

# PhotoHut Network Upgrade

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## Table of Contents

1. Executive Summary
  - a. Summary of the Project's Objectives, Scope of Work, and Key Milestones
  - b. Overview of major findings and Recommendations
2. Introduction
  - a. Background and context of project
  - b. Project objectives and goals
  - c. Stakeholder identification and involvement
3. Project Overview
  - a. Project description and scope
  - b. Project timeline and milestones
  - c. Project Team and responsibilities
4. Conceptual Network Design
  - a. Overview of the Network design and considerations
  - b. Network architecture and infrastructure
  - c. Key technologies and components used.
5. Physical Network Design
  - a. Floor plan and locations for office, studio, and server room
  - b. Equipment placement and rack configuration
  - c. Network cabling and connectivity layout
6. Equipment List and Cost Comparison Table
  - a. List of equipment required for the project.
  - b. Comparison of costs from three different vendors
  - c. Justification for vendor selection
7. Physical and Logical Security Plan
  - a. Overview of security requirements and considerations
  - b. Physical security measures for the server room and office/studio areas
  - c. Logical security measures, including firewall configuration and access controls.
8. Security Policy Recommendation Document
  - a. Recommended security policies and procedures
  - b. User access and authentication guidelines
  - c. Data protection and privacy policies
9. Full Physical Implementation Plan
  - a. Detailed schedule and tasks for equipment installation
  - b. Testing and training plans
  - c. Change management and risk mitigation strategies.
10. Floor Plan and Server Room Plan
  - a. Server specifications
  - b. Server room design, layout, and cooling considerations
  - c. Backup and disaster recovery plan
11. Cloud Server Solution and Firewall Security

- a. Overview of cloud server options and benefits
- b. Firewall security options and configurations

12. Budget Overview

- a. Project budget breakdown by category

13. Project Conclusion and Recommendations

- a. Summary of project outcomes and achievements
- b. Lessons learned and recommendations for future projects.
- c. Acknowledgments and appreciation for team members and stakeholders

14. Bibliography/References

## Executive Summary

In this project, titled "PhotoHut Network Upgrade," the main goal was to design and implement an upgraded network infrastructure to meet the current demands and potential growth demands of the company's operations while implementing new security measures.

The project involved a detailed conceptual and physical network design, including the setup of a server room, office network, and studio network. Equipment selection was based on cost comparisons from three vendors per instructions, ensuring a cost-effective solution without compromising performance.

Physical and logical security plans were developed to protect the network infrastructure, and a security policy recommendation document was provided, outlining recommended policies and procedures for data protection and user access.

The project followed a full physical implementation plan, including equipment installation, testing, and training. A dedicated server room was established, housing the servers, and ensuring their proper cooling and maintenance was available.

A budget overview detailed the estimated costs to show where money and resources were spent is attached to this document.

In conclusion, the network upgrade and security enhancement project successfully achieved its objectives, resulting in a robust and secure network infrastructure for PhotoHut. The implemented solutions will improve data transmission, communication, and overall productivity in the work environments. Recommendations for future projects include regular security audits and updates to adapt to emerging threats and technologies. The project team and stakeholders are commended for their collaboration and contributions to the project's success.

## Introduction

This project was started for the sole purpose of bringing PhotoHut into the present and preparing them for the future by upgrading their network, their workstations, and implementing new security practices. Our goal at McCall Solutions was to give them everything they asked for and more with this project.

PhotoHut has experienced growth recently, increasing the demand for their network and communication between their office as well as their studio. With the increase in volume, they are looking at upgrading and preparing for the future a network infrastructure update, workstation update, and security update. The primary objective of the project is to design and implement an upgraded network infrastructure that addresses the specific needs of PhotoHut. Key goals include optimizing data transmission, ensuring seamless communication across all departments, and establishing a secure and resilient network infrastructure.

The success of the project relies heavily on the active participation and engagement of various stakeholders. PhotoHut will need to give us full access to their building as well as their key members of the business to understand fully what is needed through the upgrade. Doing this will set the stage for the subsequent sections, enabling stakeholders to grasp the significance and relevance of the project in the context of PhotoHut's future.

## Project Overview

The network upgrade and security enhancement project aim to revamp PhotoHut's existing network infrastructure to meet the evolving business requirements. The project scope goes from planning the network, the design of the network, implementation of a modernized network architecture, including the setup of a server room, office network, and studio network. It also includes the integration of enhanced security measures to safeguard the network and the interest of stakeholders.

