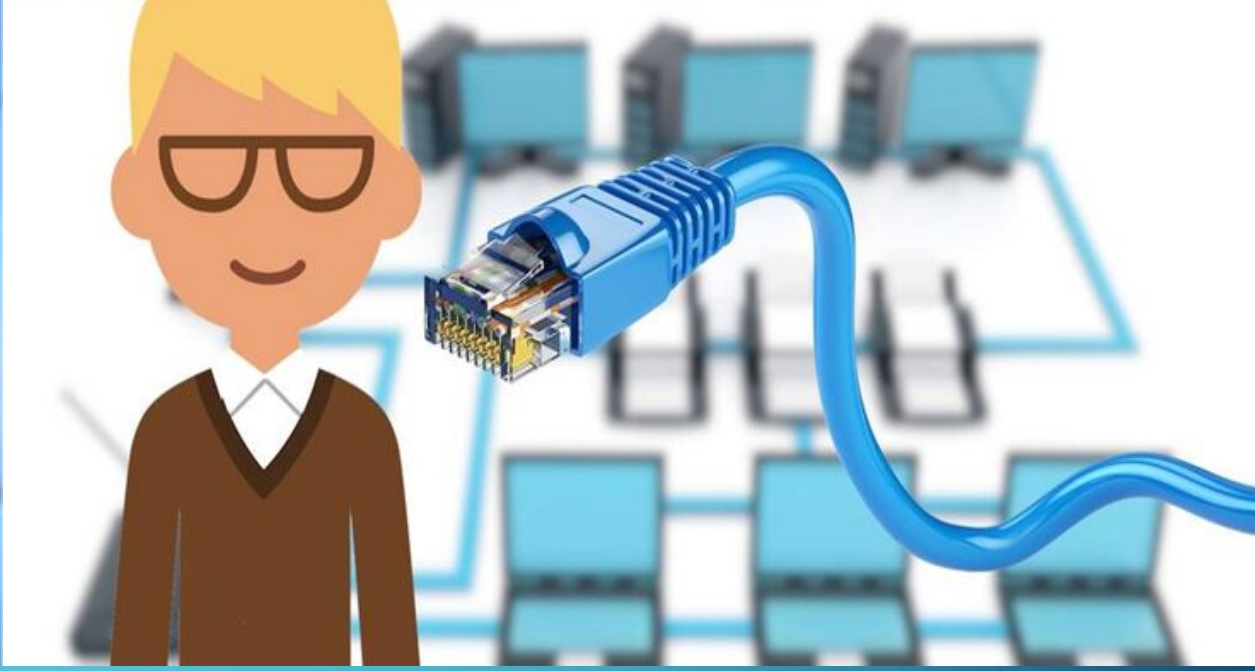

CASE ANALYSIS WIRING MAURY HIGH SCHOOL

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IT315

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A PLAN AND BUDGET FOR THE WIRING OF THE BUILDING

- To determine Maury High school's aggregate cabling, the shortest and longest cable runs to the equipment room or telecom closet will be averaged.
- Then the result will be multiplied by the number of cables running to that room. The basement, 1st floor, 2nd floor, and 3rd floor have the same layout , thus the longest and shortest cable runs for each floor will be the same.
- One equipment room will be situated at the center of the second floor. The basement will house the telecommunication room. Also, the 1st floor and 3rd floor will each house a telecommunication room.

