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ENHANCEMENT OF IT NETWORK INFRASTRUCTURE OF DEPED CANDON CITY DIVISION

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INTRODUCTION

Background of the Study

In today's rapidly advancing technological landscape, the role of I.T. infrastructure has become more crucial than ever before. The combination of networks, services, software, and hardware known as I.T. infrastructure enables businesses to efficiently oversee, process, store, and transfer massive volumes of data. It acts as the support framework for modern enterprises that enables efficient interaction, storage of information, and access to vital resources. Organizations must invest in solid and flexible I.T. infrastructure to be relevant and fulfill the evolving needs of the digital era as technology continues to advance at an unprecedented, phenomenal rate.

Information networks and computers are essential to the success of all kinds of organizations, big and small. By facilitating communication, providing assistance for programs and services, and enabling access to the assets that keep operating the businesses. The networks themselves are getting extremely complicated in order to satisfy the needs of businesses on a daily basis. With network infrastructure design, one can plan an effective I.T. network. Following implementation, network design might help resolve network difficulties by making it easier to comprehend the functions of various networked devices and how a failed system could impact the network's operations and other computers using the Internet (Solarwinds, n.d.).

Every business that uses technology requires an established network infrastructure. Companies having an excellent network structure can adopt novel applications and technologies as they become available, allowing them to stay on top of developments in their specific industries. The goal for service providers should be to provide a

network infrastructure that is well-designed and capable of supplying flexible scaling, high availability, and adequate load balancing. For modern enterprises and organizations, seamless and dependable connectivity is vital, and these elements are essential to maintaining that connectivity. No network is entirely impervious to outages; therefore, it is also crucial to have an easy-to-use network design and digital management utilities that let network administrators find and fix problems quickly. By implementing these, internet service providers can reduce downtime and ensure that I.T. systems are always available and operating effectively (DriveNets, 2022).

Network performance affects consumer satisfaction, productivity, and the effectiveness of the overall organization. Therefore, the term "network infrastructure" refers to the fundamental components of a network that permit data transport and communication between systems and devices. In simpler terms, it is the established infrastructure in assisting data transfer on networks consisting of the Internet and other networks, including servers, routers, switches, and cables. Control and safeguard network traffic and logical components, including programs and protocols.

The process of designing a network involves assessing and defining the parameters of the finalized network. A network schematic guides the network's actual physical implementation and is frequently used to represent the design process. The cabling structure logical diagram of the network is needed, and the number of connected devices, the I.P. addressing scheme, and the security of the network architecture are involved in network design. This guide provided justifications for what network layout is and why it is significant.

Using the appropriate network design instruments can reduce time spent on the task, increase its effectiveness, and yield better results if one needs more network design assistance. A well-designed infrastructure is essential to reduce costs and maintain the network's peak performance (Funmilola et al., 2015).

Jan (2020) asserted that the planning stage of implementing a computer network infrastructure is known as network design. Maximizing operational efficiency entails studying and determining how well an I.T. network's components are connected (from routers, switches, and administrators to portable devices, scanners, and desktop pcs). I.T. professionals, network creators, and other experts in the industry typically carry out network designing.

A network diagram of the network's layout may create, serving as an outline for the engineers installing the network. The network infrastructure design needs to take many factors into account. It takes more than just planning the hardware when constructing a network. Therefore, the need to acknowledge every piece of innovative software is essential due to the impact of its network efficiency.

Features regarding a well-designed network infrastructure include network topology, bandwidth needs, security precautions, scalability, and performance enhancement. It involves careful planning, implementation, and ongoing maintenance of the organization in meeting the aims that increasingly rely on cloud services, remote work, and interconnected systems of I.T. network infrastructure is relevant. It enables seamless access to cloud resources, facilitates secure remote connectivity, and supports the growing demand for bandwidth-intensive applications and services.

According to a study by Steve Petryschuk (2021), network design can significantly affect company outcomes because networks are at the core most modern businesses. It takes a unique blend of project management and technical competence to gain the right choices between network efficiency, security, redundancy, and cost.

The Department of Education (DepEd) Candon City Division is a regional administrative unit of the Department of Education in the Philippines. It is responsible for guiding and managing the public schools and educational institutions in Candon City. Thus, it serves as the main governing body for educational programs. Despite embracing various technologies in enhancing teaching, learning, and administrative processes, the office is experiencing a weak small range of internet connectivity.

Enhancing the I.T. infrastructure of DepEd Candon City is essential in ensuring effective communication, collaboration, and the seamless integration of technology into the learning environment, starting by conducting a thorough assessment of the existing I.T. infrastructure. Identifying the strengths, weaknesses, and areas that need improvement before identifying the following steps.

This study aims to improve the current I.T. network infrastructure of the DepEd Candon City Division office to boost efficiency, scalability, security, performance, availability, management, affordability, and security.

The result of this study will be beneficial in the field of Information Technology. By investing in upgraded infrastructure, individuals can position themselves in modifying evolving technologies. In addition, the findings of this study will likely be favorable to the Ilocos Sur Polytechnic State College (ISPSC) for applying to a broader internet range of connections.