The estimated time of this project will be from a ten-week sprint from late April to late June. Attached to this document will be a more detailed schedule showing the breakdown of all things included in the project. Key milestones include the completion of the conceptual and physical network design, equipment delivery and installation, software integration selected by PhotoHut, testing and training, and the final deployment of the upgraded network infrastructure.

Team communications between the stakeholders of PhotoHut and McCall Solution teams members will go through the project manager Austin Dalton. Austin will communicate the needs of PhotoHut with McCall Solution's and assign the tasks to the members best suited for the tasks involved. This project will include a network administrator, data migration specialist to handle clients' current files to uploading to the new server, IT Support Specialist that handles the installation of workstations, security specialist will take of new security measures in place, and a system administrator to tie all the moving pieces of the project together once installed.

## Conceptual Network Design

The conceptual network design for this project was very straight forward as the requirements alone mapped almost half of the project as they were already on a peer network. In this project we talked with the stakeholders to understand what workstation needs they wanted in the office. We want to give them several options regarding equipment, thus making a cost comparing chart on (insert page number).

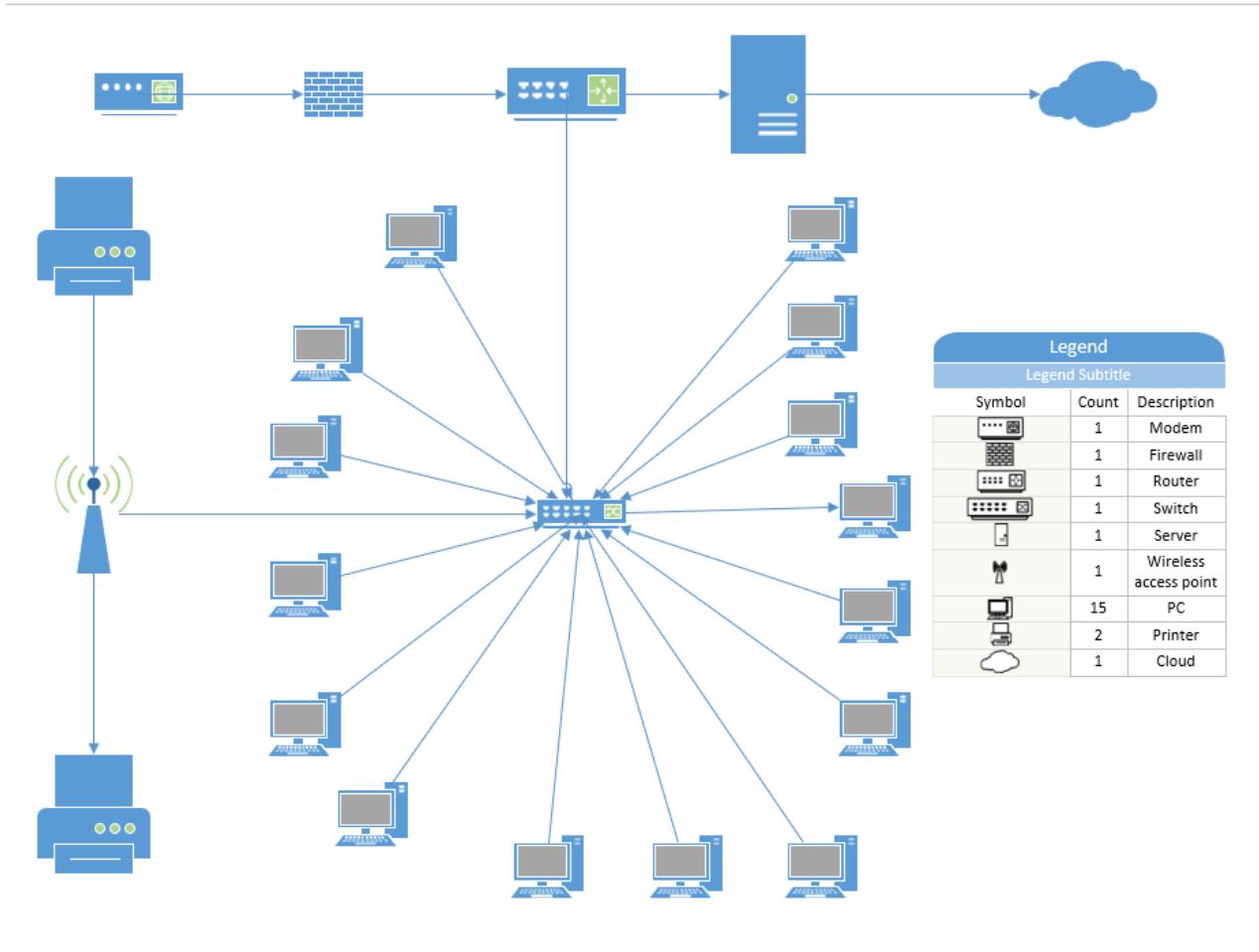
Below is an overview of the network architecture.

