Maury High School Wired Network Design

Erik C. Sorto

IT 315

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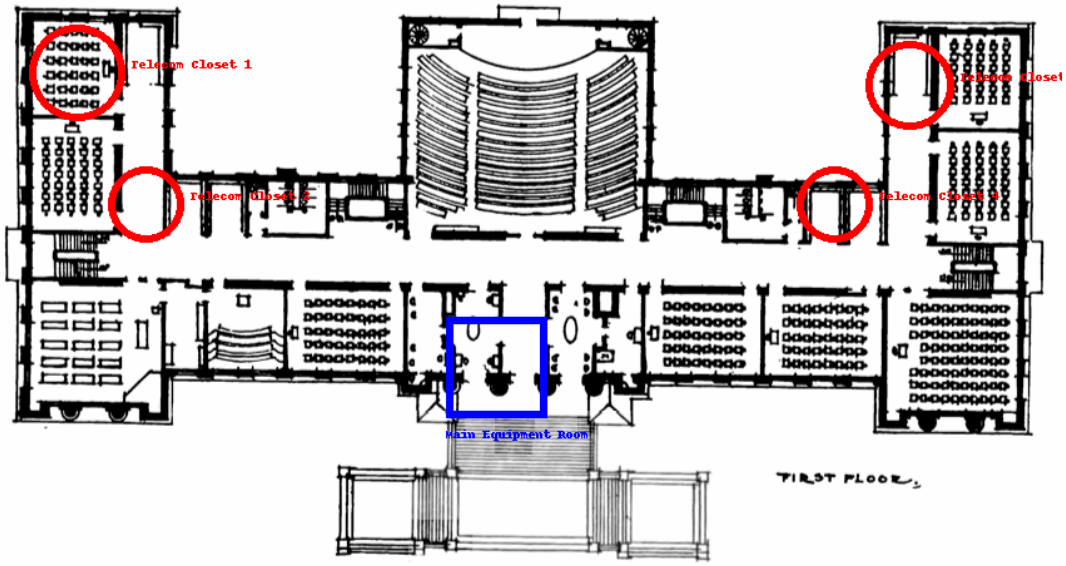
Part 1: Wiring Plan and Budget

A. Annotated Floor Plan

See below for the attached floor plan with the main equipment room and telecom closets clearly marked in red.



Main Equipment Room: Central lobby/entrance, first floor (bottom middle of the image).
Telecom Closets: Four circled small offices, one per building quadrant (see diagram above).

B. Cabling Calculations

- Rooms to be served: Estimated 60 (20 per floor × 3 floors, based on the plan).
- Outlets needed: 2 per room × 60 = 120 outlets
- Faceplates: 120
- Keystone RJ45 Punchdown Outlets: 120
- Patch Panels: 24-port × 5 = 120 ports

Cable Run Calculation

- Average cable drop: 80 ft (room to closet) × 120 = 9,600 ft
- Closet backbone runs: 4 × 150 ft = 600 ft
- Add 10% slack: (9,600 + 600) × 1.1 = 11,220 ft

C. Pricing Table

Item	Qty	Price/Unit	Total	Source
Cat6 Bulk Cable (1,000 ft)	12	$150	$1,800	Amazon/Monoprice
Faceplates (2-port)	120	$3	$360	Monoprice/Amazon
Keystone Punchdown Jacks	120	$2.50	$300	Monoprice/Amazon
Patch Panels (24-port)	5	$90	$450	Monoprice
Total			**$2,910**	

Part 2: Network Equipment and Patch Cables

A. Switches and Ports

- Outlets needed: 120 × 1.1 = 132 ports (rounded up to 144).
- Switches:
  - Main Equipment Room (core): 2 × 24-port managed switches
  - Each Telecom Closet: 1 × 24-port managed switch × 4 = 96 ports
  - Total: 48 (core) + 96 (closets) = 144 ports
- Patch Cables: 144 (one per port)

B. Pricing Table

Item	Qty	Price/Unit	Total	Source
Managed 24-port Switch	6	$120	$720	Amazon/Newegg
Patch Cables	144	$2	$288	Monoprice/Amazon

(Cat6)

Network Racks	4	$200	$800	StarTech/Amazon
Total			**$1,808**	

- Switch Model Example: TP-Link JetStream TL-SG1024DE, Netgear ProSafe GS324T
- Core switch: The main equipment room acts as the distribution/core switch, linking all closets.

