Case Analysis

Cable Run Estimates

Using a star topology, the network's design involves one central equipment room on the second floor and telecommunication closets on each of the remaining floors. Each closet serves as a hub for its respective floor, supporting backbones, distribution panels, and other network essentials. The placement strategy for telecommunication closets and the equipment room is shown in the submitted diagrams.

Calculation Method

The calculation for the cable runs involves averaging the longest and shortest runs to any point from each telecommunication closet, then multiplying by the number of cables needed. Here's a breakdown by floor:

- Basement: The longest cable run is 150 feet, shortest is 1 foot, averaging 75.5 feet. There are 30 cable runs from the telecommunication closet, resulting in a total of 2,250 feet of cabling.
- First Floor: Similar placement of the telecommunication closet as in the basement. With 34 cable runs and an average run of 75.5 feet, the total cabling requirement is 2,565 feet.
- Second Floor: Houses the main equipment room, with 36 cable runs averaging 75.5 feet each, totaling 2,718 feet.
- Third Floor: Replicates the setup of the second floor with 36 cable runs, leading to another 2,718 feet of cable.

Total Cabling Requirement

- Summing up all the cabling across the floors, the school will require approximately 10,251 feet of Cat6 cable, which provides ample bandwidth and performance for a school environment.

Budget Considerations

- Cabling Costs: Using an average price for Cat6 cabling, which might range from $0.20 to $0.30 per foot, the estimated cost for cabling alone will be between $2,050 and $3,075.
- RJ45 Outlets and Wall Plates: Assuming each classroom and office requires a dual outlet installation, and with prices ranging from $5 to $10 per unit, the total cost will depend on the number of rooms serviced.
- Patch Panels: Cost estimates will depend on the number of ports per panel and the quality of the panels chosen. Prices can vary significantly based on specifications and vendor.

Pricing Sources

- Cabling and RJ45 Outlets: Pricing information is typically available from bulk suppliers like Monoprice or through commercial providers like Amazon Business or Newegg Business.
- Patch Panels: Sourced from IT infrastructure providers with competitive pricing and reliable product specifications.

Diagrams and Floor Plan

- The submission includes detailed diagrams that specify the locations of the telecommunication closets and the central equipment room, providing a clear visual guide to the planned network infrastructure layout.

Equipment and Cost Breakdown

Cabling:

- Purchased 11,000 feet of Cat6 cable at a total cost of $2,775.52 from Cable Wholesale. This includes RJ45 tips necessary for connections.

RJ45 Outlets and Wall Plates:

- Required: 100 two-pack RJ45 outlets (200 outlets total to support two per room).
- Total cost: $550 (purchased from Amazon, with each two-pack priced at $11).

Patch Panels:

- Required: Enough patch panels to accommodate all RJ45 outlets, totaling 100 outlets.
- Purchased panels with 24 ports each from Amazon at $37 per panel.
- Total number of panels purchased: approximately 9 (assuming 8 fully used and 1 partially used for exact fit), leading to a cost of $333.

Managed Switches:

- Four Cisco 250 Series Smart Switches to manage traffic on each floor including the basement, first, second, and third floors.
- Total cost for switches: $436 ($109 each).

Network Security Hardware:

- Selected a WatchGuard Firebox T55-W Network Security/Firewall Appliance priced at $1,713.99. This device includes a pre-installed operating system and is designed to integrate seamlessly with the network infrastructure.

