GROUP 3, Inc

Network Design Project

December 15, 2022

CIS 4840-02

Presented By:

Jesus Diaz

Brenden Duong

Jessie Estrada

Nitya Kondapalli

Jasson Martinez

Prepared For:

Biological Science Building

Table of Contents

Introduction

The Biological Science building's goal is to cultivate a diverse and thriving intellectual community and prepare students for progressive careers in the life sciences through the acquisition of current knowledge, conceptual learning, quantitative and communication skills, and through opportunities for individually mentored research experiences.

As a group of students, we will describe our customer's requirements and explain how our design meets those requirements which includes, logical & physical design, and the budget & expenses associated with the building.

Background

The Department of Biological Sciences is housed in the LaKretz Hall, part of the new Annenberg Science Complex, and the original Biological Sciences building. New facilities in LaKretz Hall include a teleconferencing room complete with video capability, digital projectors and screens, and a hospitality center. The Department of Biological Sciences maintains an aluminum-glass greenhouse facility adjacent to the Biological Sciences building. There are two connected rooms with 2,135 sq ft of floor space. The facility includes heating, cooling, plumbing, and fluorescent lighting

Scope of Work

The work that will be performed will include scoping out a Biological Science building floor to propose a network design. This includes measurements of the building floor, what lines we plan to use, wireless access points, and counts of the classroom, computers, printers, and switches/routers.

Feasibility Study

Project Proposal

This proposal is for a network design project for the floor 2 of the biological science building.

Network Scope

The proposed network design is designed to serve the biological building which will consist of 30 rooms. The building is actually built to a specification meaning there will be maximum flexibility for the network to be proposed.

The rooms within the building there will be 26 classrooms, two public restrooms, one computer lab room, and 4 administration offices. There is also one storage closet and an equipment room where all telephone systems, servers, network components and connections are.

Objectives

The network is designed to achieve specifications required by the users and the building administration.

1. *Secure Service* - The highest priority of this network plan, is to make sure that the network is secure and available to students and staff of the Biological Building. Delicate information may be processed in this network, and due to this, network security needs to be established. The functionality of secure network login will facilitate this process, by only giving access to permitted users.

2. *Performance* - This network design needs to meet the expectations of student and staff. The connection needs to fast in order for users to have access to online class documentation. This network design also needs to be able to simultaneously sustain a heavy amount of users including both students and staff.

3. *Scalability* - Network design has got to be scalable. Technology is continuously growing and this network design has got to have the ability to change for that. It will need to be able to provide for both high and low performance devices.

4. *Maintainability & Updating* - A key part to this design is that it needs to be both maintainable and have the ability to be updated. Maintainability is crucial because at any given time, anything could go wrong and changes would need to

be made to the network. Ensuring that the network is maintained, will also further secure proper functionality.

Design Features

Equipment Room

The “equipment room” will be a locked room that is secure. This room needs to be properly ventilated and air conditioned for proper device functioning. No electronics will be on the floor for flooding protection. Uninterrupted power supply will also be given to all devices in this room.

Computer Labs

All the faculty members and staff are usually provided with the baseline computers or baseline notebooks. They also have their own research active faculty who maintain their computers in the laboratories that are for student use as well as the specialized research applications. There are two computer classrooms (BS 236 and BS 241) each of the rooms have 24 networked student workstations with a priority that is available for courses that are a part of the biological sciences.

Classrooms

These rooms will each have 1 workstation for the use of the Professor.

- Workstation - Computer, Monitor, Keyboard, Mouse
- Cat 6 Cabling

Design Assumptions

This design assumes the following points:

1. All network and equipment will be a new installation.
2. The building has been constructed to support and facilitate network installation.
3. Internet service will be provided by an Internet Service Provider such as AT&T.
4. Biological Science Building will be providing specialized software to be installed on the network, which they will use for the benefit of the users in the building.

Network Needs Analysis

Data Types

The types of data served by the network will be school reports, student information, personnel profiles, management information, classroom documentation, scheduling files, industry specific webpages and software. There will be a heavy usage of video and voice due to the remote learning opportunities and class recordings.