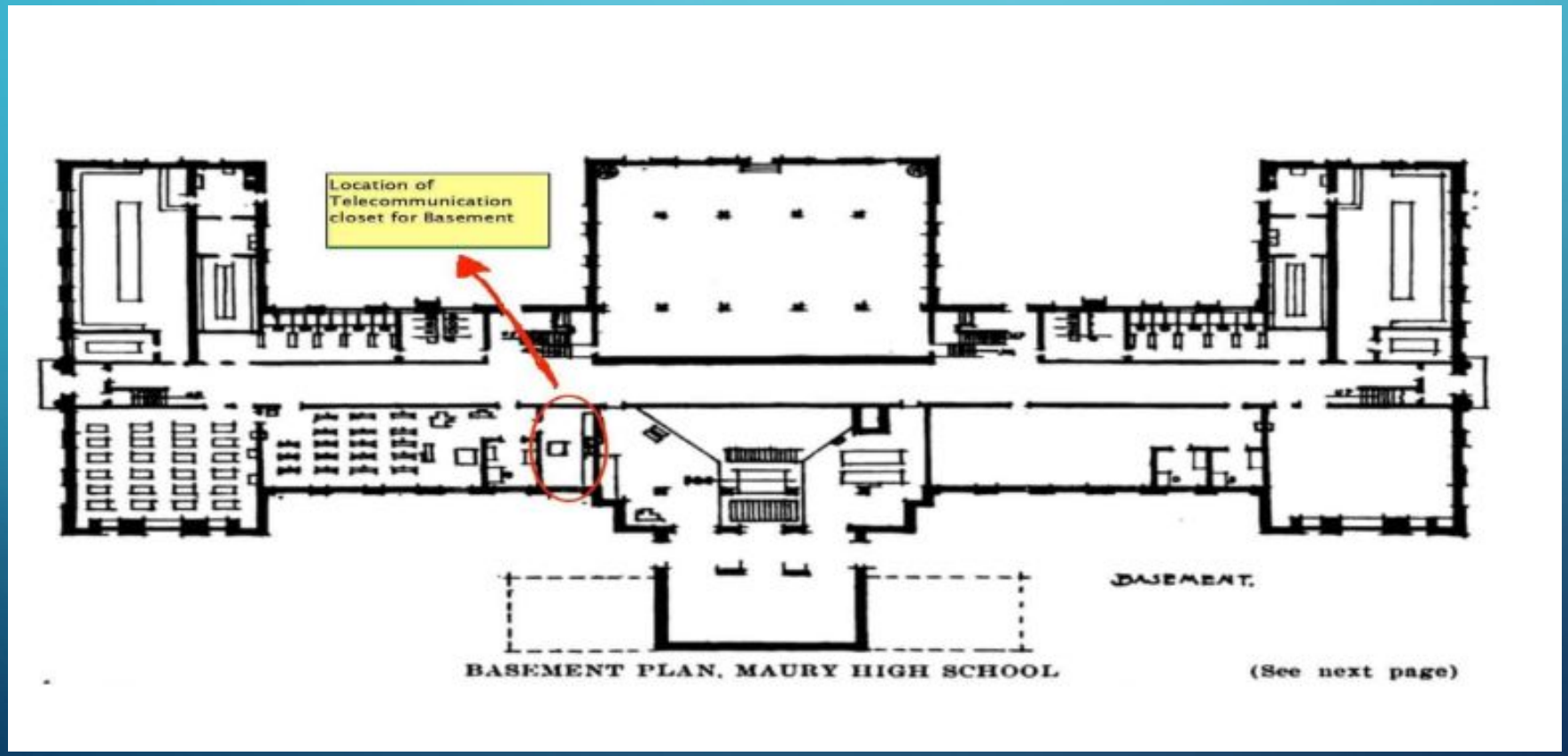
A PLAN AND BUDGET FOR THE WIRING OF THE BUILDING

- The network setup will take star topology (Hutchison & Sterbenz, 2018).
- Telecomm Closets: Basement, 1st floor and 3rd floor, located centrally for minimized cable runs.
- Equipment Room: Ideally on the 2nd floor for central access; requires larger space
- The equipment room and the telecommunication rooms will house auxiliary workstation power supplies, distribution panels, circuit administrative points, distribution panels, and house backbones (Ciampa, 2020)

EQUIPMENT LOCATION

- Equipment room in the second floor, as well as the telecom closet on each floor, will distribute all types of the network equipment.
- The Equipment room will have the core switch, the basement switch, the switch firewall, the router, the switch rack holders and the switch cabinets.
- The first floor switch, the first wireless router, and a firewall for the switch will be housed in the first-floor telecom closet.
- A switch as well as a firewall for the switch will be in the telecom closet on the basement.
- Third-floor switch with second wireless router and firewall for the switch will be located in the third-floor telecom closet.

