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CGS 4285

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Final Design project

Problem

We've been given the public block 128.60.80.0/23. We must subnet it to serve three sites, connect them via point-to-point serial lines, and offer firewall security for Site B's servers.

- Site A has five rooms that can accommodate up to 45 hosts each.
- Site B: 40 workstations and 25 servers behind a router/firewall.
- Site C has 4 rooms with 20 hosts each and inter-site connectivity. Serial /30
- ISP link: Serial/30

Available equipment:

- Routers (2× Gi0/0, Gi0/1; Ser0, Ser1)
- 1× router-firewall (eth0, eth1)
- Gigabit Ethernet switches (48-port, 24-port, 8-port)

IP address plan

Purpose	**Subnet**	**Size**	**Usable**	**Notes**
Site A LAN	128.60.80.0 /24	256 total	254	5 rooms × 45 hosts
Site B workstations	128.60.81.0 /26	64 total	62	40 hosts
Site B servers (behind FW)	128.60.81.64 /27	32 total	30	25 hosts
Site C LAN	128.60.81.96 /25	128 total	126	4 rooms × 20 hosts
Site A ↔ Site B	128.60.81.224 /30	4 total	2	Router-to-router serial link
Site B ↔ Site C	128.60.81.228 /30	4 total	2	Router-to-router serial link
Site C ↔ ISP	54.4.5.8 /30	4 total	2	.9 = ISP, .10 = Router C Ser0

Router & Firewall Interfaces

Router A (Site A)

- Ser0 → ISP link: 54.4.5.10/30
- Ser1 → Site B: 128.60.81.225/30
- Gi0/0 → Site A LAN: 128.60.80.1/24

Router B (Site B)

- Ser0 ← Site C: 128.60.81.229/30
- Ser1 ← Site A: 128.60.81.226/30
- Gi0/0 → Workstations LAN: 128.60.81.1/26
- Gi0/1 → Firewall (outside): 128.60.81.65/27

Firewall (Site B)

- eth1 (outside) ← Router B Gi0/1: 128.60.81.65/27
- eth0 (inside) → Servers LAN: 128.60.81.66/27

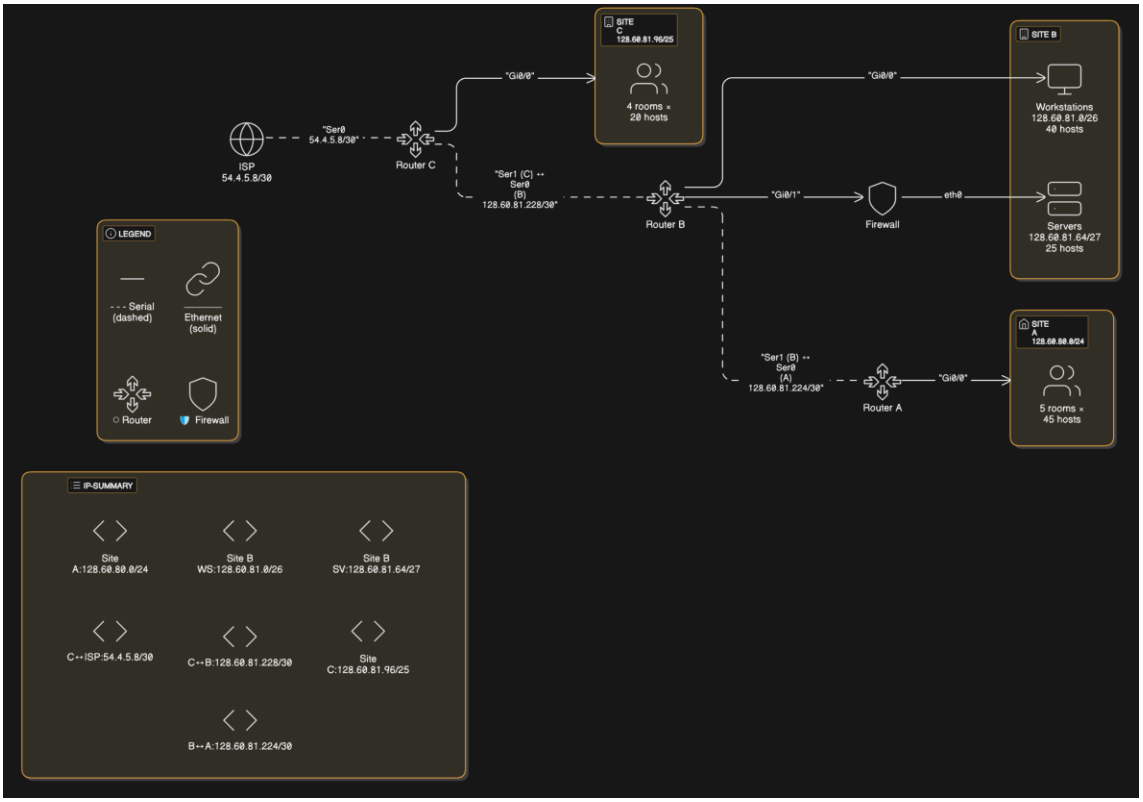
Router C (Site C)