Data Sources

Data will be created and used at all workstations on this network. The data will be created by software applications in a Windows 11 environment on all workstations and Windows Server 2022 on the server. Microsoft Office Apps and Adobe Creative Cloud applications will also be utilized .The network will be not be accessible from outside the facility

Users and Priority Levels

The maximum estimated number of users on the network at any given time is about 100. Professors and administration will be given priority, followed by students.

Load Variation Estimates

Based on the information gathered from students, the busiest times are: Monday - Thursday 8am - 5pm.

Transmission Speed Requirements

The network will be transparent to users. This is so that there is no change for the data in the process of data transmission through the wireless transmission to ensure the quality of transmission

Reliability Requirements

To keep users expectations and industry standards the network will operate at the following percentage rates:

Standard Operations Uptime	99.9%
Downtime	0.1%
Error Rate	0.001%

Security Requirements -

Firewall will be implemented to restrict access to unauthorized users. To access the network, students and faculty will be required to enter their school username and password for authentication and have access to the same capabilities.

Existing Network

There is an existing network, this design will be an improvement of the current system which would not provide sufficient network requirements. There will be an increase in range access, as well as an increase in the speed of the connections due to the appropriate placements of routers. Due to this, there will also be an increase in the

number of users that can have access at one time. There will not be a risk for drops in the connection, due to the changes/improvements being made to the system. The equipment used in some rooms are PCs, touch panel, document camera, dual 23 inch monitors, multimedia projector, PA system, USB cable, laptop input adapters, HDMI adapter, mini HDMI adapter, micro HDMI adapter, Type C, display port, mini display port. The PC model is an HP 800 G3 SFF i5-3.4GHz, 8GB, 512GB SSD, USlim, DVDRW with 24 inch monitors and there are 25 computers in this classroom. The applications used with this network are: w 10,

Existing Wireless Access Points

The existing wireless will support all the latest devices and wifi protocols. The students, faculty and staff have the ability to access the CSULA-SECURE wireless network when using their MyCalStateLA ID username and password. The Cal State is also offering access to the eduroam which can be accessed through the wireless network your home credentials. The guests that come to Cal State LA usually on their mobile phone they can request access through self registration process and then a password will be sent to them via text message. In order to access the guest network they would have to select the CSULA-OPEN wireless network.

