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Network Management and Design for an Animation and Creative Studio

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ABSTRACT

Filipino artists are in-demand for outsourcing and freelance work. This caused animation studios to slowly gain popularity in the Philippines. A rarity in the eyes of the public but slowly growing as multimedia and entertainment grow overseas. Effective computer networking can improve the animation project's production as it will lessen the time for file transfers, updates, and the need to constantly upload assets online through cloud storage. If the network is managed effectively; all progress, updates, animation frames, and assets will be accessible to all the artists in real-time. In this paper, a proposed network design for a small animation studio was developed. During the planning, the building layout does not matter as the floor plan is designed to be a single open space room, this decision was determined as most art studios rent commercial buildings that offer open space layouts. This will also benefit collaboration and communication as animation projects rely heavily on teamwork. As this paper will be used as the first step in building a new animation studio, detailed logical and physical network designs with ideal network equipment and technologies were proposed as part of the building guide.

Key words : animation studios, network design, effective computer networking, collaboration and communication

1. INTRODUCTION

Animation outsourcing is gaining a lot of attention as local studios are experiencing higher demands for their services during the pandemic [1]. This rising trend is a good opportunity for a local animation studio in Davao City to be established. This paper's sole purpose is to be the first step in building this new animation studio.

Animation studios are producing story-based projects and pushing the boundaries by taking part in enterprise and marketing. Companies are now seeing the benefits of selling their brands or products through stories. This is where the animation comes in. [2]

Computer networking can help the animation studio produce higher quality and in a faster manner. The benefits and advantages of computer networking in an animation studio setting are that it can introduce central storage for all data, animation progress, and assets. Equipment crashes are inevitable, and information might get undermined or inaccessible on one PC, networking can solve this as data have duplicates of similar information on another workstation for future use, which reduces delays and interruptions [3].

And most importantly, networking can boost the studio's storage capacity. Since all artists will be sharing data, animation progress, and assets with other artists, the studio needs to make sure all information and substance are legitimately stored in the framework. With computer networking's administration innovation, the studio can do the majority of this with no issue, while having all the space required for capacity [3].

Salient Features of an Animation Studio

In a common lens, animation relies heavily on teamwork and collaboration. It's similar to a typical office workspace where people constantly share, access, update data and files, and communicate.

Physical Assumptions

- Animation studios are typically designed in a single open space floor.
- Ideal floor area is 80-100 square meters.
- A storage area for drawing and office supplies, and a hot desk that can cater to 5 workstations.
- One gender-neutral comfort room, and a pantry.

Project Objectives

This project's main objective is to develop a networking design for a new animation studio. This project will design a logical and physical network framework as one of the building guides for the studio. This project will also analyze network management in consideration of the logical and physical design for a new animation studio.

Project Benefits

Efficient, quality, and remunerative operation are the main goals of an animation studio. To catch up on thecompetitive industry, the benefits of hosted and managed network system are clear. Here are the specificbenefits:

- Centralization of Data Storage

All data, animation progress, and assets can be stored on a file server, this will lessen the time for file transfer and access as it can be shared and made available to every artist involved in the project.

- Connectivity and Collaboration

Updates, changes, and progress on animation assets and scenes will be close to real-time. Workstations can easily communicate and access data in real time.

- Reliable and Efficient Production Duplications, network access, and real-time fileupdates will lessen delays and the possibility of dataand progress loss, which will lead to a smootheroperation without delays and interruptions.

- Security through Authorization

Only the system clients are authorized to access data, animation progress, and assets. No other individual ordevice can bypass the protection or security of information.

- Flexibility and Boost in Storage Capacity Since the storage will be centralized through a fileserver, storage upgrades and backups will be easier.