1. Core layer, this is one of the most important layers, includes the router and the switch that are being used to ensure fast data transfer as well as efficient network traffic routing for the network.
2. Distribution Layer, this layer is another switch that sole purpose is to load balance to facilitate the distribution of network traffic and ensure optimized performance and scalability. Act as intermediaries between the core layer and the access layer.
3. Access layer, access layer switches are strategically placed throughout PhotoHut's facilities. These switches provide connectivity for end-user devices, workstations, printers, and other networked devices.
4. Server Room, the brain of the system will be equipped with enterprise-grade servers to host critical applications and services. All equipment will be installed on a central cooling rack in a dedicated server room with its own security options.
5. Cloud Service Integration, cloud-based applications and software enable collaboration, productivity, and accessibility for employees. Cloud communication and collaboration tools facilitate seamless interaction among employees across different locations.
6. Network Security, next-generation firewalls implemented to protect against unauthorized access and potential threats. Intrusion detection and prevention systems monitor network traffic for suspicious activity. Virtual private networks ensure secure remote access to the network.

This concept network will be more than enough for the current workload of PhotoHut's main office as well its studio. The architecture of this network will ensure reliability, optimize data transmission, seamless communication, and support future growth of the company.

## Physical Network Design

Pictured below is the Physical network for the main office and below that directly is the physical design of the studio.



The step to step to understand this network very straight forward, starting with the modem. The modem is from an Internet Service provider, we have reached to let them on behalf of PhotoHut that changes are going to made to the network and they were willing to advise on which one of their modems that they provide. They provided an upgraded modem and upgraded service to help boost the speed of network within the PhotoHut's monthly budget. The internet service will then run through the firewall where it detects any intrusions and issues with security in the network. Once filtered, it goes into the router where it distributes to the services for the business such as office workstation, server, and switch for office equipment. The server will run most of the processes pictured at the end of this document, as well as file handling which will be backed by the cloud services chosen. Now to the distribution switch from the router where we it goes to the office hardware and studio hardware.

## Equipment List and Cost Comparison Table

For the type of projects there are tons of different things to look at to when it comes to each of the three sections of the build. The office and studio are more straight forward as they only require a handful of things to function, but the server takes most of the work. Picking the right components is important for two reasons compatibility and price. Not all pieces work together regardless of prices but the technology inside of it and prices can vary if you can decide to get more than one piece from a company. It is recommended that the bulk choice of equipment comes from only a handful of vendors such as Cisco, Dell, and big-name companies as their hardware is proven and back with guarantees as well with warranties.

Provided below is the chosen equipment list and software we recommend for each of three rooms involved.

Highlighted is the choice vendor that component of the build.

PhotoHut Network Update Cost Comparison				
Equipment	Dell Pro Services	Vendor 1	Leonov Pro Services	Vendor 2
		Vendor 3		Cisco Services
Workstations	1441.99		1539.00	2429.99
Cables	500.00		500.00	500.00
Firewall	1040.36		806.00	1480.00
Power Distribution	443.23		95.99	449.00
Server	4585.00		4466.59	5200.00
Server Rack Cooling	275.00		800.00	650.00
Switch	400.00		2510.00	1721.00
Wireless Access Point	349.99		170.00	687.99
Environment Monitor	350.00		249.00	150.00
KVM Switch	300.00		300.00	300.00
Software	249.99		500.00	239.00
Patch Panel	199.99		300.00	500.00
Storage Array	750.00		600.00	900.00
Uninterruptible Power Supply	249.00		399.00	175.00
Printers	479.00		800.00	749.00
<b>Totals from vendors</b>	<b>11613.55</b>		<b>14035.58</b>	<b>16130.98</b>
<b>Choice of Equipment total</b>				<b>14116.21</b>

### Server Room

Modem is provided by an internet service provider as it will meet requirements needed and comes with your monthly internet bill.