New Wireless Access Points

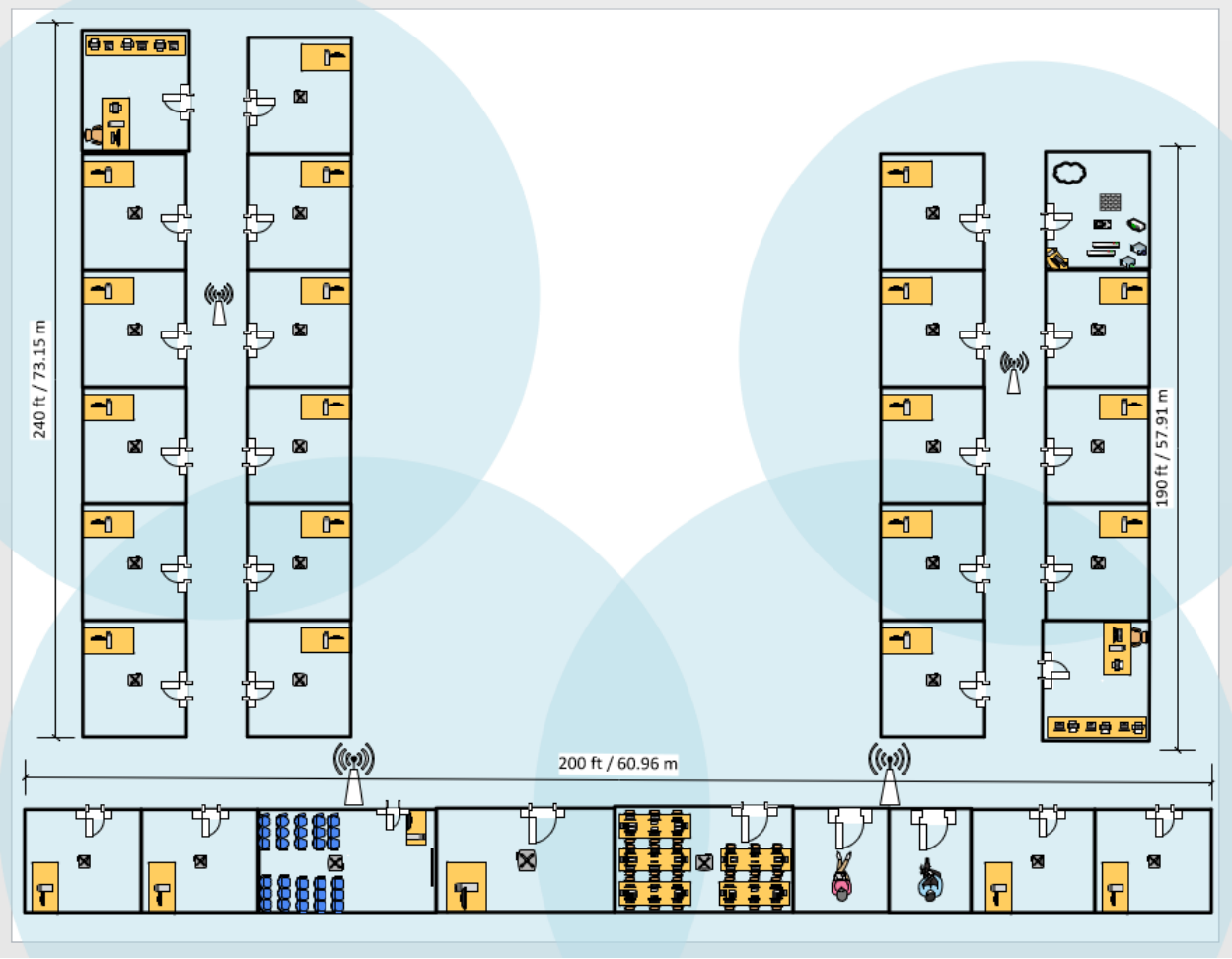
Our new wireless access point will be evenly spread across the floor. There will be four total wireless access points and this is because we want the internet speed to be consistently the same and have more people to connect without a problem. The reason