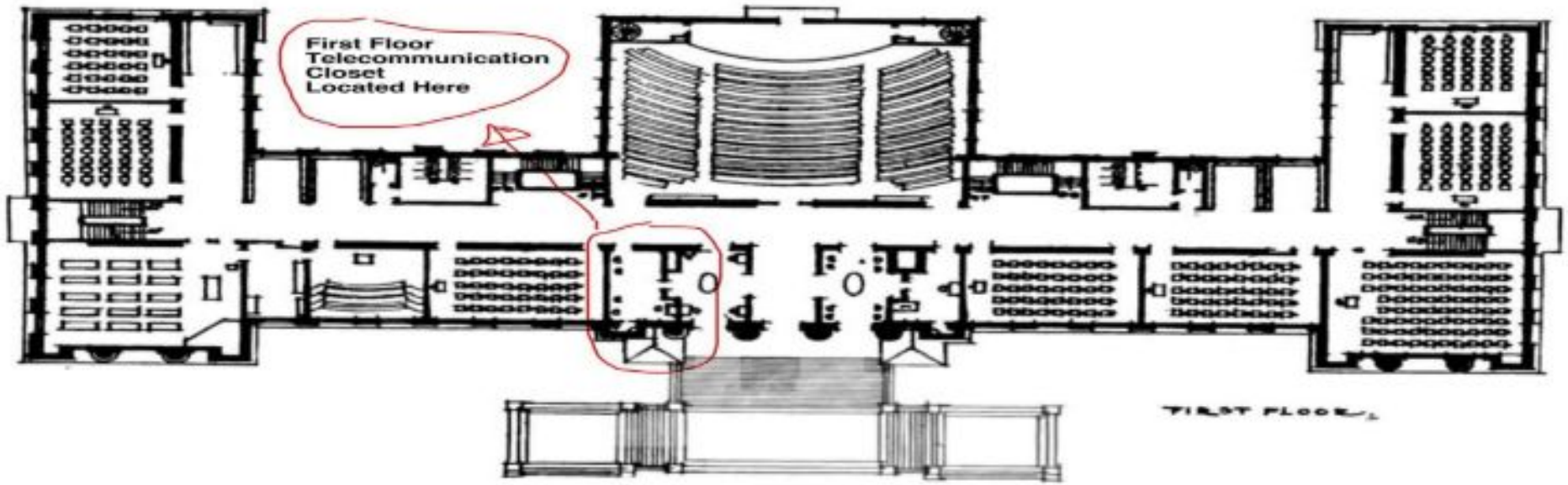
LOCATION OF TELECOMMUNICATION CLOSETS AND EQUIPMENT ROOM
BASEMENT



BASEMENT CONT…

- The telecommunication closet will be established in the room that is adjacent to the entrance toward the floor's center.
- The longest cable from that room will run from the telecommunication closet to the room situated in top right corner.
- As provided the width of the building is 95m, i.e. 311 feet, I estimate the longest cable's length run to be 45m (150 feet). The shortest cable run starts from the telecommunication closet to the next room, and it is about 1 foot.
- The longest and shortest cable runs give an average of 75 feet (which I take to be similar in all floors).
- Because each classroom has two live network outlets the cables that run in the telecommunication closet room is 30.
- Multiplying 75 feet by 30 we get the approximately 2250 feet as the total amount

