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Sta. Maria Campus, Sta. Maria, Ilocos Sur

IMPLEMENTED WIFI 6 TECHNOLOGY IN POBLACION

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Chapter 1

INTRODUCTION

Background of the Study

The world is becoming increasingly more mobile over the past few years. The world's conventional ways of networking have proved insufficient to address the challenges raised by our current collective lifestyle. When users need to be connected by physical cables to a network, their movement is drastically reduced. However, wireless networking does not face such a constraint and enables the network user to move much more freely. As a result, wireless technologies invade "fixed" or "wired" networks in the conventional realm. To someone who travels daily, this move is apparent (Miller Juma, 2021)

Wireless Technology: Protocols, Standards, and Techniques has figured it out. It provides clear, short treatments of second and third generation wireless technologies, from basic concepts to the state of the art. The bestselling author of Foundation of Mobile Radio Engineering has compiled the most recent networking standards, methods, and protocols, as well as clear, succinct presentations of the relevant background topics, to provide the most current and comprehensive wireless reference accessible (Yacoub, M. D., 2017).

On the other hand, Wireless Networks are essential for user data transfer and information-based communication. Wireless communication is a sort of data transfer that takes place and is communicated over the air. It refers to any techniques and forms of joining and communicating between two or more devices that use wireless signals and wireless communication technologies and equipment. It operates by broadcasting electromagnetic signals over the air via an equipped device, with no physical



surroundings required. The transmitter and receiver are linked via electromagnetic impulses. Wireless network communication, mobile communication, infrared communication, satellite communication, and Bluetooth communication are all examples of wireless technology forms, delivery methods, and technologies (Zreikat, A., 2020)

The usage of mobile phones for numerous activities such as browsing the internet, messaging, multimedia, gaming, taking pictures and videos, and so on has grown. These services are all available on mobile devices. We may use wireless communication services to send data, audio, photographs, movies, and other sorts of material. A cellular telephone, radio paging, TV, video conferencing, and other services are among the various services provided by the wireless communication system. Depending on the application, several wireless communication methods are devised. Some of them are discussed more below. There are three types of wireless communication systems: simplex, half-duplex, and full duplex. Modern wireless communication technology technologies, like the next WLAN 802.11ax, seeking to meet the growing demand for larger throughput and improved performance overall in busy by implementing higher modulation methods and Transceiver setups for MIMO. The first part alone results in improved EVM and, as a result, stricter the need for jitter in a synthesizer (Vlachogiannakis et al, 2019).

The Province of Ilocos Sur, one among the developed provinces in the Philippines that used modern technology. But there are still some municipalities where the internet connection is difficult, Marozo Narvacan is one of them and they need fast and stable



connection. We conduct this study to make their work easily, and to improve their internet connection.

Conceptual Framework of the Study

The conceptual framework of the study is presented below it served as the outline on how the researchers conduct the study.