Proposed Capital and Operating Expenditures

Table 1. Capital and Operating Requirements Summary

Capital Expenditures	
Particulars	Estimated Cost
Network equipment (hardware)	460,000.00
Storage	200,000.00
Installation & Delivery	40,000.00
Workstations (Microsoft Surface Studio)	400,000.00 x 5
Software License	100,000.00
Drawing Supplies	20,000.00
Office Supplies	20,000.00
Office Peripherals	150,000.00
Printer	100,000.00
Total Capital Expenditures	3,090,000.00

| Operating Expenditures	
Subscription and Marketing Expenses	100,000.00/year
Electricity Expenses	150,000.00/year
Salaries and Wages	500,000.00/year
Internship and Training	50,000/year
Total Operating Expenditures	800,000.00
Total Capital and Operating Expenditures for the First Year of Implementation	3,890,000.00

Table 1above shows the Capital and Operating Requirements summary

Network Management

By definition, network management is the total of applications, tools and processes used to provision, operate, maintain, administer, and secure network infrastructure. Its main goal is to oversee, manage, andensure that network resources are made available to the users efficiently, effectively, and quickly [4].

In addition, the International Organization for Standardization (ISO) defines five main areas of network management. These are network administration, network operation, network maintenance, network provisioning, and network security. These areas are an integral part of designing effective network management for an organization.

The figure 1 below shows how these 5 areas work. First,the organization will hire a network administrator that will manage the areas identified above, this is to makesure that the network is efficient and effective.
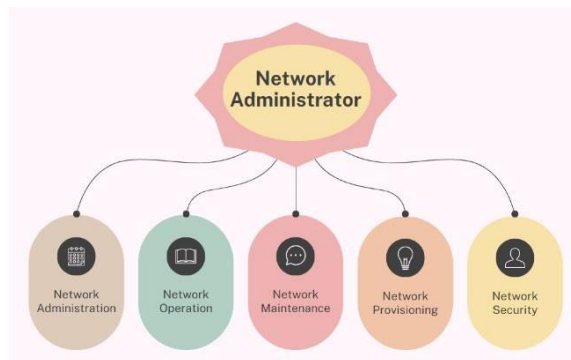
Figure 1. Network Management

2. UNITS

Network Analysis

As mentioned, there are five network management areas: Network Administration, Network Operation, Network Maintenance, Network Provisioning, and Network Security. These areas will be used to analyze the ideal network management for the studio.

A. Network Administration

One of the areas of network administration isinventory and management of network resources and equipment used in the organization. Provided below(table 3) isthe inventory for the proposed animation studio.

Table 2. Proposed Network Resources and Equipment

Network Resources and Equipment	Qty	Specification/Description
Workstation (Microsoft Surface Studio)	5	These workstations are equipped with the latestanimation software and multimedia creative suites.
Printers	1	Printers are networked and formulti-use.

Server	2	File and Database Server
Access Point – Ruckus R310 BoofGround	5	The RUCKUS R310 delivers consistent, reliable 802.11ac wireless networking. The R310provides an ideal combination of features and performance for smaller environments. Additionally, it supports up to100 clients per AP.
1u Cat 6 48-Port Unshielded Dual IDC Patch Panel c/w rear Wire Manager	1	Dual IDC allows both 110 andkrone tools to be used for termination, support both T568A and T568B wiring, andgigabit Ethernet application.
Ethernet Switch -Juniper EX3300-24T PoE	1	Either 24 or 48 built-in network ports with 10/100/1000BASE-T GigabitEthernet connectors (Ports labeled 0 through 23 or 0 through 47) Four uplink ports (ports labeled 0 through 3).
Gateway Router with Firewall - Juniper SRX300	1	1-Gbps firewall with 300-Mbps IPsec VPN. This device consolidates security, routing, switching, and WAN connectivity in a small, fanlessdesktop device ideal for retail-type offices with up to 50users. (www.juniper.net)

B. Network Operation and Monitoring

One of the most critical functions of networkmanagement is network operation and monitoring.The network admin must have insight and continuous monitoring of everything the network is operating.

This can be done with the use of a Network OperatingCenter (NOC) dashboard, it will display helpful data and information such as network maps, report data, alerts, historical information, problem areas, and other useful information. Since NOC is centralized, IT technicians can directly support remote monitoring and management (RMM).

C. Network Maintenance and Provisioning

Maintenance should also be planned when designing the ideal networking for the animation studio. The table 3 below shows the tasks for maintaining and keeping the network up and running.

