

Team Alpha

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CIS 4100, Gomez Tagle

Project Scope – IT Infrastructure for Public School

Infrastructure Upgrade:

- Establish new IDF wiring closets strategically located across the school premises.
- Set up Win 2019 Server, CISCO MS355-48X2-HW Cloud Managed MS355-48X2 Switch 48 Ports Managed and Patch Panel in each IDF for efficient local network management.
- Cisco MX250-HW Meraki MX250 Cloud Managed security appliance
- Extend the high-speed 100/1000 base T LAN throughout the entire school.
- Implement a 1000 BASE T Cat 7 uplink to the MDF.
- Network Topology and IP Addressing Develop and implement a new IP addressing scheme for efficient network management.
- Switching Infrastructure: Install new core and access layer switches in each IDF and relevant network locations.
- Security Configuration: Configure VLANs, firewalls, and routers to ensure a secure and controlled network environment. Implement
- Enhanced Learning Environment: Provide high-speed access to CIS students across the school for IS IT course materials.

Project Timeline:

Deliver fully operational labs, classrooms, and network infrastructure within a timeline of 76 days.

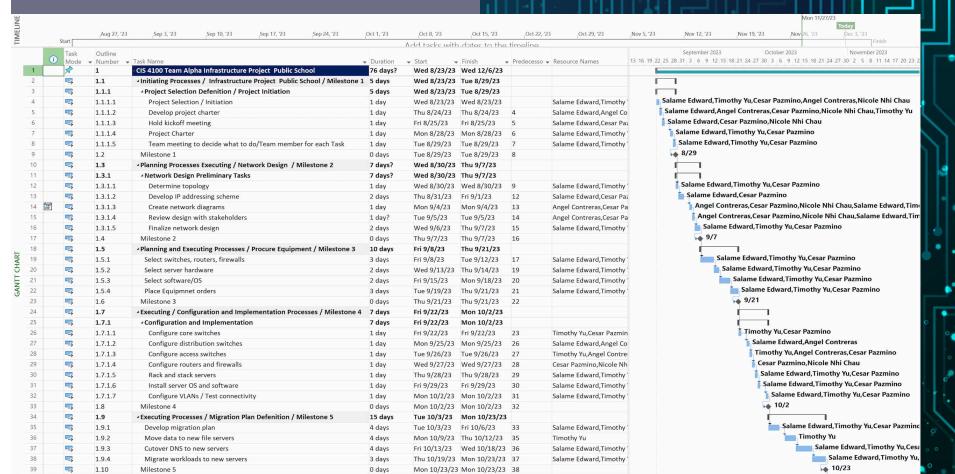
Migration Plan:

Develop and execute a migration plan to seamlessly transition existing servers/workloads to the new infrastructure.