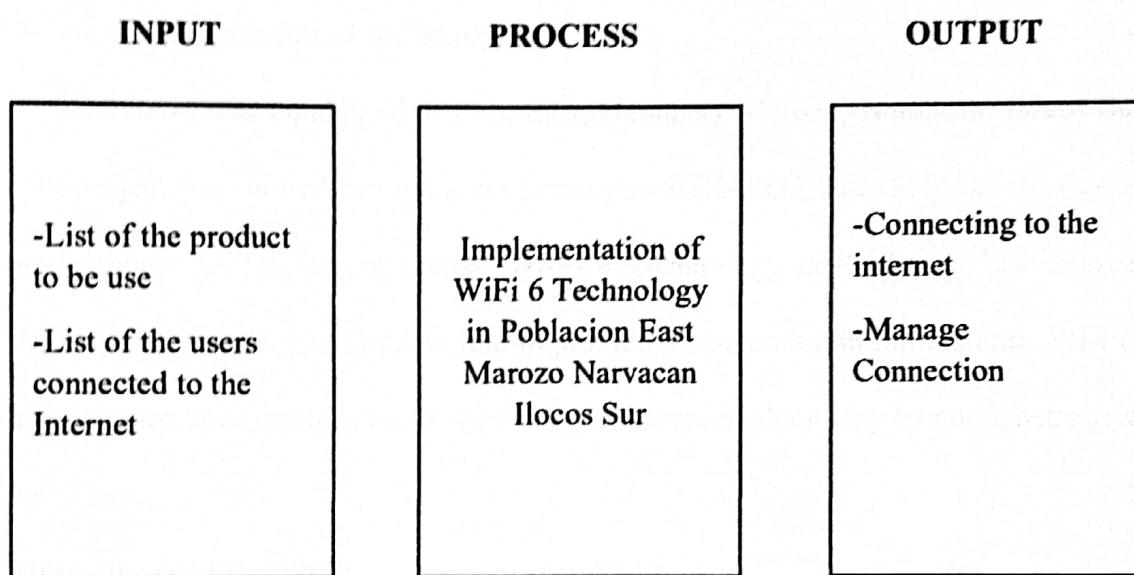


Figure 1. The Conceptual Framework of the study

The input shows the list of the product to be used and the list of the users connected to the Internet which they will have to get a limited voucher and connect through a One Time Password (OTP) that has a different expiration. And in the process, is the implementation of WiFi 6 Technology and for the output on the connecting to the internet and manage connection.

Objectives of the Project

This study aimed to design, compare and Implement the Wifi 6 Technology in Poblacion East, Marozo, Narvacan, Ilocos Sur.



Specifically, it aimed to achieve the following objectives:

1. To assess the existing wireless network at Poblacion East, Marozo, Narvacan, Ilocos Sur.
2. To design and implement a network infrastructure using Wi-Fi 6 technology.
3. To assess the designed and implemented Network.

Scope and Limitation of the Study

The study was conducted at Pob. East, Barangay Marozo, Narvacan, Ilocos Sur. The project was studied during the academic year 2022-2023. The study aimed to assess and propose an Implementation of Wi-Fi 6 Technology in Poblacion East Marozo Narvacan Ilocos Sur, to improve and to provide a connection in limited area. Wi-Fi 6 connections have rating level of strength of connection which may be good, better, and excellent.

Importance of the Study

The study is to improve the community's wireless experience by outperforming ordinary Bayesian compressive sensing.

Community. The community shall enhance their capability on communication that will lead them being updated of all news inside and outside the community, and by this study, it would provide an avenue for the community to adopt the fast and changing demands in the trends of wireless technology.

The **Network** will provide the exact study that would help enthusiasts in wireless networking to have better way of understanding the underlying trends in the field of computer networking.



The **Researchers** enhanced the capabilities and skills of the researchers in understanding the value of wireless networking.

The **Future Researchers** will use the results of this study in developing and as a reference for the conduct of similar studies in connection to wireless technology.



Chapter 2

METHODOLOGY

This chapter discussed the research design software, project plan, sources of data and the statistical tools utilized throughout the system development process.

Research Design

The researchers used experimental method which includes the research design, sources of data, instrumentation and data collection, and tools for data analysis for the “Implemented Wifi 6 Technology Network Infrastructure. Network Infrastructure refers to all the resources of a network or internet connectivity, management, business operations and communication possible. Network Infrastructure comprises hardware and software system and devices, and it enables computing and communication between users, services, applications and processes. Anything involved in the network, from servers to wireless routers, comes together to make up a system’s network infrastructure. Network Infrastructure allows for effective communication and service between users, application, services, devices and so forth (Daniel, D 2022). In this chapter, researchers used PPDIOO methodology network model to identify and validate technology requirements; plan for infrastructure; develop network design aligned with technical requirements and business goals; improve the efficiency of the network; and reduce operating expenses by improving the efficiency of operation processes and tools.

Network Model

The PPDIOO network lifecycle influences Design described the six (6) phases of the network model derived the following phases; Prepare, Plan, Design, Implement, Operate, and Optimize (Solikin, I. 2017).

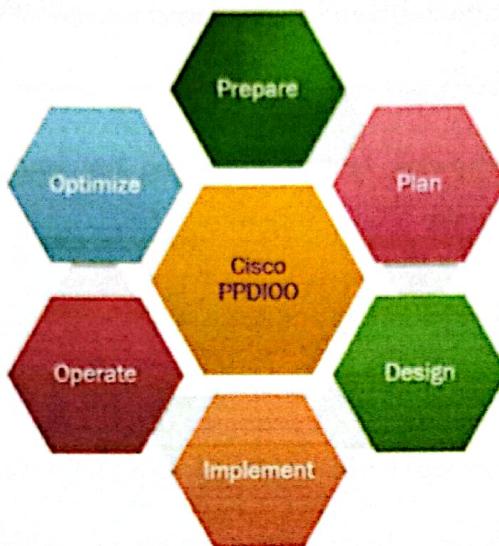


Figure 2. PPDOIO Network Model

Increasing network availability of network security and its ability to support proposed design, producing an operational design, and validating network operation of the Wireless Technology Wi-Fi 6 Network are particularly important.