- Main Components
  - Cooling
  - Environment Monitor
  - Firewall
  - KVM Switch
  - Network Security Application
  - Patch Panel

- Power Distribution
- Router
- Server powered by Cisco Software
- Storage Array
- Switch
- Uninterruptible Power Supply
- Other Key components
  - Cables
  - Keyboard
  - Mouse
  - Monitor

The main office will be equipped with the following:

Dell OptiPlex Micro Form Factor Workstation 16GB RAM Windows 11 Pro

HP Officejet M479fdn printer

Cisco Aironet wireless access point

Studio will be outfitted with

Point of Sale System from Square

Dell OptiPlex Micro Form Workstations

HP Officejet M479fdn printer

### Physical and Logical Security Plan

The physical and logical security plan is designed to ensure the protection and integrity of the network infrastructure, data, and assets of the organization. It encompasses a comprehensive set of measures that address both physical and digital security risks. The plan aims to establish a secure environment for the office and network infrastructure, mitigating potential threats and vulnerabilities.

#### Physical Security:

Security of this upgrade is important to all stakeholders of PhotoHut's as they hold customer information on there. We have the physical part where we are implementing a few different measures to ensure proper security meet and is enforced in the workplace. The server room will only be accessible by the manager and on-site IT staff that are trained on the system that will be in place. Server room will have in own environmental monitoring system as it is the center of the business and needs different parameters than the office or studio. The physical drives of the data will

lock into the server and will only be able to be removed personally named by stakeholders in the event of an emergency. The data on hard drives will be backed up to clouds on the daily schedule of when work hours are complete. All cables in the server room, as well as the main office, and studio will be protected with anti-tampering wraps or casings to ensure that they cannot be tampered with by someone unauthorized to do so.

#### Logical Security:

To ensure logical security, the plan includes great logical security measures. Network firewalls will be implemented to control network traffic, protecting against unauthorized access and potential cyber threats. Intrusion detection and prevention systems will be in place to monitor network activities and detect suspicious or malicious behavior. Antivirus and anti-malware software will be installed on all systems to help stop malicious software.

Strong password management and authentication protocols will be in place as they are necessary for all workstations within the building.

Both the plans will be closely monitored to make sure that they are followed properly and that any gaps in the security plan will be fixed accordingly as well as timely to the stakeholders' demands.

## Security Policy Recommendation Document

### User Access Guidelines

To safeguard the security of PhotoHut's network and systems, it is recommended to apply the following user access guidelines.

1. Each employee should have their own user account with individual login credentials.
2. Users should be promptly created upon hiring and deactivated upon termination.
3. Password requirements should be enforced, with regular password changes.
4. Two-factor authentication should be implemented for enhanced security and is highly recommended for higher up roles in the company.

### Role-Based Access Control

1. Access privileges should be based on job roles as well as their responsibilities.
2. Only have access to resources within their job descriptions.
3. Sensitive data should be protected from certain job positions.

### Access Control Policies

1. Access control should be enforced for systems, applications, and data.
2. Users should have only access to things within the user's job responsibilities.

### Data Protection

To protect the privacy of the data, it is recommended to have data protection plans in place.

1. Data should have a classification such as (Office, Studio, Public, and Management).
  - a. This includes documentation to show how to protect the data and how each classification works.
2. Encryption
  - a. Secure encryption protocols should be used to protect data confidentiality throughout the company divisions.
3. Data Backup and Recovery
  - a. Regular back up of all data schedule daily.
  - b. Backup to a cloud or offsite location for more security.
  - c. Validation of data backup process through tests done on a weekly basis.

### Privacy Policies

To maintain trust with customers and comply with privacy regulations, we recommend that these policies be implemented into the company as quickly as possible.

### Data privacy

1. Data privacy policy should be made to outline how client data is being used and collected.
2. Clear guidelines for the collection and use of personal data within the guidelines.

### Data Retention

1. Data retention plans in place for data older than a certain amount of time.
2. Created processes for securely deleting data when it is no longer in use to the company.