Cost: \$2,137,580.00 usd



Gantt Chart Milestone 1



Gantt Chart Milestone 5 -8

			Sat 9/9/23													
		Aug 27, '23	Sep 3, '23	Sep 10, '23	Sep 17, '23	Sep 24, '23	Oct 1, '23	Oct 8, '23	Oct 15, '23	Oct 22, '	23 Oct 29, '23	Nov 5, '23	Nov 12, '23	Nov 19, '23	Nov 26, '23	Today Dec 3, '23
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25	=	1.7.1	Configuration and Implementation Configure core switches Configure distribution switches Configure access switches Configure routers and firewalls Rack and stack servers Install server OS and software Configure VLANs / Test connectivity Milestone 4			7 days	Fri 9/22/23	Mon 10/2/23	22	T: -1 V C - D - 1	1	Timothy Yu, Cesa	ar Pazmino			
26	=	1.7.1.1				1 day	Fri 9/22/23	Fri 9/22/23	23	Timothy Yu,Cesar Pazmir		Salame Edward, Angel Contreras				
27	=	1.7.1.2				1 day		Mon 9/25/23		Salame Edward,Angel Co		Timothy Yu,Angel Contreras,Cesar Pazmino Cesar Pazmino,Nicole Nhi Chau Salame Edward,Timothy Yu,Cesar Pazmino Salame Edward,Timothy Yu,Cesar Pazmino Salame Edward,Timothy Yu,Cesar Pazmino 10/2				
29	→ =	1.7.1.3				1 day	Tue 9/26/23 Wed 9/27/23	Tue 9/26/23 Wed 9/27/23	27	Timothy Yu, Angel Contre Cesar Pazmino, Nicole Nh						
30	→	1.7.1.4				1 day 1 day		Thu 9/28/23	29	Salame Edward, Timothy						
31	→	1.7.1.6					Thu 9/28/23		30	Salame Edward, Timothy						
32	→					1 day	Fri 9/29/23	Fri 9/29/23		The state of the s						
33		1.7.1.7				1 day 0 days		Mon 10/2/23 Mon 10/2/23		Salame Edward, Timothy						
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35	→	1.9 1.9.1	Executing Processe		ian Detenition / N	villestone 5	15 days	Tue 10/3/23 Tue 10/3/23	Processor State State State	33	Salame Edward, Timothy		Sala	∥ me Fdward.Tim	othy Yu,Cesar Paz	rmino
36	→	1.9.1	Develop migration Move data to new				4 days 4 days		Fri 10/6/23 Thu 10/12/23		Timothy Yu			Timothy Yu	,,	
37	→ =3	1.9.2	Cutover DNS to ne				4 days		Wed 10/18/23		Salame Edward, Timothy				lward, Timothy Yu	Cesar Pazmino
38	→	1.9.3	Migrate workloads				3 days		Mon 10/23/23		Salame Edward, Timothy		Salame Edward, Timothy Yu, Cesar Pazmino			
39	→	1.10	Milestone 5	is to new servers	5		0 days		3 Mon 10/23/23		Salame Edward, Ilmothy			10/2		y rajecsar razimno
40	→	1.11	4 Monitoring and Cor	ntrolling Proces	ssos / milostono 6		10 days		Mon 11/6/23	30				10,2		
41	→ ====================================	1.11.1	Validate functiona		sses / Illiestolle t		2 days		Wed 10/25/23	20	Timothy Yu			Time	othy Yu	
42	→	1.11.2	Plan activation and	200.50	on procedures		2 days	200 200 200 200 200 200 200 200 200 200	Fri 10/27/23	41	Cesar Pazmino			_	sar Pazmino	
43	→ □	1.11.3	Plan activation du				2 days		3 Tue 10/31/23		Salame Edward				Salame Edward	
44	→ =	1.11.4	Plan activation out				2 days		Thu 11/2/23	43	Salame Edward, Timothy			-		d,Timothy Yu,Cesar Pazn
45	→	1.11.5	Actions upon activ		isiliess flours		1 day	Fri 11/3/23	Fri 11/3/23	44	Salame Edward, Timothy					rd,Timothy Yu,Cesar Pazi
46	→	1.11.6	Internal communic		rar.		1 day		Mon 11/6/23	45	Salame Edward, Timothy				-	vard,Timothy Yu,Cesar P
47	□	1.12	Milestone 6	cation procedure	C3		0 days		Mon 11/6/23		Salame Lawara, milothy				11/6	, , , , , , , , , , , , , , , , , , , ,
48	-	1.13	4 Closing Processes /	/ Cyhar Sacurity	/ Milestone 7		14 days	a trademontal system Aprophilises of	Fri 11/24/23	40						_
49	→ —	1.13.1	Cyber Security Plan	5 (5)	/ / Willestone /		2 days	Tue 11/7/23		47	Cesar Pazmino				Cesar Paz	mino
50	→	1.13.1	Meting to choose		IT solution (SPLLIN	IK)	2 days		Fri 11/10/23	49	Timothy Yu				Timothy	
51	→ 	1.13.2	Define Business Re				2 days		3 Tue 11/14/23		Salame Edward					me Edward
52	→	1.13.4	Training for staff o	2000 00 0000 0000	_		2 days		3 Thu 11/16/23		Salame Edward, Timothy				The second second	lame Edward, Timothy Yu
53	-	1.13.5	Create an Emerger	Control of the Contro			2 days	Anna management of the state of	Mon 11/20/23		Salame Edward					Salame Edward
54	→	1.13.6	Create and Vendor		pioree contact list	3	3 days		Thu 11/23/23		Timothy Yu					Timothy Yu
55	— <u>—</u>	1.13.7	Craate and Cyber S		ency Plan		1 day		Fri 11/24/23		Cesar Pazmino					Cesar Pazmino
56	→ ====================================	1.14	Milestone 7	security cinerge	siley i idii		0 days		Fri 11/24/23		SCSSI I UZITIIIO					11/24
57	→ =	1.15	4 Closing Processes /	/ Documentatio	on / Milestone 8		3 days		3 Wed 11/29/23							П
58	→	1.15.1	Closure Document		,estone o		1 day		3 Mon 11/27/23		Salame Edward, Timothy					Salame Edward,T
59	-	1.15.2	Get sign-off on imi				1 day		Tue 11/28/23		Salame Edward, Timothy					Salame Edward,
60	=	1.15.3	Hold lessons learns		ow the team was s	uccessful	1 day		3 Wed 11/29/23		Salame Edward, Timothy					Salame Edward,
61	<u> </u>	1.16	Milestone 8	.ca .necenig/ no	on the team was s		0 days		3 Wed 11/29/23		a Edward, illiothy					11/29

IDF Intermediate Distribution Frame

IDF Overview:

- Intermediate Distribution Frame (IDF) serves as a crucial component in the IT infrastructure.
- Acts as a centralized point for network connectivity and distribution within a specific geographical area or floor.
 Minimizes the distance between end-user devices and network
- Minimizes the distance between end-user devices and network resources, optimizing performance.

