference. Mobile phones operate on radio frequencies, which can be subject to interference from other devices or electronic systems. This can cause problems with call quality and connectivity.

2.3 PROPOSED SYSTEM

The proposed system comes with the idea of using the network infrastructure to handle both the network and telephone services. VoIP stands for "Voice over Internet Protocol," and is often pronounced VoIP. VoIP is basically a telephone connection over the Network. The data is sent digitally using the Internet Protocol instead of analog telephone lines. This allows people to talk to one another when they are connected to the same network without having to pay phone charges.

The proposed system also has the idea of incorporating a web portal in the LAN. A web portal is special designed web page that brings information together from different sources and creates a single point of access to the information [5].

A web portal can also be termed as a web site that brings information together from diverse sources in a uniform way. Usually, each information gets it dedicated area on the page for displaying information (a port let); often, the user can configure which ones to display [6].

A web portal also known as a links page, presents information from diverse sources in a unified way [7]. The portal will serve the function of helping employees during the time of making calls by providing them the ease of remembering call extensions since it is not practical for humans to remember all extensions especially in large organizations.

In VOIP the signals are converted into digital signals and it is then transferred through the network to reach the destination. VOIP uses the network and therefore has no additional cables involved. There is also no need of any exchange when making VOIP to VOIP calls. The voice signals are converted into packets of data and the packets travels through the VoIP server to the destination. The server uses its cloud-based PBX to route the packets. Once the data reaches its destination, it reassembles and converts back into voice signals.

VOIP used packet switching which is more efficient than circuit switching because the data is sent and received as and when needed. A constant connection isn't maintained throughout the call duration. Each data packet travels through the least congested and shortest path to reach its destination. Since Packet switching is efficient and cost-effective, VOIP should be widely used in companies.

It is noted that businesses are saving up to 75% after switching to VOIP and they get to enjoy several additional benefits such as increase in productivity, growth, improved employee communication, improve in employee engagement, better control, superior customer services and many other more with few to mention.

Once a call is made in this system, it will first be encoded into digital format and packetized in order to be transmitted in the network through the VOIP server. The server determines the destination of the call and routes it to the receiver. The receiver decodes the packet and the data is heard on the other end. Figure 2.2 below explains diagrammatically the details of how the proposed system works with blocks of each step that the call passes through from the transmitter to the receiver.

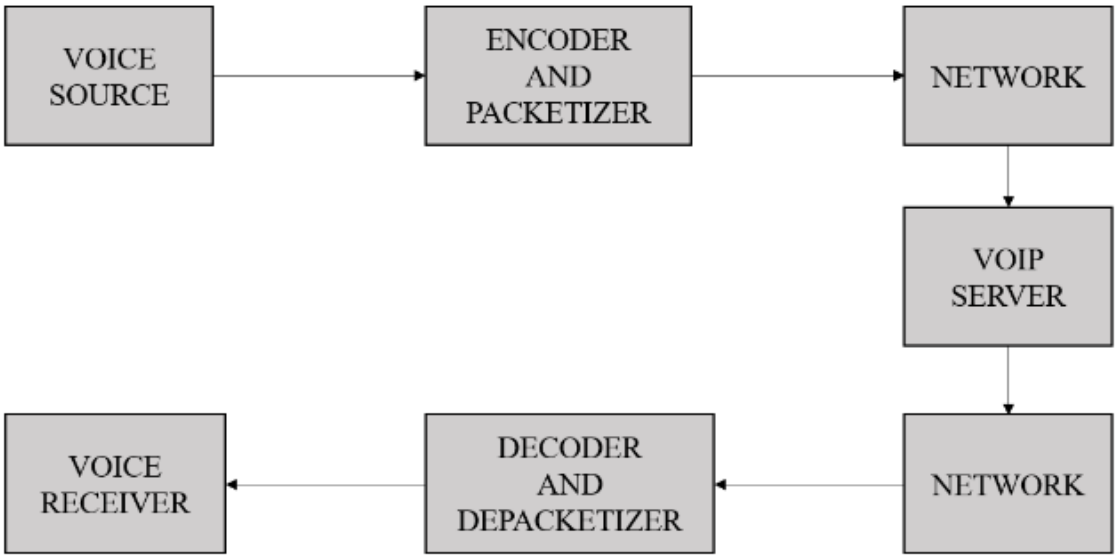

Figure 2-2 Proposed System

2.3.1 ADVANTAGES OF PROPOSED SYSTEM

The proposed system comes with advantages that will help in covering the limitations present in the existing system. Below mentioned are advantages that will be brought by the introduction of the proposed system.