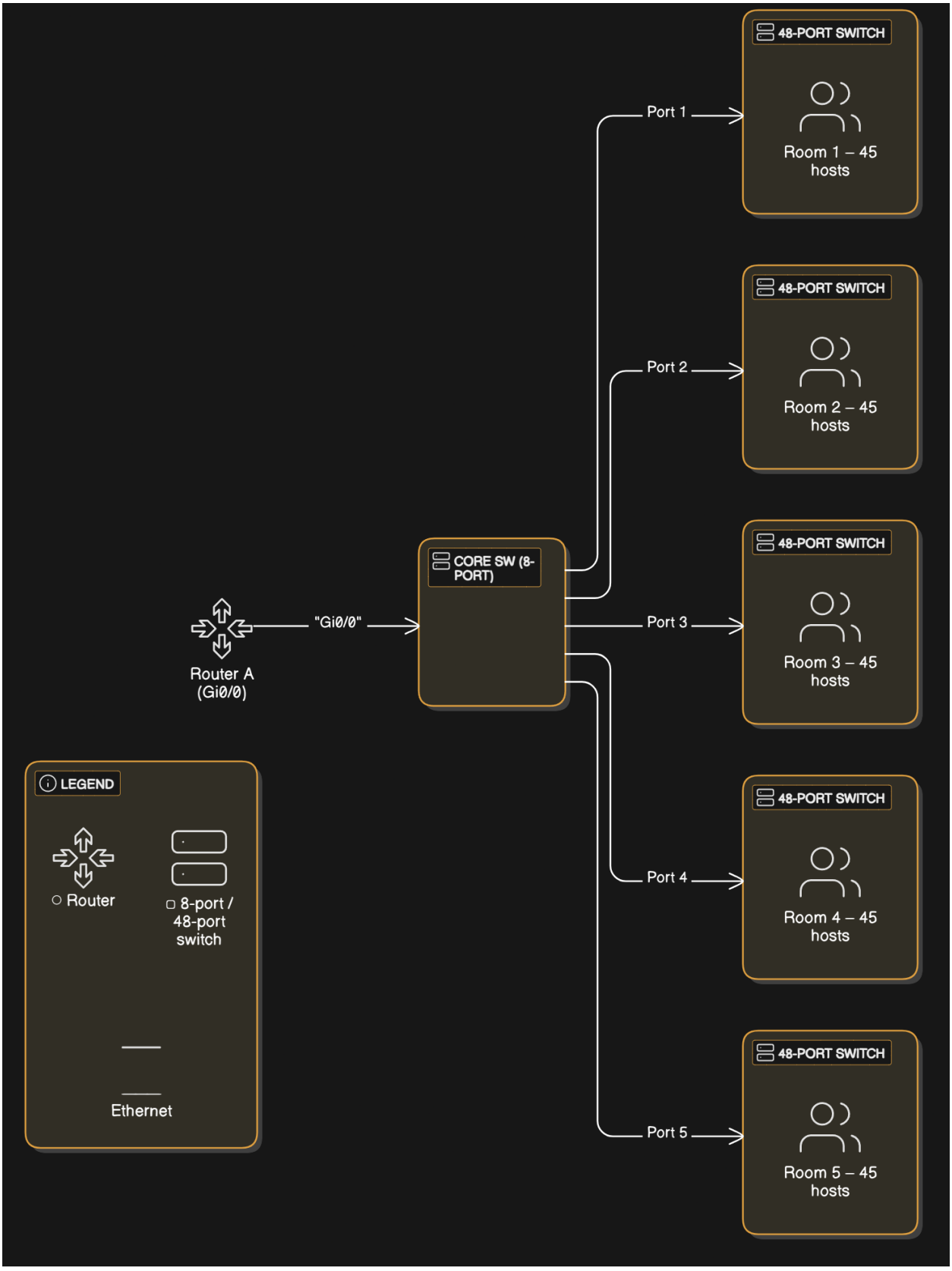
- Ser0 ← ISP: 54.4.5.9/30
- Ser1 → Site B: 128.60.81.230/30
- Gi0/0 → Site C LAN: 128.60.81.97/25