#### Privacy Notice

1. Provide clients with privacy policies that are clear about how their information is collected and used.
2. Include information on clients right with their data and how they can protect their privacy.

## Full Physical Implementation Plan and Training

Like the Work Break down structure we want to follow a strict implementation plan as it will insure proper training as well installation time on this project.

1. Objective
  - a. Objective for this project is to ensure a smooth as well as effective network upgrade for PhotoHut. This plan will outline the steps, producers needed to be taken, responsibilities involved in the implementation of the network to ensure the infrastructure and workstations are protected.
2. Timeline
  - a. Our timeline as stated before starts with equipment procurement, installation, testing and user training. Coordination with vendors, team members, and the internal to align maximum usage of time is met to streamline the process for all stakeholders.
3. Equipment Procurement
  - a. Identify all keys piece of equipment for the three places involved in this project such as the server room, main office, and the studio. Prepared detailed list of all equipment that will be needed to meet the requirements of the project. Coordinating with vendors to make sure all equipment is sourced correctly and within the budget of the project.
4. Physical Setup
  - a. In the allotted space for the server room, main office, and studio as per design we will start the installation of hardware in order of server then to the main office as the server room is located within the main office. Then on to the setup of the studio, making sure that all three locations meet the agreed upon specifications and installation of all hardware to manufacturer specifications.
5. Equipment Installation and Configuration
  - a. Team members will install all equipment to manufacture specifications and configure them to meet PhotoHut's requirements. Network settings, security protocols, creation of user accounts, and access controls will be created to meet network design requirements along with security of the network.
6. Network Connectivity and Testing
  - a. Verify proper network connection between all devices with the scope of work such as server, workstations, pos, and security devices. Conduct thorough test of security measures such as firewall, intrusion detection system, and the access controls system.
7. User Training
  - a. Creation of training materials and conduct user training sessions to make everyone familiar with new security policies and procedures, the new workstations as well as the network infrastructure that is in place. This is important for daily users and keeping employees updated with their new tools that they will be using.
8. Transition and Migration
  - a. Execute the transition from the existing network to the new network in a very coordinated manner. Migrate data, applications, user data, and user accounts onto the new system. Once completed test verification system and the user accessibility off the new system.
9. Maintenance and Support

- a. Establish an ongoing maintenance plan for the system to help keep the network running smoothly and keep it secure. The role and responsibilities of the IT team being defined in the testing planning to make sure all hardware and software are updated accordingly.

10. Documentation and Handover

- a. Documentation of the full installation and configuration of the network upgrade will help in troubleshooting issues. This will ensure that troubleshooting issues, upgrades for the future, and expansion capabilities are noted for the future as well.

#### Training Protocols for Employees

1. The piece of the training will be a needs assessment, which is a process that is recommended because it gives a chance to get hands on needs with employees and create a plan to fill in their knowledge gaps. This is important because individuals need different types of training between visual and physical doing.
2. Once item one concludes a training plan will be developed to show the basics to the employees. Hand out user accounts that have been assigned to employees, help them set up their back login credentials individually for privacy protection.
3. Then as a group we will go over the new features as they have been using old software and outdated practices in the workplace. Questions will be answered as they come up in the training session, so the information is getting to everyone instead of individually. In this session as well the new physical and logical security protocols are introduced as well implemented.
4. Once step three is taken care of we will be moving into the hands on with the new workstations in further detail with using their new login credentials as well they and demo the new features from Google Suites and Windows 11 Pro. This period is critical for people as these scenarios will be their new day-to-day duties.
5. Even after the hands as group we will be role training duties as not everyone will have the same roles from day to day. These sessions with people will be used to deep dive into individuals' duties that require a lot of in-depth knowledge.
6. All the steps and questions during the session will be documented for record purposes so once McCall Solutions is on the site, they can reference issues as they come up in the workplace.
7. McCall Solutions will continue to assist in training and create refreshing training work that should be completed on a needed basis. We would like to implement this as it is important for continuous learning as well as relearning your daily tools.

## Floor Plan's and Sever Plan

Below is the layout of the Main office floor, we wanted to make the space as enjoyable as possible with all takes in anticipation of the network layout with the new workstations and supporting hardware.