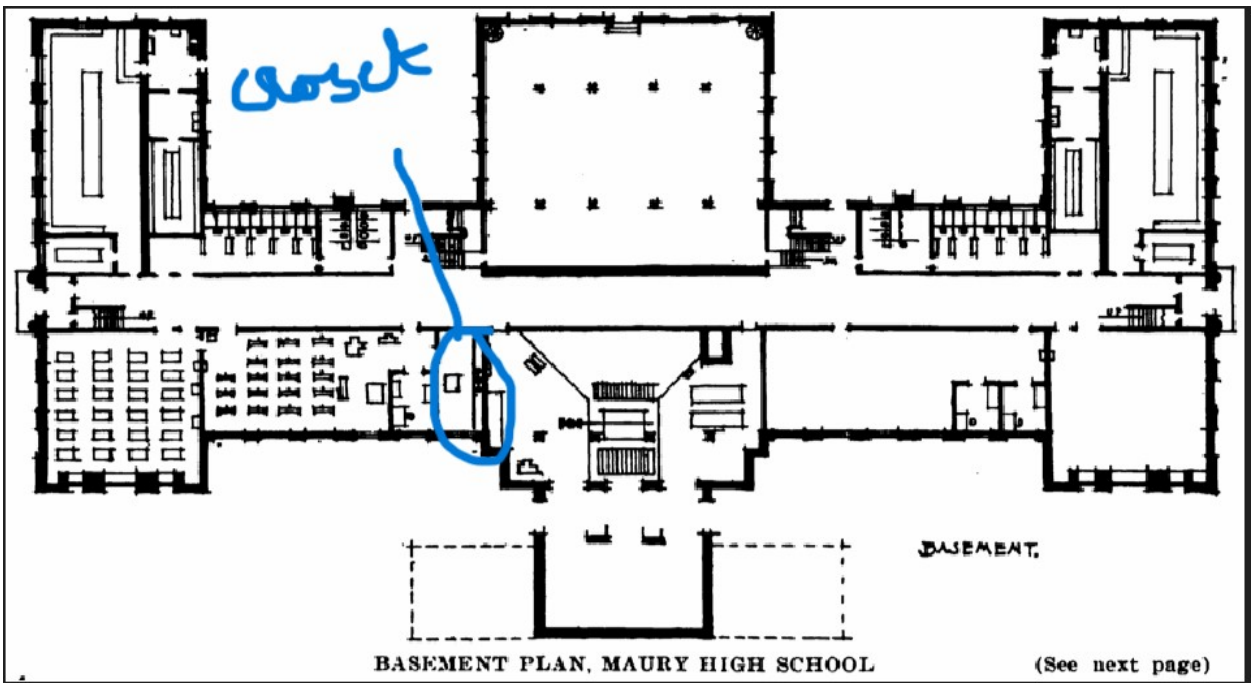
Total Estimated Costs:

- Cabling: $2,775.52
- RJ45 Outlets: $550
- Patch Panels: $333
- Switches: $436
- Firewall: $1,713.99
- Total Budget: $5,808.51

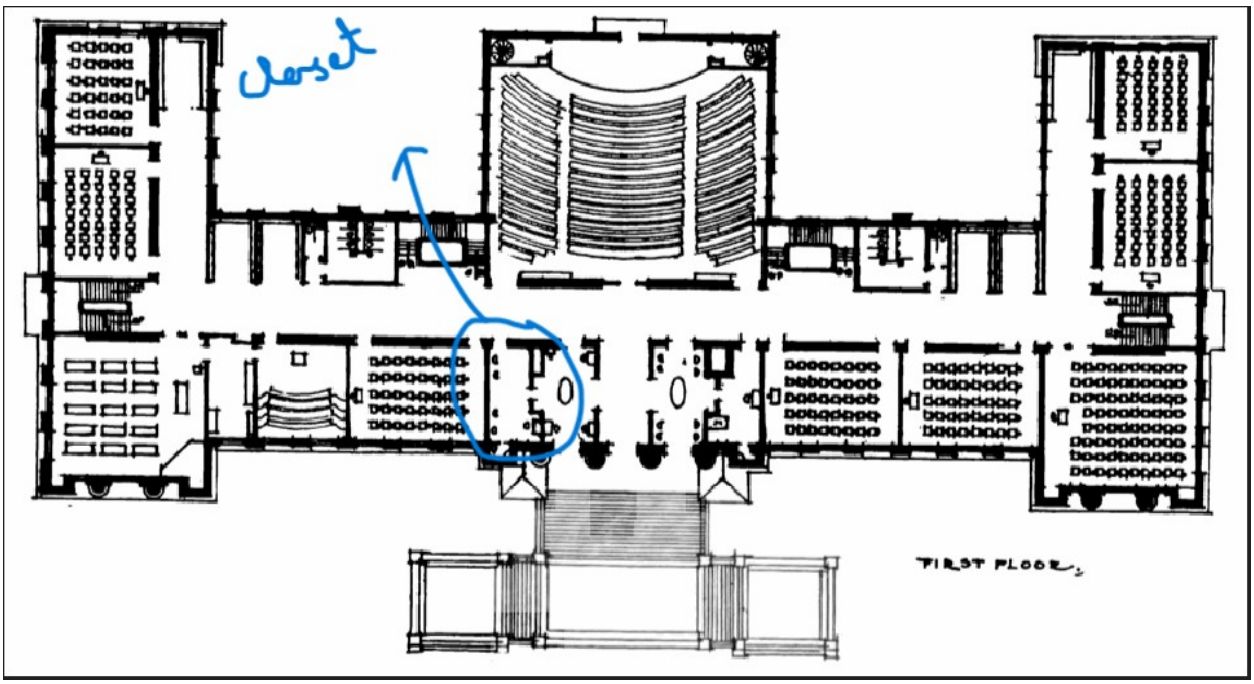
Networking Specifications and Assumptions:

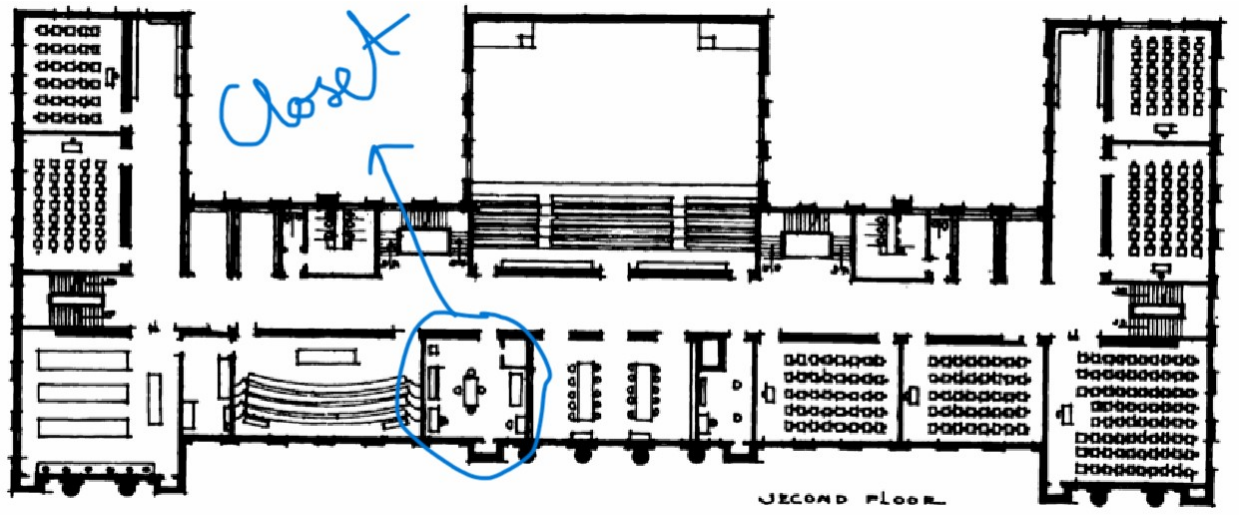
- Each classroom and office is equipped with two network outlets, interconnected via the RJ45 outlets and managed by the Cisco switches.

- The network is based on 1 Gigabit Ethernet, aligning with the hardware capabilities of the high school's computers, which have 10/100/1000Base-T NICs.



BASEMENT PLAN, MAURY HIGH SCHOOL (See next page)

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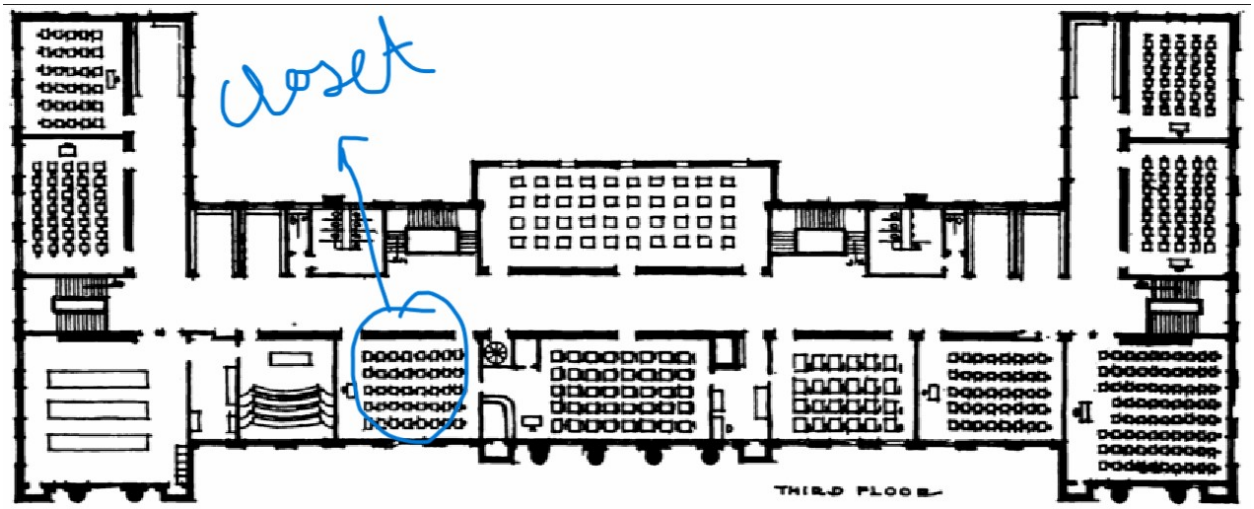
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