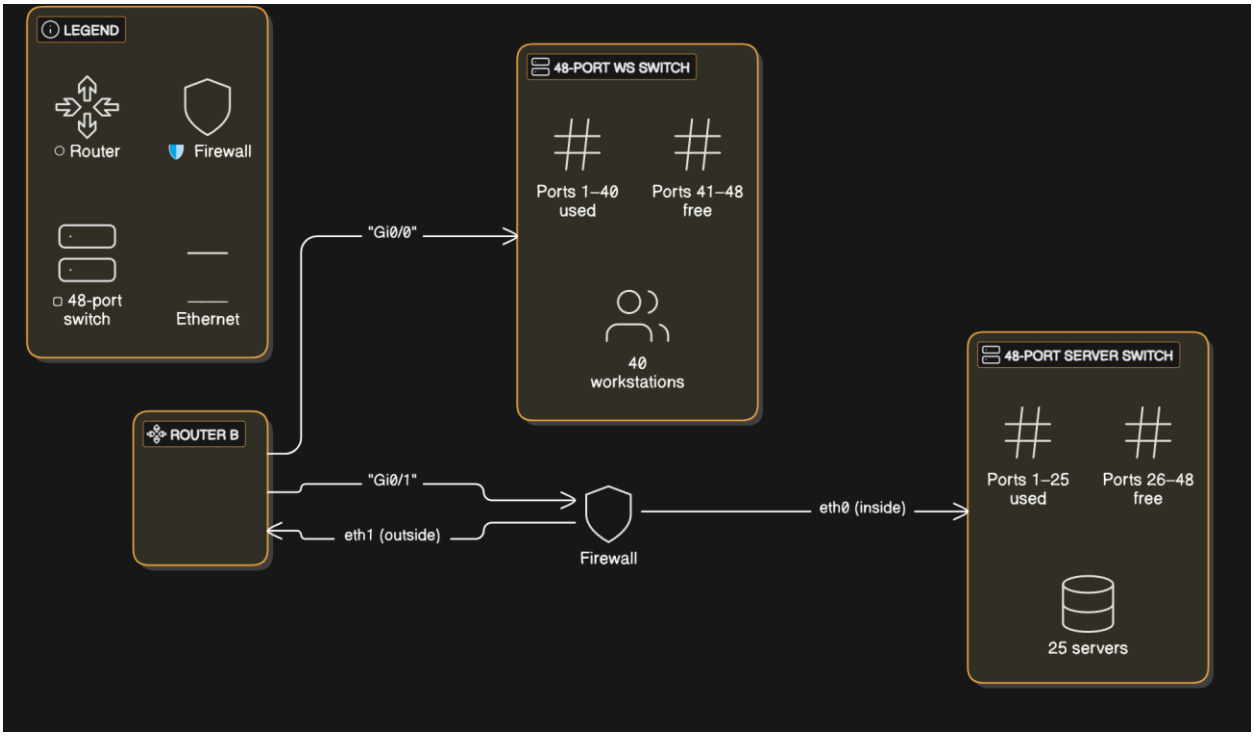
Summary

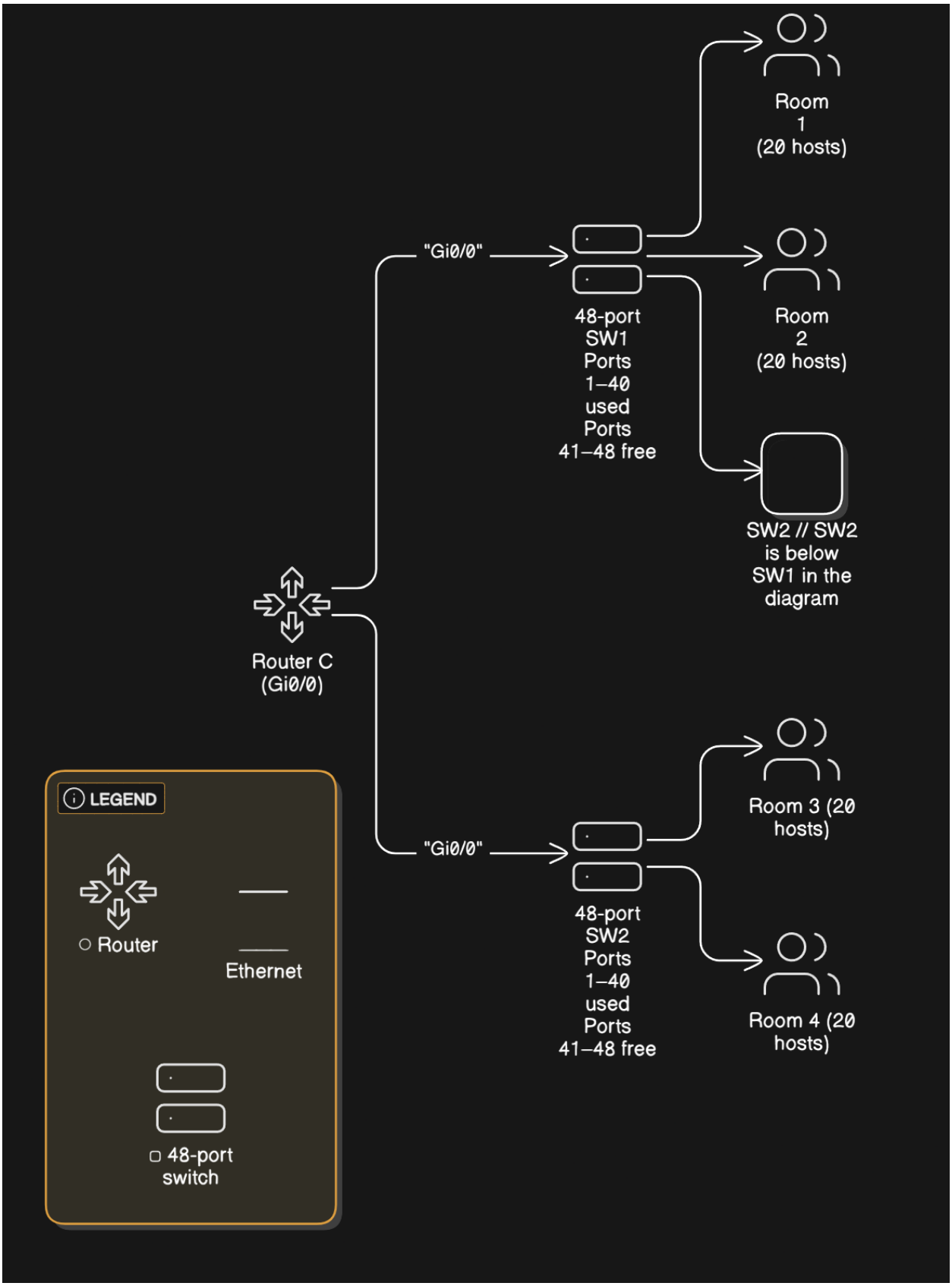
- Layer 3: Three routers connected by /30 serial subnets; each router's Gigabit interface serves the site LAN. Site B's servers are segregated by a router-firewall.
- Layer 2: Site A has one 8-port aggregation switch and five 48-port access switches; Site B has two 48-port switches (workstations and servers); and Site C has two 48-port switches for four rooms.
- Scalability: Unused ports and address space remain for each site and inter-site link, allowing for easy growth.

Diagrams Layer 3, Site A, Site B and Site C:




48-PORT SWITCH
Room 1 – 45 hosts
48-PORT SWITCH
Room 2 – 45 hosts
48-PORT SWITCH
Room 3 – 45 hosts
48-PORT SWITCH
Room 4 – 45 hosts
48-PORT SWITCH
Room 5 – 45 hosts
Port 1
Port 2
Port 3
Port 4
Port 5
CORE SW (8-PORT)
"Gi0/0"
Router A (Gi0/0)
LEGEND
Router
8-port / 48-port switch
Ethernet


LEGEND
Router
Firewall
48-port switch
Ethernet
48-PORT WS SWITCH
Ports 1–40 used
Ports 41–48 free
40 workstations
"Gi0/0"
ROUTER B
"Gi0/1"
eth1 (outside)
Firewall
eth0 (inside)
48-PORT SERVER SWITCH
Ports 1–25 used
Ports 26–48 free
25 servers


Room 1 (20 hosts)
"Gi0/0"
48-port SW1 Ports 1–40 used Ports 41–48 free
Room 2 (20 hosts)
SW2 // SW2 is below SW1 in the diagram
Router C (Gi0/0)
"Gi0/0"
Room 3 (20 hosts)
48-port SW2 Ports 1–40 used Ports 41–48 free
Room 4 (20 hosts)
LEGEND
Router
Ethernet
48-port switch