i. IP Telephony has low setup and maintenance cost compared to the existing system since it largely deals with software.
ii. Physical devices and hardware are reduced in this system and therefore making handling better and efficient.
iii. It provides better handling of calls by providing a lot of free features and eases the way of manipulating calls since it is in digital form. Also, it can be used to transmit other forms of multimedia.
iv. It is found to be more reliable since it is evolving day by day and technology advancements correct errors brought by this system.
v. There is free VOIP to VOIP calls and little cost in international calls.

CHAPTER 3

3.0 METHODOLOGY

Methodology is the systematic, theoretical analysis of the methods applied to a field of study. It is the general research strategy that outlines the way in which a project is to be undertaken and, among other things, identifies the methods to be used in it [8].

Methodology refers to the collection of procedures that a project will pass through (undertake) in order to archive its stated objectives. There are different types of methodologies as shown below.

i. Prototype Model.
ii. Waterfall Model.
iii. Rapid Application Development model (RAD).
iv. Agile Model.
v. Spiral Model.

For the project objectives to be achieved, I will employ prototyping-based methodology.

3.1 PROTOTYPE METHODOLOGY

In this type of methodology, an early approximation of the final product will be made and based on the approximation; the final product is expected to come from it. The prototype will act as a sample to test my specific objectives before the implementation is done later.

While conducting the project, changes may arise and therefore the model will be suitable in modifying perfectly without problems. The prototype will be reworked as many times as possible only to ensure that a quality product is achieved after the completion of the project. The figure below is the block diagram of prototype methodology.

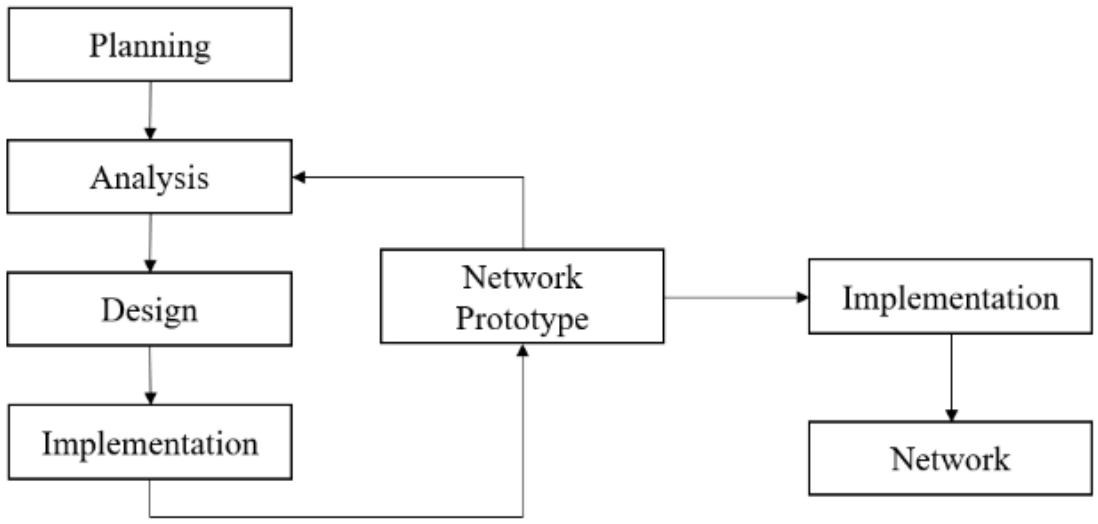

Figure 3-1.1 Block diagram of prototype methodology

3.1.1 PHASES OF PROTOTYPE METHODOLOGY

The following are the activities that will be carried out in each phase of the development model.