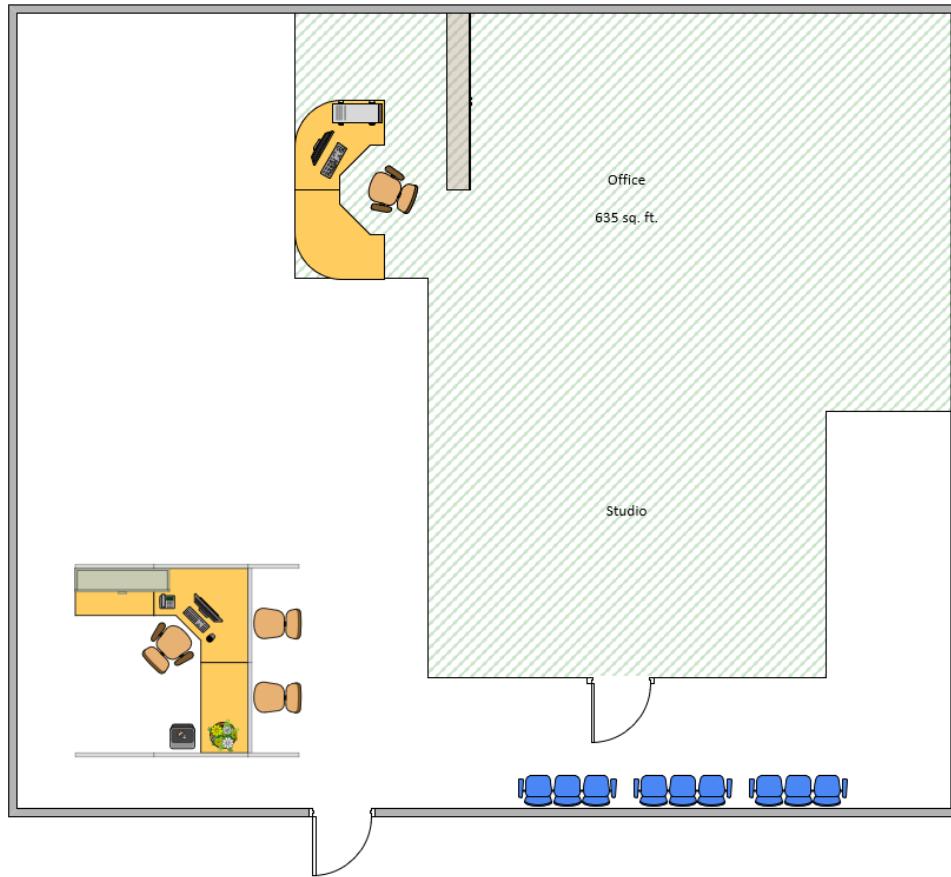


Hardware includes in this layout go as the following:

1. Workstations
2. Printers
3. Wireless Access point
4. Network Switch

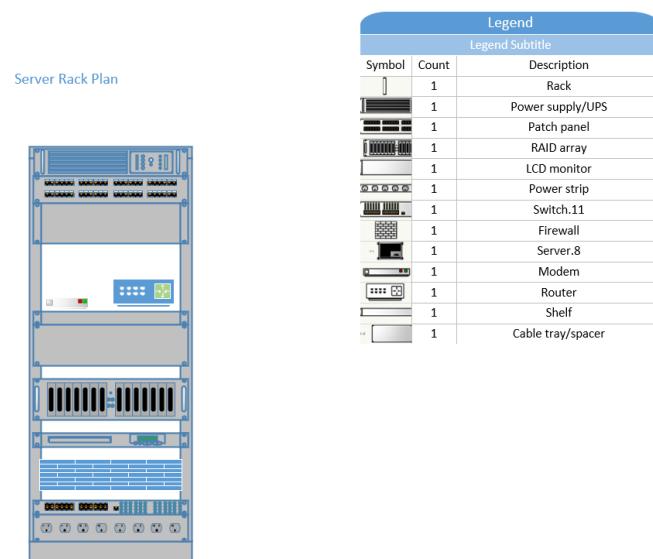
The server room is located on the north wall of the office enclosed in an environment-controlled closet keeping the components at manufactured recommended room temperature.

Below is the Studio layout that accommodates the needs of PhotoHut as well as clients.



Here is shown representation of the studio with a waiting area in the reception area, as well as receptionist at a desk with point of sale. Then in the studio a portion of them have a dedicated workstation as requested.