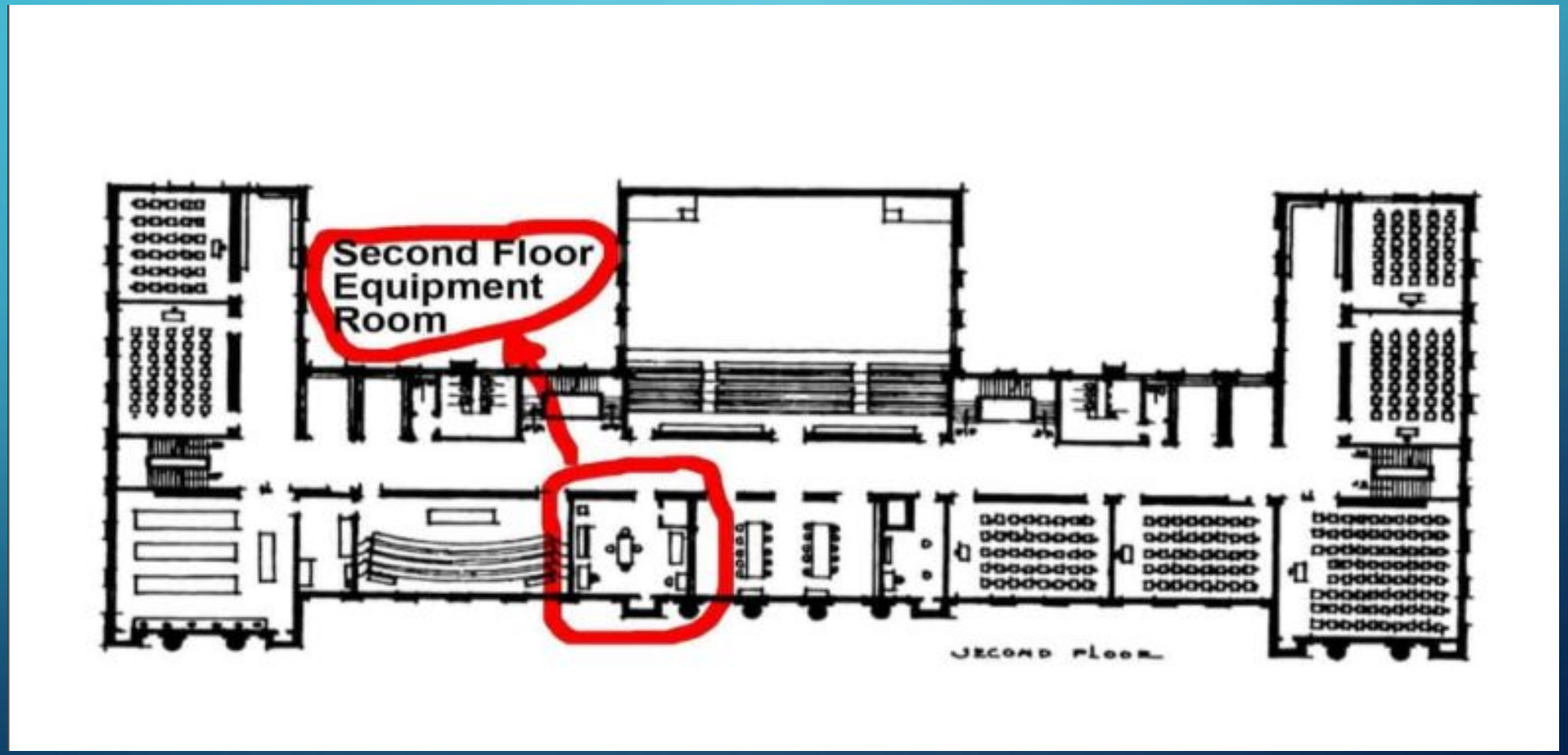
FIRST FLOOR



FIRST FLOOR CONT…

- The same location the basement housed the telecommunication room is where the first floor will hold the telecommunication room.
- The total number of cables runs to the closet for this floor will be 34. Multiply average feet of 75 by 34 gives aggregate cabling of 2550 feet for this floor.