i. Planning

In this phase, lies the process of examining the existing system where there will be an identification of the problems in it, objectives and different opportunities. The planning phase is the fundamental phase of understanding how a system should be built and determining how the project will be carried out.

ii. Analysis

Data collection will be done in this phase where information will be gathered from different users of the system and analyze to get useful information in developing the new system. The analysis will answer different questions like how will the system be used, run, maintained etc. There will be the use of different methods for the purpose of gathering information such as observation and interview.

iii. Design

The design phase of this project decides how the system will operate, the tools that will be used, both hardware and software tools. The design phase is actually where the real system comes from and hence it is a crucial stage in the development of the system.

iv. Implementation

This involves the actual development of the system and finally testing it to see if it works. In the implementation of the system, demonstration will be performed on what has been done apart from really installing the system.

v. Prototype Refining

A prototype can be refined to satisfy user needs, this may involves redesigning the system and present to the user again for evaluation. In this stage, the feedback from the user is worked upon so as obtain the complete final product. It's the time to correct errors and make sure that the next product is improved. This acts as the skeleton of the system for which the user can check if all the requirements have meet before actual implementation.

vi. Final Network

After making the prototype several times, and modifying it until the users are satisfied, then the final network is going to be implemented and make a final thoroughly test before handling it to the user/customer so that he/she can start using it.

3.1.2 ADVANTAGES OF THE PROTOTYPE METHODOLOGY

i. The model will help me in covering my specific objectives with ease.
ii. The model enables the prototype to be tested first before implementation is done.
iii. The model also provides the ability to alter any occurring changes as many times as before only to ensure a good product afterwards.
iv. The model gives the ability to observe strengths and weaknesses of the product using the prototype developed.
v. The model also helps in designing a prototype that will have much interaction with the user since different corrections can be made for the user to be comfortable while using it.

3.2 TOOLS TO BE USED

A tool is an instrument that enables one to do a specific job/ function. In my project, there will be both hardware and software tools involved. Below are the mentioned tools that will be used;

Router is a networking physical device that acts as a gateway and will enable devices to access through to the internet. A router operates at the layer 3 of the OSI model. A router routes and forward packets and joins two or more networks [10]. In this project, the router will act as a gateway device to enable connection with the internet.

Switch is a computer network device that connects devices together on a computer network by using packet switching to receive, process and forward data to the destination devices [11]. The switch will be used to connect devices, meaning connection of devices in the local area network. Apart from that, the switch will help in the configuration of security measures in the switch level.

Ethernet cables are standard UTP cables that will be clipped with RJ-45 connectors for enabling connection between devices in a network. The cables will be used in the project for the purpose of connecting the various physical devices that will be used in the local area network. For example, connecting similar devices e.g., a switch with a switch or a computer with a computer and the cables can also be used to connect different devices for example a computer with a switch.

Cisco packet tracer is a powerful network simulation program that allows students to experiment with network. It provides simulation, visualization, authoring, and facilitates the teaching and learning of network concepts [12]. This program will be used to make configurations and see if the output is correct before really implementing in the system. It is used in the prototype developing part of the project.

Source code editor is a type of program used to edit text files which can be used in changing configuration files, documentation files and programming language source code. A source code editor, mainly visual studio code, will help in developing the web portal where necessary codes will be written.

Computers are physical devices that will be used as clients participating in the network. In this project, the computers will be used as clients in the local area network. Computers will form the network together with other devices participating in the network for example switches and routers.

Server is computer program/devices that provide services requested by other devices/programs in a network. This project will include two main servers which are the VOIP server and the

Web server. The web server will have the function of hosting the web portal in the network and the VOIP server will be used to route calls from one host to another.

Network Monitoring Tools will also be used largely in this project. These are tools which track the activities and flow of packets in the network and the analysis of their outputs can be used by network administrators to solve problems such as trafficking. The monitoring tool which will be mostly used in this project is Wire shark.

Headphones/ Earphones will enable the calling process where staffs will transfer and receive sound waves through the use of these devices. They contain a mic for capturing the sound eaves and speakers for receiving the waves.