The diagram is the layout of the server that is placed within the server room.



Pictured above is the server and all the components that will have been put into the server to ensure that the network is secure and able to transmit all the data properly through the system. If you look at page eight of this report, you will notice that there are some components listed as core components in the list of equipment not shown as they are small pieces to the overall build.

## Cloud Server Solution and Firewall Security

### Overview of cloud server options and benefits

The benefit of using cloud services in today's world is almost a must for people as they have many different benefits. The cloud service selected for PhotoHut is from Google, with Google Suites we can prepare for the new network in many ways.

1. Scalability is important to think of when choosing a cloud service as you're able to choose the number of resources that are needed. With this network upgrade not only will the cloud service meet the demands but has the capabilities to PhotoHut in the right position to grow better.
2. Cost is very important because you want to understand the services that you are paying for when selecting a service. Google Suite is perfect for all your needs at a reasonable price, you get developer tools, office tools, and most important communication tools. It is considered a one stop shop.
3. Accessibility options for cloud services are incredibly reliable, giving users more flexibility with their tools. Allows remote work options for employees, better collaboration tools on projects, and better access to the resources needed for the job.
4. Recovery is another great point as you can recover data that has been uploaded to the cloud in the event of a disaster or loss of a file. Data is copied across various servers and data centers, warranting high availability and raw data.

### Things to look for in a cloud service provider:

1. The Service Offering: Compare the range of services offered by different providers, such type of service like Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). It is very important to understand what you are getting from your service.
2. Performance is important to look at as it determines the reliability of the service. Looking for up time, server availability, and the cloud infrastructure that meet the needs of PhotoHut.
3. Data Location is important as cloud services are required to meet industry standards that are required to meet. It is important to know if your data meets your compliance requirements.
4. The most important is Integration and Interoperability of the service. Not all services work well with certain components, making sure you are to use the service without any issues is important. The availability of API's, developer tools, and compatibility with technologies.

### The Firewall Security Importance

The Importance of selecting a firewall service that meets your organization's security requirements.

### Things we considered for this service included.

1. Features of the system offered by the firewall choice should include tools such as detection and prevention, application control, VPN support, Filtering of content, and threat protection.

2. The ability to scale your network is a key piece that most people don't think is important to about because it filters to your network and can slowing him down. It is important to have a firewall that meets the requirements of the network and keeps it safe and secure.
3. Managing the firewall is critical as you need filter services. Having a reputable firewall that a management tools that are user friendly is important, so service don't get blocked out.
4. The reputation of a vendor is critical as possible because there is a different company that provides their service, but it might not be the best service for you. Reputation is what we looked for in a firewall as it is a key part of keeping the network secure.

## Budget Overview

Inserted Below is the budget of this project with everything including changing orders, original scope of work, and any miscellaneous cost that came up in the project.

As previously stated, in the change order document there was no additional cost to this project with the cloud services being added in just a monthly charge to PhotoHut.