Table 3. Network Maintenance

| Task	Network Maintenance Schedule	Checking Schedule
Fault Management	Configure the network devices (routers, switches, firewalls, servers, etc.) to capture logging messages and send them to an external server. Whenever an interface goes down, or the CPU goes above 80% utilization.	Every Saturdays
Configuration Management	Any changes made to the network have to be logged. We will use change management so relevant personnel will be notified of planned network changes. Changes to network devices have to be reported and acknowledged before they are implemented.	Every Saturdays
Performance Management	Network performance will be monitored on all LAN and WAN links, so we know when things go wrong. QoS (Quality of Service) will be configured on the appropriate interfaces.	Every Saturdays
Security Management	Create a security policy and implement it using firewalls, VPNs, intrusion prevention systems, and AAA (Authorization, Authentication, and Accounting) servers to validate user credentials. Network breaches have to be logged, and an appropriate response has to be made.	Every Saturdays

D. Network Security

Network security emphasizes tracking and preventing misuse, illegal access, and unauthorized activity.

The user is provided with a unique user ID and password for authentication, this is required to gain access to the firewalls, access control, antivirus, anti- malware software, and virtual private network (VPN).

Proposed Physical Design

The figure 2 below represent the proposed cabling floorplan ideal for the animation studio.
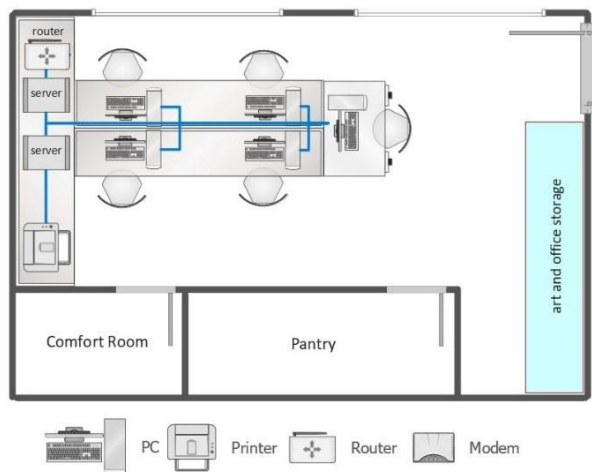
Figure 2. Proposed Cabling Floor Plan

Figure 2 shows the proposed cabling floor plan for the animation studio. The total cable length is approximately 4 meters, which includes allowance.

Proposed Logical Design

The logical network design (figure 3) comprises networks that are implemented physically using virtual local area networks (VLANs) defined by the network switch.
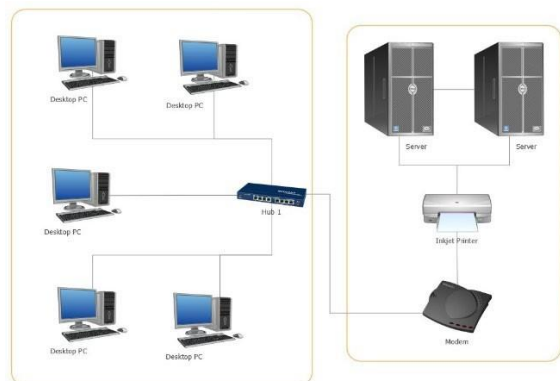
Figure 3: Proposed Logical Network Design

Implementation

The main objective of this project is to provide the best network management and design for an animation studio, which can be utilized in the studio building planning process.

If an animation company uses this as their networking management guide, these are the implementation description:

The office floor plan and layout are designed with an open space building in mind, it must be followed or similar with a few customizations based on the physical condition and constrictions of the building. The capital and operating requirements can be followed, but few budget adjustments can be done due to changes in market price changes.

Network management analysis and solutions should be followed. The physical and logical design must be followed with only a few modifications. The organization can follow 5-month planning and implementation.

3. CONCLUSIONS

In the Philippines, the animation market is expanding. The creation of the animation project may be enhanced by effective computer networking since it will reduce the time required for file transfers, updates, and the requirement to regularly upload materials to cloud storage. All work in progress, updates, animation frames, and materials will be available to all artists in real-time if the network is managed efficiently. This paper proposes an ideal logical and physical network design for an animation studio with the addition of network management analysis and financial components. If the proposal will be adopted,the animation production and process will be faster, reliable which will have great results in client retention, income, and sustainability.

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