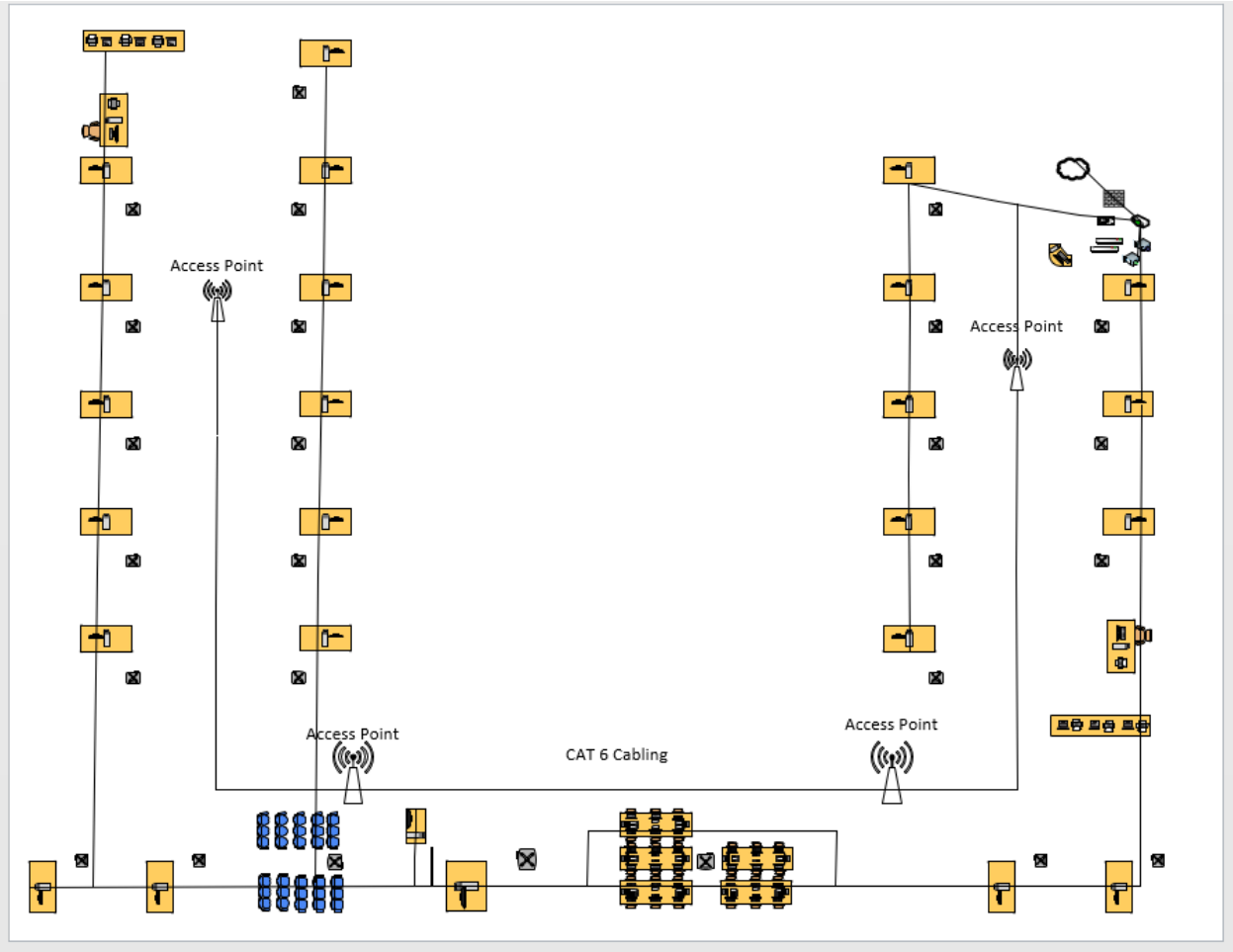
why we have wireless access points instead of range extenders is because they can easily handle over 60 simultaneous connections each. With multiple, users can roam freely from room to room without experiencing network interruptions.