3.3 DATA COLLECTION

Data collection is a systematic approach to gathering information from a variety of sources to get a complete and accurate picture of an area of interest [13]. There are various types of data collection and this project has used the following methods in its data collection;

i. Interview
ii. Observation

3.3.1 INTERVIEW

Interview is a conversation between two or more people, that is the interviewer and the interviewee where questions are asked to the respondent for the aim of gaining information/facts on something. The interview method will help in gaining information on the previous system that will help me in constructing the new system. Interview questions are prepared to ask the technical staff on the company. Refer to appendix A which shows the sample interview questions that I prepared to ask the technical staffs on the institute.

3.3.1.1 ADVANTAGES OF INTERVIEW

i. Appropriate when the respondent lacks reading skills to answer the questions
ii. Interviews are used for overcoming questions that needs complex descriptions.
iii. The interview method enables the interviewer to probe deeper into the interviewee whenever necessary.
iv. Interviews are found to have high response rate compared to other methods.

3.3.2 OBSERVATION

Observation method in data collection is a method under which data from the field is collected with the help of direct observation where the observer is directly involved in the field. It is the systematic viewing coupled with consideration of seen phenomenon. This method will help me obtain direct information that will be used to help in designing the network for examples obtaining physical lengths for cabling purposes. It also helps in determining the best position to place the devices in order to encourage a suitable structure and order of the network.

3.3.2.1 ADVANTAGES OF OBSERVATION

i. Subjective bias is eliminated in this type of data collection.
ii. The information that a researcher obtains from this type of data collection is guaranteed to be current.
iii. The observation method is independent of the respondent's variable.
iv. It assists in accessing situations and people where questionnaires and interviews are impossible or inappropriate to use.

CHAPTER 4

4.0 RECOMMENDATION AND CONCLUSION

It is highly recommended that the project should not only be implemented in Dar-es-Salaam Institute of Technology, but also to any organization that uses network infrastructure and has telephone needs as a communication means between employees inside and outside the company's premises.

The project has helped me a lot in learning new ideas and increases my knowledge in different theories and practices in the networking world.

4.1 PROJECT COST ESTIMATION TABLE

The project cost estimation table is a summary of all the major costs that the project is likely to endure through its process. The particular description part shows what activities is going to be done and for what reason while the cost estimated part indicates the cost estimated for the particular activity to be accomplished.

Table 4-1 Cost estimation table

PARTICULARS DESCRIPTION	COST ESTIMATED
INTERNET BUNDLES For studying, searching for new materials and referencing purposes, downloading software	55,000/=
TRANSPORT ACTIVITIES For reaching to different services that are vital to the completion of the project.	15,000/=
STATIONARIES For photocopying the report book to 8 copies @100/=	60,000/=
EQUIPMENTS For buying equipment and tools like RJ45 connectors, UTP cables, etc.	60,000/=
TOTAL	**190,000/=**

4.2 PROJECT TIMELINE ESTIMATION TABLE

This timeline explains the duration expected to accomplish this project. As every month explained with activities related to color coding.

Table 4-2 Timeline estimation table

SN	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
1										
2										
3										
4										
5										
6										
7										
8										
9										

TIMELINE COLOR PRESENTATION

SN	COLOR CODING	ACTIVITY
1		Title search
2		Title defending
3		Literature review
4		Data collection
5		Data analysis
6		Network design
7		Implementation
8		Verification
9		Report writing

Appendix A

SAMPLE INTERVIEW QUESTIONS TO TECHNICAL STAFF

I. Why haven't your institute shifted yet from Mobile Voice Calling to IP Telephony (VOIP)?

II. Do you think that the introduction of IP Telephony in your institute will be sufficient in operations for your staffs and beneficial in cost for your institute?

III. Are there any doubts that you have on IP telephony that you think will bring problems in communication? If present, state them.

IV. What is the biggest advantage that you think the Mobile Voice Calling System brings over IP telephony?

V. What is the biggest disadvantage that you believe the Mobile Voice Calling System possess in today's world of communication?

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