Rack 1: Switches & Router:

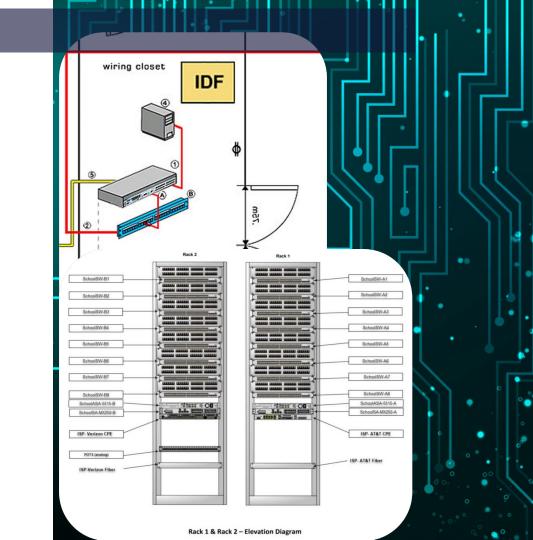
- Primary function: Housing network switches.
- Switches manage local area network (LAN) traffic efficiently.
- Enables segmentation of network for better traffic control and security.

Rack 2: Switches & Router:

- Dedicated space for routers responsible for wide area network (WAN) connectivity.
- Routers handle inter-network communication, ensuring seamless data flow between different networks.
- Provides a gateway for external connectivity and internet access.

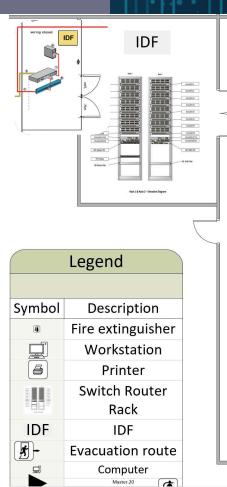
Network Redundancy:

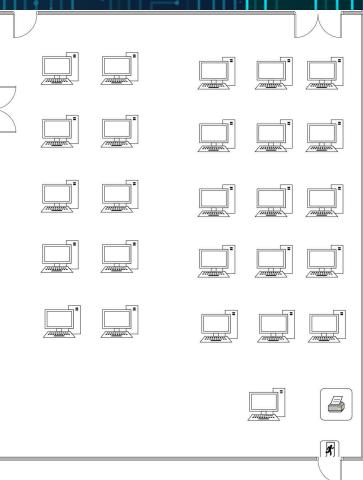
- Incorporates redundancy mechanisms to ensure continuous network availability.
- Redundant power supplies and network links enhance reliability and fault tolerance.



Class-Room Floor Plan

- 25 PCs Classroom
- IDF Server Closet
- Legend
- Type of PC Lenovo PC

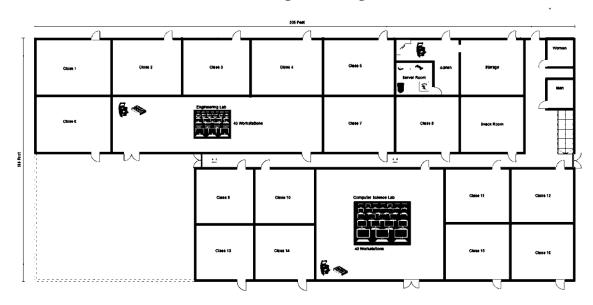




Building 11 - Wing C Floor Plan

- 18 Class Rooms
- 25 Workstation each
- 2 Computer Labs
- 40 Workstation each
- IDF Server Room
- I.T. Admin Office

Building 11 Wing C

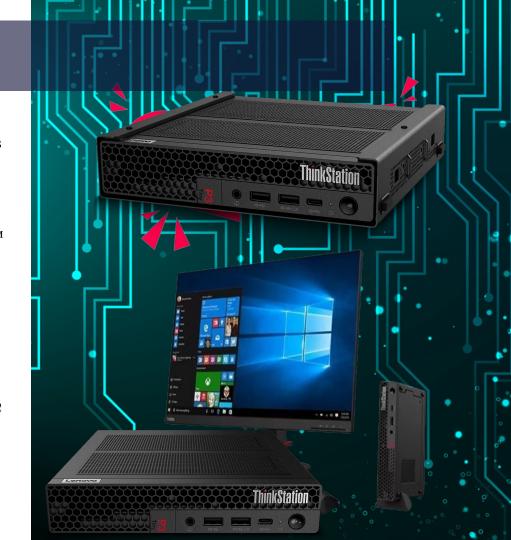


Work-Stations

Lenovo Workstations feature the superior reliability and innovative capabilities that engineering, and architecture students require to build, model, and create modern structures.