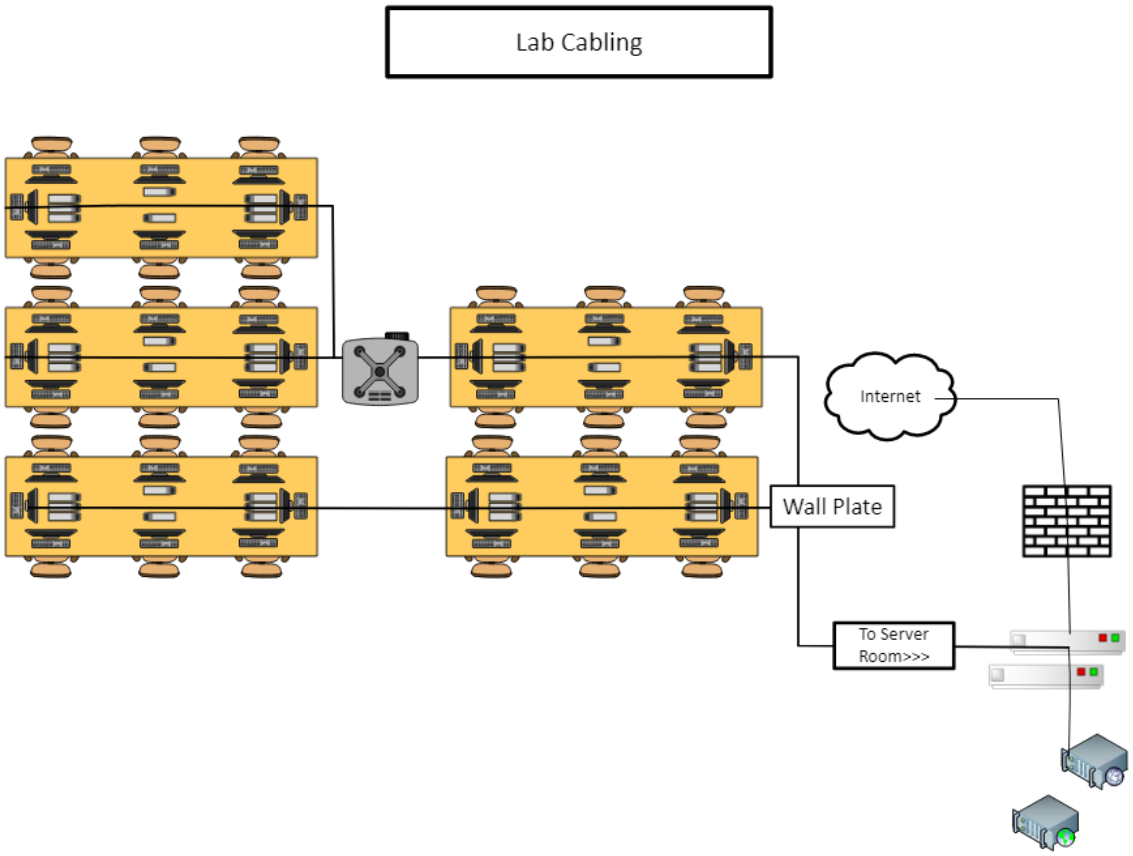
Requirements

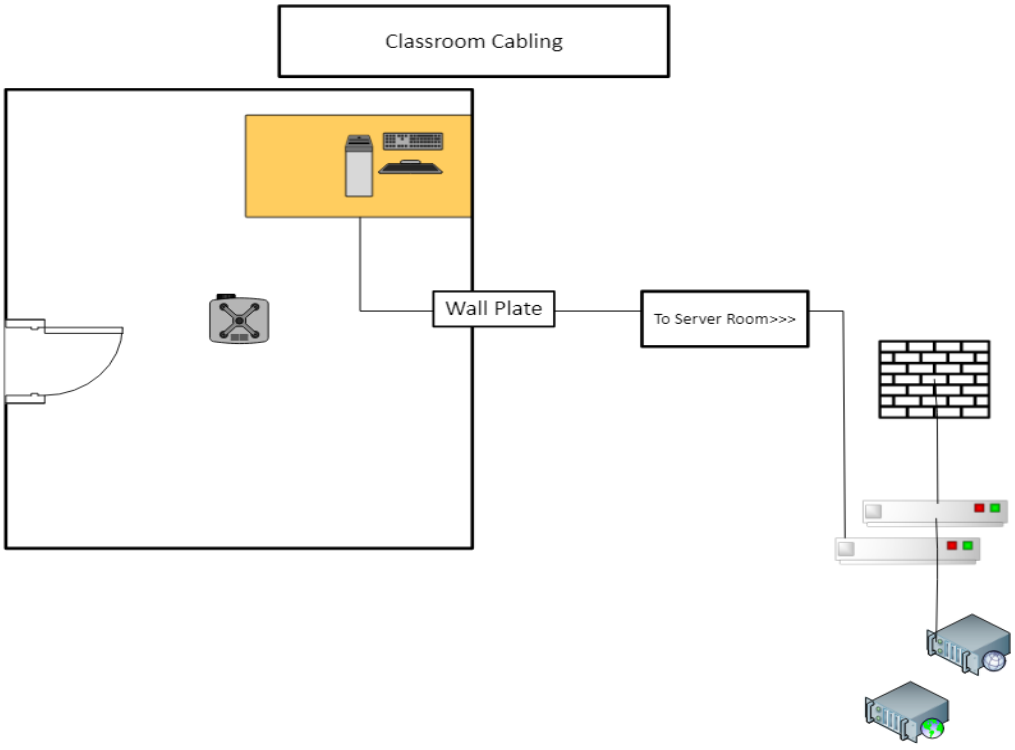
- *Software*
    - *Microsoft Windows 11 Home Edition on all Workstations and laptops (wired or wireless)*
    - *Microsoft Server 2022 on the server*
    - *Microsoft Office 365*
    - *Service packs and Updates*
    - *Computer Login software*
- *Multi functional devices (print, copy, fax, scan)*
- *Switches*
- *Wireless Access Points*
- *Cabling & Connectors*
- *Workstations*
- *Firewall*
- *Server*
- *Modem (Provided by building's chosen internet service provider)*