C. Equipment Placement

- Main room: Core switches, patch panels, fiber/copper uplinks.
- Each closet: One managed 24-port switch, patch panel, small rack.

Part 3: Network Security & Subnetting

A. Subnetting / VLAN Plan

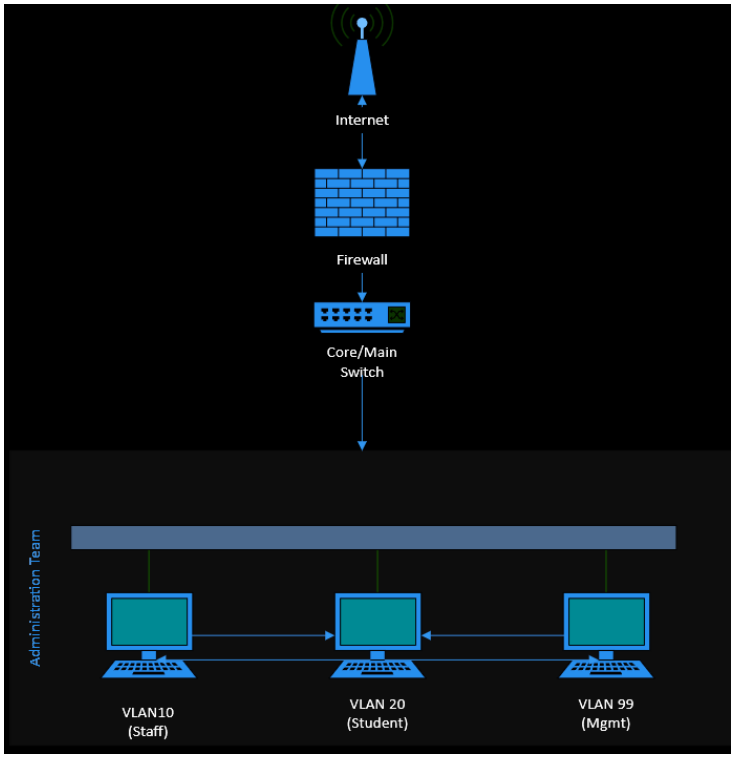
- VLAN 10: Staff/Admin (offices)
- VLAN 20: Students (classrooms/labs)
- VLAN 99: Network Management (IT staff)

B. Firewall Selection and Pricing

Item	Qty	Price/Unit	Total	Source
FortiGate 60F	1	$650	$650	Amazon/CDW

- Firewall location: Main equipment room, between ISP and core switch.
- Function: Segmentation, NAT, filtering, traffic between VLANs, no public-facing servers.

C. Network/Subnet Diagram



All VLANs are trunked through switches; firewall enforces inter-VLAN policies and Internet access.

Summary Table

Category	Total
Wiring	$2,910
Equipment	$1,808
Firewall	$650
TOTAL	**$5,368**

Reflection

Designing this wired network plan helped me understand how much it goes into making a big networking in the real world. I learned that it's not just about running cables but, you must also plan out closet locations, calculate cable lengths, and make sure everything stays within Ethernet standards. Pricing out the materials and comparing switch options and was actually pretty eye-opening, especially seeing how fast costs can add up even when using

basic equipment. Separating the network into staff and student VLANS made sense to me from a security perspective, and I can see why schools need to lock things down that way. I realized that having a good main equipment room and closets in the right spots make the whole install cleaner and easier to manage later on. Honestly, it was a lot more detailed than I thought going in, but now I feel more comfortable reading floor plans and putting together a basic network for a real building. If I ever had to install something like this, I know what to look out for and how to break the job into steps where I can understand. Overall, this project gave me a solid understanding of what goes into network design and how to make sure it's both secure and reliable.

Sources

- Monoprice: https://www.monoprice.com/
- Amazon: https://www.amazon.com/
- CDW: https://www.cdw.com/
- Netgate: https://shop.netgate.com/