Prepare phase: Requirements are something that must be done, or something that researchers need to accomplish the project. In this stage, the requirements of the system were gathered and analyzed. The researchers conducted an interview to some of the people in Poblacion East Marozo, Narvacan, Ilocos Sur. The researchers used close-ended questions to gather the idea of the respondents as a basis of the WiFi 6 Network. In addition, the researchers also read more of their review related literature that served as their reference to their study. The data gathered were analyzed by the researchers to come up with necessary actions and solutions for the problems to be addressed.

Plan phase: Plan is an outline or sketch, as of the form and structure of a work of art. This phase was focused on designing the user interface, defining the process, and data design. In this process, the details of the physical, logical and architecture design were



described and defined. The researchers have defined the objectives of different signal mappers/signal strength. Moreover, in this process, the researchers have defined the overall network architecture and the hardware and network requirements were also specified.

Design phase: Design is an outline, sketch, or plan, as of the form and structure of a work of art. Plan phase drive the network design specialists' activities. These specialists design the network according to those initial requirements, incorporating any additional data gathered during network analysis and network audit (when upgrading an existing network) and through discussion with managers and network users. The network design specification that is produced is a comprehensive detailed design that meets current business and technical requirements and incorporates specifications to support availability, reliability, security, scalability, and performance. This design specification provides the basis for the implementation activities.

Implement phase: Implementation and verification begins after the design has been approved. The network and any additional components are built according to the design specifications, with the goal of integrating devices without disrupting the existing network or creating points of vulnerability.

Operate phase: Operation is the final test of the design's appropriateness. The Operate phase involves maintaining network health through day-to-day operations, which might include maintaining high availability and reducing expenses. The fault detection and correction and performance monitoring that occur in daily operations provide initial data for the network lifecycle's Optimize phase.



Optimize phase: The Optimize phase is based on proactive network management, the goal of which is to identify and resolve issues before real problems arise and the organization is affected. Reactive fault detection and correction (troubleshooting) are necessary when proactive management cannot predict and mitigate the failures. In the PPDIOO process, optimize phase might lead to network redesign if too many network problems or errors arise, if performance does not meet expectations, or if new applications are identified to support organizational and technical requirements.

Project Plan

Project planning is the discipline of planning, organizing, securing and managing resources to bring the successful completion of the project goals and objectives. The Table 1 below were the formulated project plan for the progression of the study.