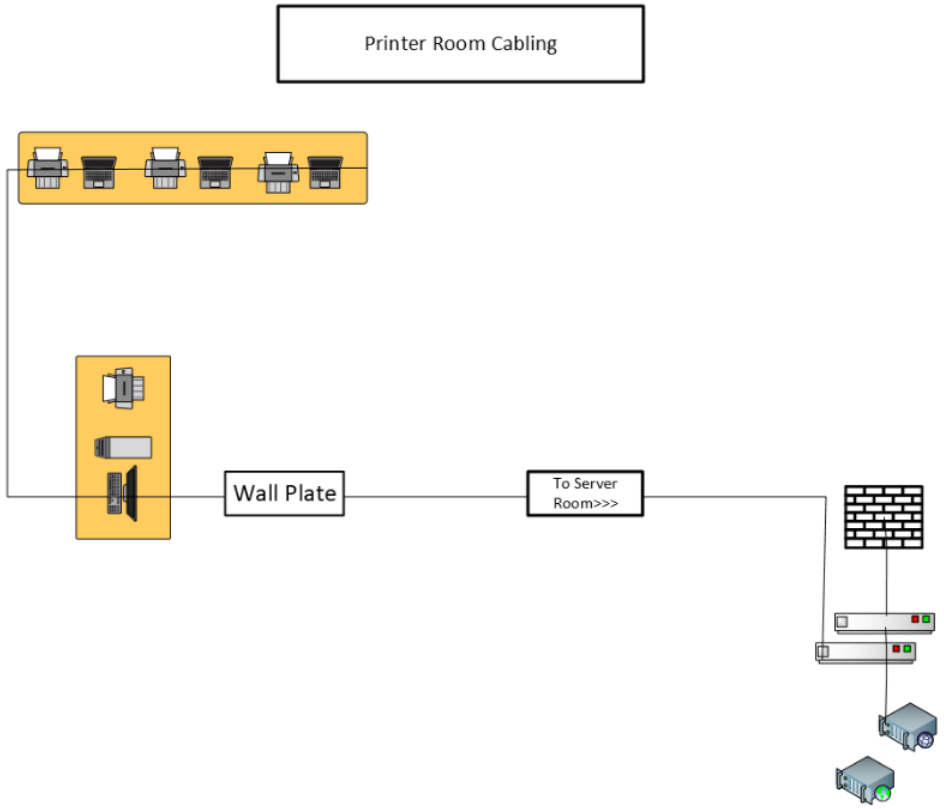
Network Diagrams and Topologies

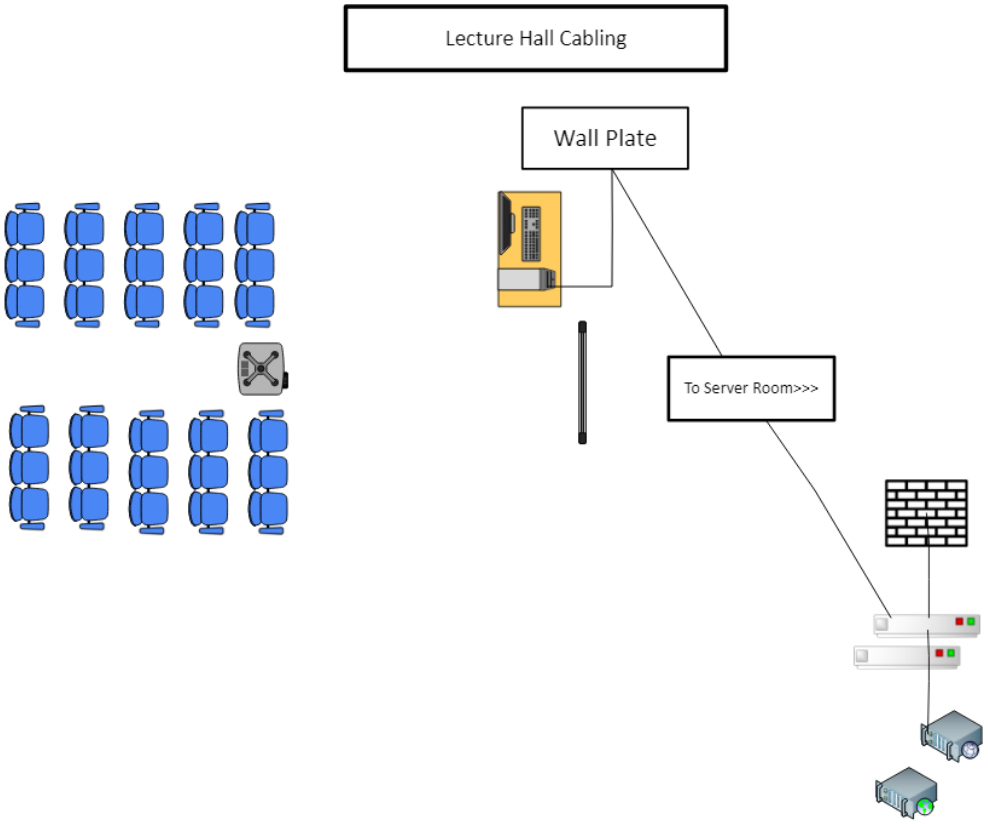



Access Point
Access Point
Access Point
Access Point
CAT 6 Cabling


Lab Cabling
Internet
Wall Plate
To Server Room>>>


Classroom Cabling
Wall Plate
To Server Room>>>


Printer Room Cabling
Wall Plate
To Server Room>>>


Lecture Hall Cabling
Wall Plate
To Server Room>>>

Cost Benefit Analysis

Items:	*Units*	*Cost of each*	*Total Cost*	*Link (URL)*	*Labor (EST)*
Monitors	*68*	*$349*	*$23,732*	*HP Elite Display*	*$900*
Laptops	*6*	*$1,999*	*$11,994*	*Laptop*	*$500*
Workstations	*68*	*$929.99*	*$63,239.32*	*Workstation*	
Projector	*26*	*$2,000.11*	*$52,002.86*	*Projector NEC*	*$600*
Printers (integrated with fax, scanner, etc…)	*8*	*$819.99*	*$6559.92*	*Printer*	*$300*
Modems	*2*	*$499.99*	*$999.98*	*Modems*	*Installed @75hr*
Routers	*1*	*$599.99*	*$599.99*	*Router*	*$400*
UPS	*1*	*$239.99*	*$239.99*	*UPS*	*$300*
Wireless Access points	*4*	*$557*	*$2,228*	*Wireless Access Point*	*Installed @70hr*
Server	*1*	*$2,884*	*$2,884*	*Server*	*$500*
Server Rack	*1*	*$192.56*	*$192.56*	*Server rack*	*$300*
Cable Management Tools	*30*	*$7.99*	*$239.07*	*Cable management*	*Installed @80hr*
Cat 6 cable (1000 ft)	*1*	*$189.99*	*$189.99*	*Cat 6*	*Installed @70hr*
Rj connectors (100 pack)	*2*	*$13.97*	*$27.94*	*Connector*	
Card reader Door Access Control System	*29*	*$263.57*	*$7,643.53*	*Card Reader*	*$1000*
TOTAL			*$172,773.15*		*If worked on for 8 hours ~ $7,160*