Conceptual Framework of the Study

It represents the guide applied in enhancing the I.T. infrastructure of the DepEd Candon City Division.

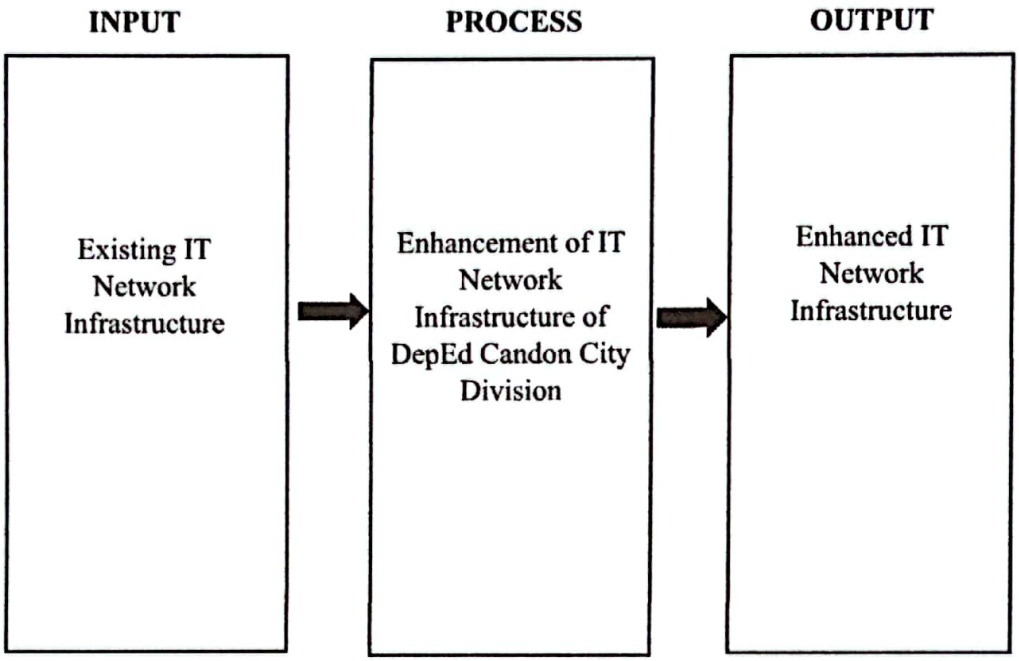

Figure 1. Conceptual Framework

Figure 1 shows the conceptual paradigm utilized to fulfill the study employed the Input-Process-Output Model as seen above. The input variable involves the existing I.T. network infrastructure installed in every establishment of DepEd. The process is carried out solely regarding improving the I.T. network infrastructure of the DepEd division office located at Candon City, which is one of the reasons for delaying employees' work when online activities are present. The output variable revolves around the enhanced I.T. network infrastructure throughout the network connectivity's effectiveness and efficiency. Thus, an evaluation form is employed for its network performance.

Objectives of the Study

This study aimed to enhance the effectiveness and efficiency of the improved I.T. infrastructure of the DepEd Candon City Division.

Specifically, the various objectives are:

1. To assess the current I.T. infrastructure of the DepEd Candon City Division office
2. To design and implement an enhanced I.T. infrastructure for DedEd Candon City Division Office; and
3. To evaluate the enhanced network infrastructure of DepEd Candon.

Scope and Limitation of the Study

This study mainly focused on the design application of the existing I.T. infrastructure of the DepEd Division office, which was conducted at San Isidro, Candon City. In improving underlying I.T. infrastructure, proponents have developed a network plan which includes; Preparing, planning, designing, Implementing, Operating, and Optimizing for the expansion and upgrading of the network capability, increasing bandwidth, and improving connectivity in underserved areas. An access point and outdoor waterproof cat 6 UTP cable were employed in assessing the network connectivity and tested by a signal mapper for the speed test. The researchers delimited the study covering 38 respondents to evaluate the chosen subject matter. The coverage range of the internet connectivity is also limited to up to 2500 sq. ft each.

Importance of the Study

This study would significantly contribute to the vast knowledge regarding the I.T.

Infrastructure in Information Technology. In addition, the findings of the chosen subject matter could be highly significant or relevant to the following:

DepEd Candon City Division Office will be benefited from this study as it will serve as a guide in improving its Existing I.T. network infrastructure. The I.T. network infrastructure plan not only solves current network Issues but also eliminates the problems encountered, and most significantly, it will give them a strong and quick internet connection.

This study will support **Ilocos Sur Polytechnic State College's** efforts to educate people regarding networking or I.T. infrastructure. It can be used for benefits around the campus, easy access, and a strong and quick internet connection if the campus plans to.

It may help **I.T. professionals** develop new designs of I.T. network infrastructure as this study will serve as their basis.

Future Proponents may utilize this study to understand how to improve a network infrastructure in a particular area. Thus, it will give them a starting point or guide and a substantial study foundation.

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