Lenovo ThinkStation P3 Tiny combines simple and efficient design with professional-level power. With a total volume of just 1L, powered by Intel vPro® with 13th Gen Intel® Core™ processors and NVIDIA® discrete graphics. It can also support up to six independent displays.

- Lenovo ThinkStation P3 Tiny Workstation Intel 30H 13th Generation Intel® Core™ i7-13700T vPro® Processor (E-cores up to 3.60 GHz P-cores up to 4.80 GHz)
- NVIDIA® T1000 8GB GDDR6
- 32 GB DDR5-4800MHz (SODIMM)
- 1 TB SSD M.2 2280 PCIe Gen4 Performance TLC Opal
- Lenovo ThinkVision T32p-20 31.5" 4K Monitor



Laptop Portable Workstations

ThinkPad P16s Gen 2 (16" Intel) has an Ultra Performance Mode to optimize power and maximize output. It has an array of ports, including ThunderboltTM 4, and lightning-quick WiFi. ThinkPad P16s Gen 2 (16" Intel) is protected by ThinkShield. A suite of hardware and software solutions, it works together to safeguard your mobile workstation and data. It includes the discrete Trusted Platform Module (dTPM) to encrypt your data, an optional biometric fingerprint reader to log in quickly

- ThinkPad P16s Gen 2 Intel (16") Mobile Workstation –
 Black
- 13th Generation Intel® Core™ i7-1360P Processor (Ecores up to 3.70 GHz P-cores up to 5.00 GHz)
- Windows 11 Pro 64
- NVIDIA® RTX[™] A500 Laptop GPU 4GB GDDR6
- 32 GB LPDDR5X-4800MHz (Soldered)
- 1 TB SSD M.2 2280 PCIe Gen4 Performance TLC Opal
- 16" WQUXGA (3840 x 2400), OLED, Anti-Reflection/Anti-Smudge, Non-Touch, HDR 500, 100%DCI-P3, 400 nits



Servers

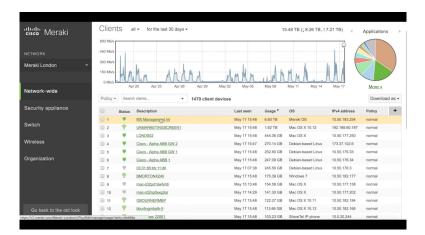
ThinkEdge SE450 Edge Servers

- Equipped with a 3rd Gen Intel' Xeon' Platinum processor for all the processing power needed to enable AI Workloads at the Edge
- Compact and ruggedized form factor for space-constrained and harsh environments
- Enhanced physical security with physical tamper protection, hardware- integrity with the lates TPM technology and full data protection with self-encrypted storage options
- Complete out-of-band management option from a local or remote wireless network



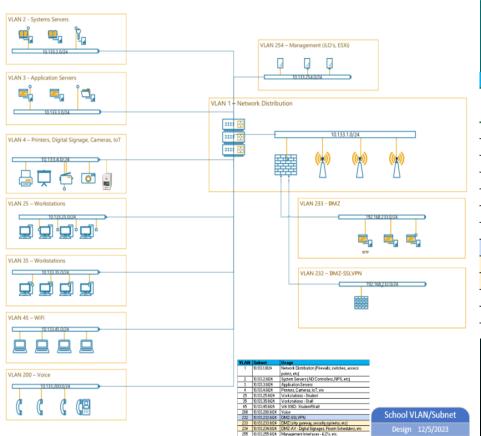
Meraki Switches & Security Appliances

- MS355 and MX250
- Cloud-managed
 - Configurations saved to the cloud
 - Accessible from anywhere