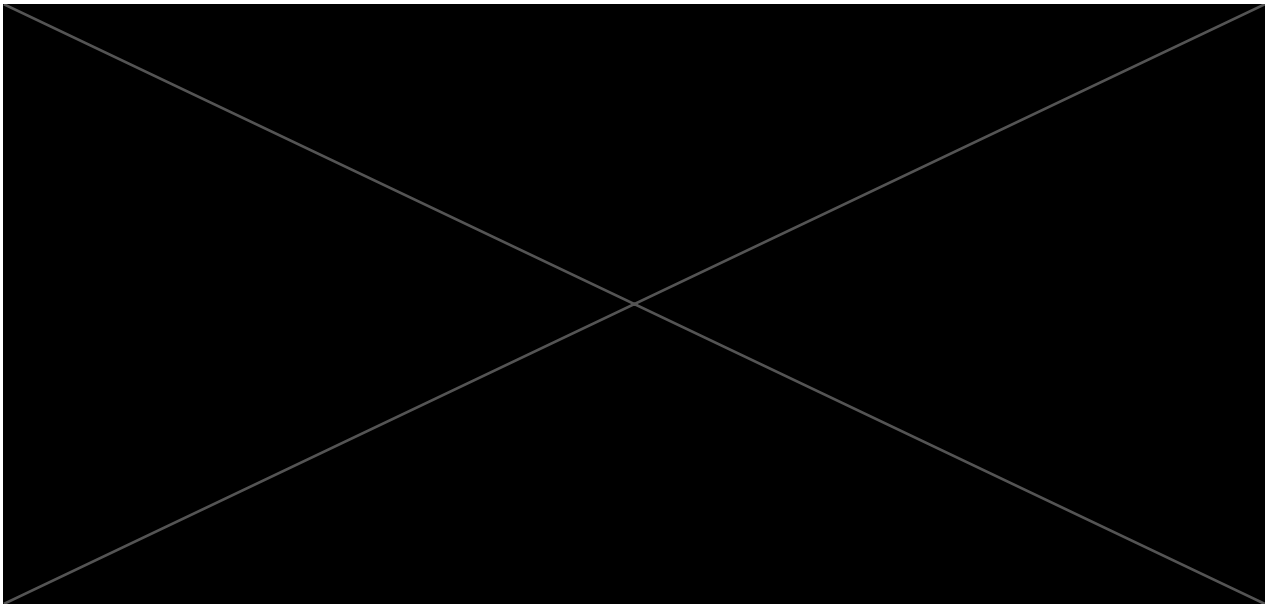
Disaster Recovery Plan

- The use of backup plans for data will be incorporated into all the computer programs.
    - Backups will occur every day at 11:59 am and pm to ensure your new and old data is backed up.
    - This process will help ensure the recovery of important files and information.
- Cloud storage should be used in each program.
    - Stores info in the programs cloud server which also gives access to older versions of your documents.
    - Cloud service will be saved after any change you make into your document.

Acceptance and Authorization

The terms and conditions of the Professional Services Agreement apply in full to the services and products provided under this Statement of Work.

IN WITNESS WHEREOF, the parties hereto each acting with proper authority have executed this Statement of Work, under seal.



Date

Date

System Setup Documentation

Operating System Installation

Windows Server 2022

Windows Server 2022 standard edition will be installed for this building's servers.

System Version Info

There have been changes to the biological science building’s software.

The biological software will be available in two versions: client and server.

The client will be accessible by your school email and password. There will be a folder called Biological Science Software containing Client-Setup.exe and Server-Setup.exe. In the same folder there will be the user manual named as BiologicalScienceBuilding_User_Install_Manual.

Please Copy both Client-Setup.exe and Server-Setup.exe files to either a flash drive or any other external storage device.

The software must:

You must be connected to the internet while installing and activating the Software. Once fully installing you must enter the following activation codes to finish the activation.

The activation codes are:

Client activation code: [redacted]

Server activation code: [redacted]

Additional Software will be added onto each computer that restricts access from students. This software can be downloaded from another folder called Admin_Sofware.

This folder will contain: .exe file for the software application, .pdf file containing the User Manual, and .txt file containing license keys required when installing the application. The process of downloading this software will be the same as the other programs by copying the .exe file to a flash drive or any other external storage device.

We offer 24/7 technical support at [redacted] and clarify where you are calling from. Thank You!