## Source of Project Cost

PROJECT TASKS		LABOR HOURS	LABOR COST (\$)	MATERIAL COST (\$)	TRAVEL COST (\$)	OTHER COST (\$)	TOTAL PER TASK
PROJECT DESIGN	Network Consultation and Requirements Gathering	2.0	\$50.00	\$0.00	\$0.00	\$0.00	\$100.00
	Research and Analysis	3.0	\$50.00	\$0.00	\$0.00	\$0.00	\$150.00
	Network Conceptual Design and Documentation	4.0	\$50.00	\$0.00	\$0.00	\$0.00	\$200.00
	Network Design Review and Iterations	5.0	\$50.00	\$0.00	\$0.00	\$0.00	\$250.00
	Design Documentation and Deliverables	6.0	\$50.00	\$0.00	\$0.00	\$0.00	\$300.00
	<b>Subtotal</b>	<b>20.0</b>	<b>\$250.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$1,000.00</b>
PROJECT DEVELOPMENT	Hardware Acquisition and Configuration	5.0	\$80.00	\$0.00	\$0.00	\$0.00	\$400.00
	Procure Software	2.0	\$0.00	\$239.00	\$0.00	\$0.00	\$239.00
	Procure Hardware	2.0	\$0.00	\$14,116.21	\$5,000.00	\$0.00	\$19,116.21
	Server Setup	12.0	\$40.00	\$0.00	\$0.00	\$0.00	\$480.00
	Workstation Setup	13.0	\$30.00	\$0.00	\$0.00	\$0.00	\$390.00
	Studio Setup	7.0	\$30.00	\$0.00	\$0.00	\$0.00	\$210.00
	Development Acceptance Test Package	5.0	\$30.00	\$0.00	\$0.00	\$0.00	\$150.00
	Customization and Configuration	2.0	\$40.00	\$0.00	\$0.00	\$0.00	\$80.00
	<b>Subtotal</b>	<b>48.0</b>	<b>\$250.00</b>	<b>\$14,355.21</b>	<b>\$5,000.00</b>	<b>\$0.00</b>	<b>\$21,065.21</b>
PROJECT DELIVERY	Deployment and Implementation	2.0	\$40.00	\$0.00	\$0.00	\$0.00	\$80.00
	Training and User Support	11.0	\$30.00	\$0.00	\$0.00	\$0.00	\$330.00
	Data Migration and Conversion	10.0	\$50.00	\$0.00	\$0.00	\$0.00	\$500.00
	System Testing and Acceptance	3.0	\$40.00	\$0.00	\$0.00	\$0.00	\$120.00
	Provide Warranty Support	2.0	\$40.00	\$0.00	\$0.00	\$0.00	\$80.00
	Archive Materials	1.0	\$40.00	\$0.00	\$0.00	\$0.00	\$40.00
	<b>Subtotal</b>	<b>29.0</b>	<b>\$240.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$1,150.00</b>
PROJECT MANAGEMENT	Project Planning and Scheduling	5.0	\$100.00	\$0.00	\$0.00	\$0.00	\$500.00
	Resource Allocation and Management	4.0	\$100.00	\$0.00	\$0.00	\$0.00	\$400.00
	Risk Assessment and Mitigation	1.0	\$100.00	\$0.00	\$0.00	\$0.00	\$100.00
	Stakeholder Communication and Engagement	2.0	\$100.00	\$0.00	\$0.00	\$0.00	\$200.00
	Configuration Management	2.0	\$100.00	\$0.00	\$0.00	\$0.00	\$200.00
	Project Closure and Evaluation	1.0	\$100.00	\$0.00	\$0.00	\$0.00	\$100.00
	<b>Subtotal</b>	<b>15.0</b>	<b>\$600.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$1,500.00</b>
OTHER COST	Misc Material	0.0	\$0.00	\$5,000.00	\$0.00	\$0.00	\$5,000.00
	Other cost	0.0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	<b>Subtotal</b>	<b>0.0</b>	<b>\$0.00</b>	<b>\$5,000.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$5,000.00</b>
<b>Subtotals</b>		<b>112.0</b>	<b>\$1,340.00</b>	<b>\$19,355.21</b>	<b>\$5,000.00</b>	<b>\$0.00</b>	<b>\$29,715.21</b>
Risk (Contingency)		10.0	\$250.00	\$275.00	\$0.00	\$0.00	<b>\$525.00</b>
<b>Total (Scheduled)</b>		<b>122.0</b>	<b>\$1,590.00</b>	<b>\$19,630.21</b>	<b>\$5,000.00</b>	<b>\$0.00</b>	<b>\$30,240.21</b>

## Project Conclusion and Recommendations

With the conclusion of this project, McCall Solutions has created robust and secure network for PhotoHut. We are confident that the network will hold true through time, as we built it to meet current needs as well as prepare them for the future.

Future recommendations that we suggest after the hand of the project are regular maintenance checks on all hardware installed by McCall Solutions and making sure that everything is running smoothly.

Below are our recommendations we believe could be used in the future for further security and upgrades to the network in the event of more rapid growth.

1. VPN services are great tools as they help with security as the other very important features like extra encryption protocols that cannot be intercepted by unauthorized parties. This makes it difficult for websites, online services, or malicious attacks towards the network.
2. Network load balancers are something to consider as the company grows as they help balance and distribute the traffic of the network to help performance, availability, and scalability.
3. In future expansions of PhotoHut we recommend consultation with McCall Solutions to make sure demands are met, to ensure that the network still flows correctly and to ensure day-to-day activities are not impacted.
4. Security of the network will always need to be a factor as cybersecurity measures are always tested by third parties. We recommend regular security tests and continuous training of all employees to ensure the safety of the company.

## Bibliography/References