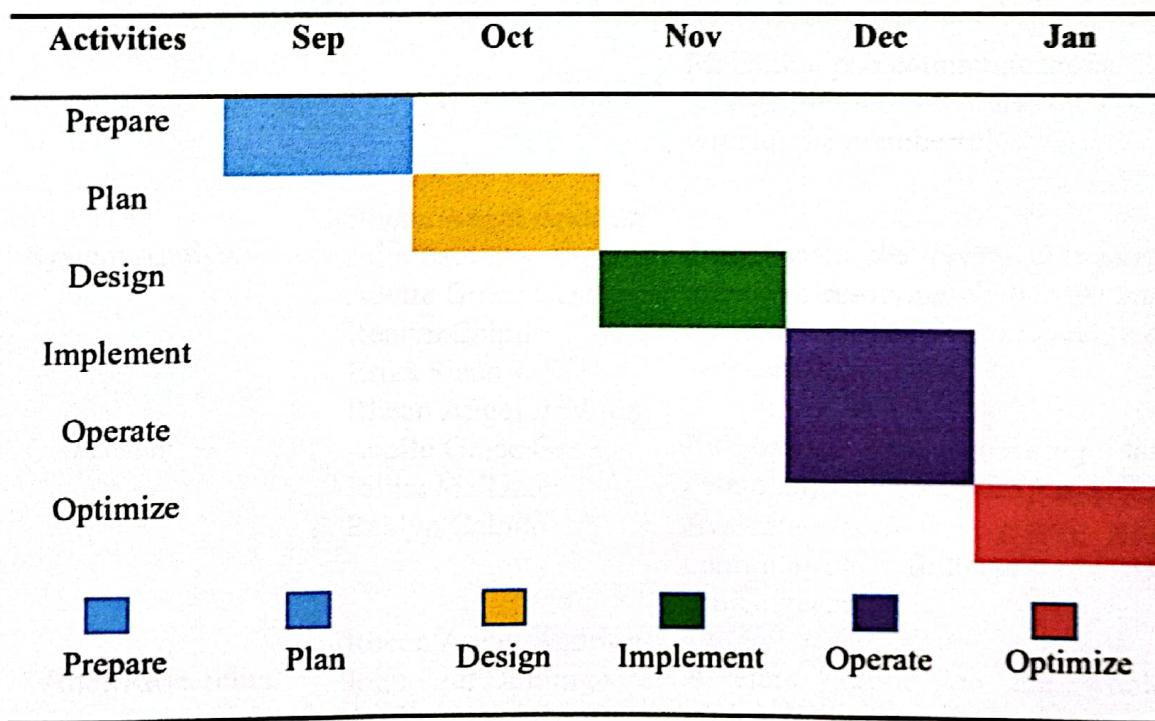


Table 1: The Project Schedule Gantt Chart of the Project Plan.

In this project, one of the things that was taken into consideration is the time management. In this study, the researchers have established a schedule on each of every



phase of development that served as their guide in keeping an organized work which help them determine the things that needs to be done within the scheduled time frame. This also helped them in preventing from overdue tasks and finished the project development within the allotted duration.

Project Assignments

The project member roles and responsibilities within the propose project, the implementation of WiFi 6 Technology in Poblacion East, Marozo, Narvacan, Ilocos Sur.

ROLE	NAMES	FUNCTIONS
Project Manager	Jolina M. Tizon	Responsible for coordinating with the project team Maintain open communications with all the members.
System Analyst	Rhean Angel Andrion John Paul Domingo Acelle Grace Gose Realy Calpito Erika Sison	Coordinates the technical team's efforts in resolving challenges and ensuring that solutions are practical and consistent.
QA/Tester	Rhean Angel Andrion Acelle Grace Gose Jolina M. Tizon Realy Calpito	Responsible for checking the debugging queries of the project Evaluate software needs and communicate findings to the project team.
Writer/Researcher	Rhean Angel Andrion John Paul Domingo Acelle Grace Gose Realy Calpito Jolina Tizon Erika Sison	A status report on the whole project.

Table 2. Role Requirements and Responsibility



Table 2, present the role requirements and responsibilities of the members of the project leader organizes and refines the project concept and manages the team, keeps tracks of the project development, establishes deadlines, handles unforeseen problem, handles finances guarantees stakeholders satisfaction, and assesses the success of the project, including that their team members. In addition to the standards and best practices specific to their role, core team members also have a secondary duty to ensure the project's success.

Population and Locale of the Study

This study was conducted at Sitio Antabang, Barangay Marozo, Narvacan, Ilocos Sur. The project started last September 2022 to December 2022.

Respondents	Number
ENJ INTERNET PROVIDER-OWNER	1
MAROZO WIFI USER	20
TOTAL	21

Table 3. Distribution of Respondents

Table 3 shows the distribution of the selected respondents to participate in the stability of the proposed network. The study involved the participation of the 20 respondents, namely the Wi-Fi user to the said barangay and the ENJ Owner (1).

Research Instruments

Interview, documentary analysis, internet research/library research and survey questionnaire were tools used in the study, which also involved the participation of some of the users in Poblacion East, Marozo, Narvacan, Ilocos Sur.



Assessment survey instrument by (Guerzon et. Al,2018) was used by the network infrastructure researchers in their data gathering from the respondents to determine whether it is acceptable or not.

Data Analysis

This aims the researchers to test the implemented Wireless Technology Wi-Fi 6 network of Pob. Est, Marozo, Narvacan, Ilocos Sur, the Likert scale was used through a survey instrument and to analyze the results for objectives no. 3, mean was used. The Likert scale used in this study is presented in Table 4.

Point Value	Mean Range	Descriptive	Descriptive
		Rating	Interpretation
5	4.21-5.00	Strongly Agree	Very Highly Acceptable
4	3.41-4.20	Agree	Highly Acceptable
3	2.61-3.40	Neutral	Neither Acceptable or Not Acceptable
2	1.81-2.60	Disagree	Slightly Acceptable
1	1.0 1.00-1.80	Disagree	Not Acceptable

Table 4. The Likert Scale used in the Survey Instrument

The data gathered were categorized from Not Acceptable to Very Highly Acceptable. Mean ranges from 1.00-1.80 described as Strongly Disagree and interpreted as Not Acceptable, 1.81-2.60 described as Disagree and interpreted as



Slightly Acceptable, 2.61-3.40 described as Neutral and interpreted as Neither Acceptable and Not Acceptable, 3.41-4.20 described as Agree and interpreted as Highly Acceptable, and 4.21-5.00 described as Strongly Agree and interpreted as Very Highly Acceptable.