

Case Analysis

Part 1. Budget and Wiring

Based on an assessment of floor plans, there are a total of 50 classrooms (9 classrooms in the basement, 13 on the first floor, 14 on the second floor, and 14 on the third floor). With the width of the school being 300 feet wide.

The cable has to run from the classroom wall jacks to the nearest telecom closet. And from the telecom closet to the main equipment room. With each classroom having 2 outlets. 4 telecom closets, one per floor. And one equipment room. With the cables estimate to be 75 to 100 ft moving horizontally, but to have extra cable the cable would be 150 ft horizontally. With 2 outlets for each class, $2 \times 100 = 100$ network outlets, $100 \text{ outlets} \times 150 \text{ ft} = 15,000$ feet of cable total for the horizontally. We have the basement, 1st, 2nd, and 3rd floor with each having a telecom closet. Having the vertical cable running 200ft, with a total of 4 closets, $4 \text{ closets} \times 200 \text{ ft} = 800$ feet of cable vertically.

Item	Quantity	Unit price	Total price	Source
Bulk cat6 copper ethernet cable (1,000 ft)	18 boxes (18,000 ft)	\$161.22	\$2,901.96	Cat6a F/UTP Stranded Network Cable, Black, Spool, 1000ft
RJ45 punchdown jacks	2 (25 per box)	\$22.99	\$45.98	Amazon.com: Tedgetal Cat6 RJ45 Keystone Jack 25-Pack 45 Degree, Punch Down Ethernet Wall Jack Insert Coupler, Adapter UL Listed, White : Electronics
RJ45 wall plates	5(10 per pack)	\$14.99	\$74.95	Amazon.com: Cable Matters 10-Pack Low Profile 2-Port Keystone Jack Wall Plate, RJ45 Wall Plate for Keystone Jacks in White : Electronics
Patch panels	5	\$61	\$305	FDMP Cat6 110-Style Unshielded Recessed Patch Panel, 24-Port, 1RU, Cable Management Bar Included - FS.com
Cat6 RJ45 connectors	2 (100 pack)	\$13.88	\$27.76	Amazon.com: CableCreation Cat6 RJ45 Connectors, 100-PACK Cat6 RJ45 Ends, Ethernet Cable Crimp Connectors UTP Network Plug for Solid Wire and Standard Cable, Transparent : Electronics

Total Price: \$3,355.65

Part 2. Network Equipment Plan and Budget

To support an Ethernet network that connects all rooms in Maury High School, first calculated the number of required network outlets. With 50 classrooms and offices, each requiring two live Ethernet outlets, the total number of outlets is 100. To ensure future expandability and redundancy, I added 10% more outlets, bringing the total number of required Ethernet ports to 110. To manage and distribute network connectivity across the entire school building, four telecommunications closets will be set up one on each floor: the basement, first, second, and third floors. Each closet will be equipped with at least one managed switch, and together these switches will provide the connectivity to the classrooms and offices on their respective floors. Each telecom closet will contain one 48-port managed switch. One of the closets will also include a 24-port managed switch to provide the additional ports needed beyond the four 48-port switches. The switches will connect to a central core management switch located in the main equipment room. This core switch collects all the connections and provides support for all traffic across all floors.

Item	Quantity	Unit Price	Total Price	Source
48-port switch	4	\$399	\$1,596	Amazon.com: TP-Link TL-SG3452X 48 Port Gigabit Switch, 4 x 10GE SFP+ Slots L2+ Smart Managed Omada SDN Integrated IPv6 Static Routing Support QoS, IGMP & LAG 5 Year Manufacturer Warranty
24-port switch	1	\$199.99	\$199.99	TP-Link TL-SG3428 JetStream 24-Port Gigabit Managed SG3428 B&H
Core 48-port managed switch	1	\$1,595	\$1,595	Amazon.com: Cisco Business CBS350-48P Managed Switch 48 Port GE PoE 4x1G SFP Limited Lifetime Protection (CBS350-48P-4G-NA) : Electronics
Cat6 patch cables	10	\$15.49	\$154.9	Amazon.com: Cat 6 Ethernet Cable 5FT 10Pack, Cat6 Ethernet Patch Cable 10Gbps, High-Speed UTP Cat6 Network Cable Pure Copper, Cat 6 Cable for Home and Office Network, Black : Electronics
42U Server rack Cabinet	1	\$969.99	\$969.99	Amazon.com: Sysracks Server Rack 42U Network Enclosure 39 inch Deep Data Cabinet on Wheels - Fully Locking Network Rack - Thermostat - LCD Screen - Power Strip : Electronics

Total Price: \$4,515.88

Part 3. Network Security Plan and Budget.

To secure the school’s network traffic, a business grade firewall will be deployed at the network core to protect internal users and manage traffic to the Internet. Internal network segmentation using VLANs will help separate staff and student traffic. Firewall with support for 600 users. VLAN segmentation to isolate student and staff traffic. ACL (Access Control Lists) to block/allow traffic per subnet.

Internet

|

Firewall

|

Core Switch

|

| | | | |

Floor Switches

Basement | 1st | 2nd | 3rd

Item	Quantity	Unit Price	Total Price	Source
100F Firewall	1	\$2,069.99	\$2,069.99	Fortinet FortiGate 100F - security appliance - FG-100F - Firewalls & VPN - CDW.com
Cat6 Patch cables	4	\$15.49	\$61.96	Amazon.com: Cat 6 Ethernet Cable 5FT 10Pack, Cat6 Ethernet Patch Cable 10Gbps, High-Speed UTP Cat6 Network Cable Pure Copper, Cat 6 Cable for Home and Office Network, Black : Electronics

Total Price: \$2,131.95