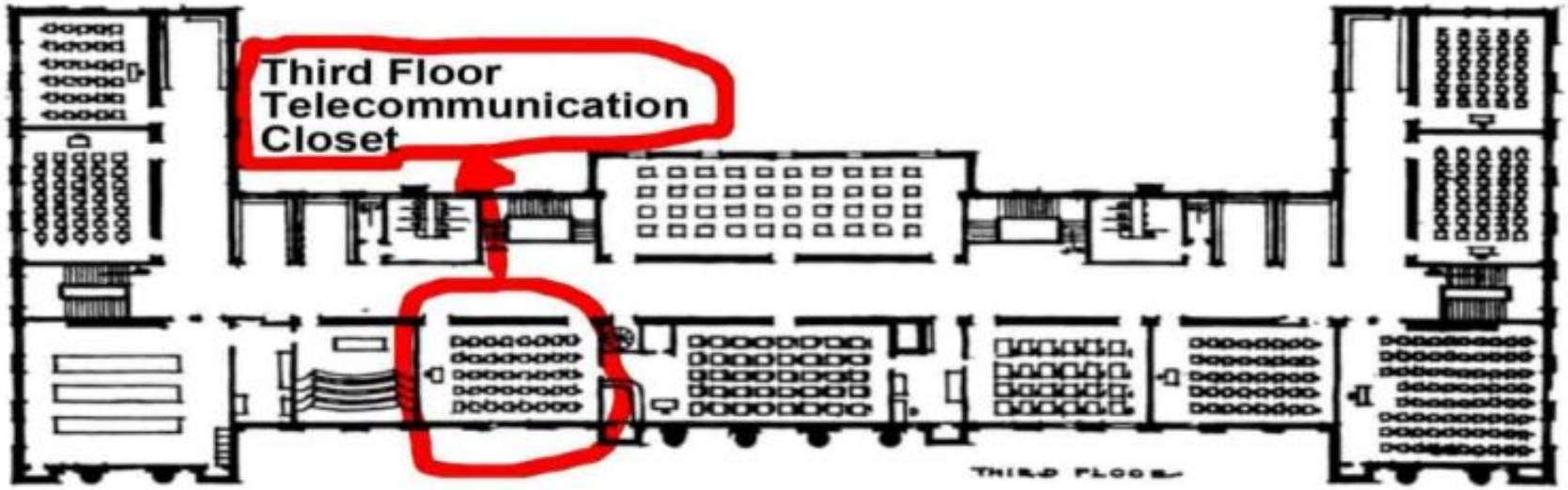
SECOND FLOOR



SECOND FLOOR

- I will use the same average of 75 feet.
- The total cables runs will be 36.
- Multiply 75 by 36 gives total cabling of the second floor as 2700 feet.

THIRD FLOOR



THIRD FLOOR

- The third floor will have the same cables runs of 36 as the second floor.
- Multiply 75 feet (average) by 36.
- We get 2700 feet as aggregate amount of cabling required for the third floor.
- Overall;
- The total amount of cabling for all the floors will be 2250+2250+2700+2700= 10,200 cabling feet.

WIRING PLAN & BUDGET ESTIMATION

- I went on Amazon and found 100 feet Cat6 cables sold wholesale at approximately $255 dollars per 1000 feet. This price comes with RJ45 tips.
- I purchased 11, 1000 feet Cat6 cables. Thus, the aggregate cabling cost is $2805. (255*11)
- Because two live network outlets are required in each room, 100 RJ45 outlets and patch panels are required.
- On Amazon I discovered two pack of RJ5 outlets retailing at $11. This price comes with wall plates.
- Also, still on the same site the patch panel cost $37 (24 ports).
- The overall cost of RJ45 outlets adds up to $550 and patch panels $3700

WIRING PLAN & BUDGET ESTIMATION

- I will get the managed switches for each floor. I will have 4 for the 3 telecommunication closets and the main equipment room.
- Type: Gigabit Managed Switches are recommended for flexibility and control.
- Cisco offers the 250 series smart switches at a price of $109
- The four brings a total of $436.
- Additional Hardware from Fortinet:
- Rack units for mounting switches in the telecomm closets and equipment room.
- UPS (Uninterruptible Power Supply) for each closet and the main equipment room to ensure network uptime.
- Rack Units: $100 per rack unit.
- UPS Systems: $250 per UPS system.
- Total Additional Hardware Cost: (4 racks × $100) + (4 UPS × $250) = $400 + $1,000 = $1,400.

EQUIPMENT AND BUDGET ESTIMATION

Router

- The network cannot function effectively without a basic router which directs the incoming and outgoing data traffic. It will connect to an internet service provider (ISP), which is, actually a router. There should be elements of security in the router such as firewalls and detection systems.
- This leaves the most appropriate router for the Institution as the NETGEAR Nighthawk Tri-Band WiFi 7 Router (RS700S) - BE19000. It has VPN and SSL router encryption. It is secure, as it contains an in-built IP filter.
- Wireless Routers
- Wireless devices which comprise of phones, tablets, laptops, and other smart machines will be connected via a wireless router. Two wireless routers will be placed at telecom closet for first floor and third floor, respectively. NETGEAR Nighthawk is the best wireless router that can be used in this school.
- With a range of up to 1500 sq. and supporting up to 100+ devices, this router boasts wireless speeds of up to 1750 Mbps. It comes with a package of an Armor Security service add on to the WiFi Router. It would be quicker in speed, cover a wide area, and its enhanced security capability would assist in monitoring the network traffic. Wireless Router goes at about $224 (Amazon, 2023).
- So, aggregate routers' cost 224*2=$448

FIREWALL & BUDGET ESTIMATION

- From OPNsense@ Shop website I found the Zen Armor® hardware appliance for OPNsense firewall to ensure the network traffic is secure.
- The appliance and firewall cost on the website will be approximately $2,000
- Configuration and Setup: Approximately $500 (varies based on local rates).
- Maintenance: $300 per year.
- Contingency: 10%
- Grand Total: $2,000 (Firewall) + $500 (Setup) + $300 (Maintenance) + $280 (Contingency) = $3080
- Overall, the total budget of everything is $ 9,614

KEY ASSUMPTIONS

- All the computers within the institution have 10/100/1000Base-T NIC.
- The school uses 1 gigabyte ethernet.

NETWORK DIAGRAM