IP Addressing - VLAN



VLAN	Subnet	Usage						
1	10.133.1.0/24	Network Distribution (Firewalls, switches, access points, etc)						
	10.133.2.0/24	System Servers (AD Controllers, NPS, etc)						
3	10.133.3.0/24	Application Servers						
4	10.133.4.0/24	Printers, Cameras, IoT, etc						
25	10.133.25.0/24	Workstations - Student						
35	10.133.35.0/24	Workstations - Staff						
45	10.133.45.0/24	Wifi SSID: Student/Staff						
200	10.133.200.0/24	Voice						
232	10.133.232.0/24	DMZ-SSLVPN						
233	10.133.233.0/24	DMZ (sftp gateway, security systems, etc)						
234	10.133.234.0/24	DMZ-AV - Digital Signages, Room Schedulers, etc						
255	10.133.255.0/24	Management Interfaces - iLO's, etc.						
	10.133.252.0/23							

Budget Chart

Item	Units	Cost ea.	Total Cost	URL (Click link to view)	Labor Est.
Worskstations - ThinkStation P3 TinyWorkstation	250	\$1,629.00	\$407,250.00	ThinkStation P3 Tiny Workstation	\$14,000.00
Monitors - ThinkVision 31.5 inch Monitor-T32p-20	250	\$449.00	\$112,250.00	ThinkVision 31.5 inch Monitor - T32p-20	\$ 14,000.00
Laptops - ThinkPad P16s Gen 2 Intel (16") Mobile Workstation-					
Black	34	\$1,949.00	\$1,949.00	ThinkPad P16s Gen 2 Intel (16") Mobile Workstation - Black	\$14,000.00
Server - ThinkEdge SE450 Edge Server	4	\$3,386.76	\$13,547.04	ThinkEdge SE450 Edge Server	\$10,750.00
Server Rack - Tripp Lite (SR42UB) Rack Equipment	24	\$1,608.25	\$38,598.00	Tripp Lite (SR42UB) Rack Equipment	\$4,000.00
Switches - CISCO MS355-48X2-HW Cloud Managed MS355-				CISCO MS355-48X2-HW Cloud Managed MS355-48X2 Switch 48 Ports Managed	
48X2 Switch 48 Ports Managed Rack-Mountab	144	\$8,300.00	\$1,195,200	Rack-Mountab	\$8,200.00
Router - Cisco MX250-HW Meraki MX250 Cloud Managed					
security appliance new	34	\$2,385.00	\$81,090	Cisco MX250-HW Meraki MX250 Cloud Managed security appliance new	\$8,200.00
UPS	1	\$1,595.07	\$1,595.07	APC SMT2200RM2UC 2200 VA 1980 Watts	\$2,200.00
Licenses	25	\$199.99	\$4,975	Windows 11 Pro License	\$4,276.00
Licenses	4	\$1,069.00	\$4,276	Windows Server 2022 License	\$1,000.00
Licenses	81	\$249.99	\$20,249.19	Office Home & Business 2021	\$800.00
HP All-in-One Color Laser Printer	3	\$ 819.00	\$2,457.00	HP All-in-One Color Laser Printer	\$300.00
Cat 6a Cabling 1000 ft rolls	2	\$209.99	\$419.98	Monoprice 1000' 23AWG Cat6a	\$3,000.00
RJ-45 connectors 50 pk	4	\$74.95	\$299.80	Everest Media Solutions 90° Angled CAT6A Jack	\$4,000
Firewall	2	\$2,401.97	\$4,804.00	Cisco Firepower 1120 (FPR1120-ASA-K9)	\$200.00
Wireless Access points	2	\$1,183.99	\$2,367.98	Cisco Catalyst 9120AXE 802.11ax 5.38 Gbit/s	\$400.00
Card Reader Door Access System (INS)	1	\$6,000.00	\$6,000.00		\$4,000
					•
Total	865.00	\$47,979.00	\$1,995,576.00		\$94,025.00

Grand Total

\$2,137,580.00

Recap

- 1. Objective:
- Modernize IT Infrastructure in a public school.
- Enhance learning with high-speed network access.
- 2. Scope:
- New IDF wiring closets and 100/1000 base T LAN.
- 1000 BASE T CAT 7 uplink to MDF.
- IP Scheme, core/access switches, VLANS, firewalls and routers.
- 3. Hardware and Software
- Classroom: 25 Lenovo PCs/ room, ThinkVision monitors.
- Servers: ThinkEdge SE450 for AI and data protection.
- Network: CISCO MS355 and MX250 Switches.
- 4. Budget Timelines
- Total Budget: \$2,137,580
- Duration: 76 days
- 5. Key Milestones
- IDF Installation
- Classroom and lab setup
- Server and network infrastructure deployment
- Migration and testing phase.
- 6. Future Steps
- Ongoing maintenance and updates
- Training for staff and students.



Thanks! ¡Syueyl

