# Network Addressing Plan — VLSM & CIDR (Start IP: 192.168.1.0)

Summary: This document shows VLSM subnet allocation, CIDR notation, and IP address assignments for departments and router links. All addresses use private addressing starting from 192.168.1.0.

## 1. Overall Network

Assigned Block (starting point): 192.168.1.0/22 (usable hosts: 1022)  
Note: Standard CIDR networks are usually aligned on natural boundaries (e.g., a /22 normally starts at x.x.0.0). Using 192.168.1.0/22 is acceptable for private addressing but be aware it is an offset start. Range: 192.168.1.0 - 192.168.4.255

## 2. VLSM Allocation (largest→smallest)

Allocation strategy: assign subnets from the start of 192.168.1.0/22 using VLSM. Each department gets the smallest subnet that satisfies its host requirement. Router-to-router links use /30 subnets. Gateway addresses use the first usable IP of the subnet (x.x.x.1).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Subnet Name | Hosts Req. | CIDR | Network | Usable Range | Broadcast | Subnet Mask |
| CSE | 120 | 192.168.1.0/25 | 192.168.1.0 | 192.168.1.1 - 192.168.1.126 | 192.168.1.127 | 255.255.255.128 |
| EEE | 100 | 192.168.1.128/25 | 192.168.1.128 | 192.168.1.129 - 192.168.1.254 | 192.168.1.255 | 255.255.255.128 |
| Pharm | 80 | 192.168.2.0/25 | 192.168.2.0 | 192.168.2.1 - 192.168.2.126 | 192.168.2.127 | 255.255.255.128 |
| EE | 70 | 192.168.2.128/25 | 192.168.2.128 | 192.168.2.129 - 192.168.2.254 | 192.168.2.255 | 255.255.255.128 |
| DNS/Web | 60 | 192.168.3.0/26 | 192.168.3.0 | 192.168.3.1 - 192.168.3.62 | 192.168.3.63 | 255.255.255.192 |
| BBA | 50 | 192.168.3.64/26 | 192.168.3.64 | 192.168.3.65 - 192.168.3.126 | 192.168.3.127 | 255.255.255.192 |

## 3. Router-to-Router Links (P2P /30)

Use /30 subnets for point-to-point links. Below are sample assignments for the ring of routers R0–R5. Each P2P link uses the first usable IP for the lower-numbered router and the second usable IP for the higher-numbered router.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Link | CIDR | Network | Usable Range | Broadcast |
| R0 - R1 | 192.168.3.128/30 | 192.168.3.128 | 192.168.3.129 - 192.168.3.130 | 192.168.3.131 |
| R1 - R2 | 192.168.3.132/30 | 192.168.3.132 | 192.168.3.133 - 192.168.3.134 | 192.168.3.135 |
| R2 - R3 | 192.168.3.136/30 | 192.168.3.136 | 192.168.3.137 - 192.168.3.138 | 192.168.3.139 |
| R3 - R4 | 192.168.3.140/30 | 192.168.3.140 | 192.168.3.141 - 192.168.3.142 | 192.168.3.143 |
| R4 - R5 | 192.168.3.144/30 | 192.168.3.144 | 192.168.3.145 - 192.168.3.146 | 192.168.3.147 |
| R5 - R0 | 192.168.3.148/30 | 192.168.3.148 | 192.168.3.149 - 192.168.3.150 | 192.168.3.151 |

## 4. Router Interface & Gateway Assignments

Gateway convention: Each department gateway = first usable IP (.1) in that subnet. Router P2P addresses use the usable IPs in each /30 link.

|  |  |  |
| --- | --- | --- |
| Device / Interface | Connected Network | IP Address (assigned) |
| R0 - to CSE (gw) | CSE 192.168.1.0/25 | 192.168.1.1 |
| R1 - to EEE (gw) | EEE 192.168.1.128/25 | 192.168.1.129 |
| R2 - to Pharm (gw) | Pharm 192.168.2.0/25 | 192.168.2.1 |
| R3 - to EE (gw) | EE 192.168.2.128/25 | 192.168.2.129 |
| R4 - to BBA (gw) | BBA 192.168.3.64/26 | 192.168.3.65 |
| R5 - to DNS/Web (gw) | DNS/Web 192.168.3.0/26 | 192.168.3.1 |
| R0 - to R1 (p2p) | 192.168.3.128/30 | 192.168.3.129 |
| R1 - to R2 (p2p) | 192.168.3.132/30 | 192.168.3.133 |
| R2 - to R3 (p2p) | 192.168.3.136/30 | 192.168.3.137 |
| R3 - to R4 (p2p) | 192.168.3.140/30 | 192.168.3.141 |
| R4 - to R5 (p2p) | 192.168.3.144/30 | 192.168.3.145 |
| R5 - to R0 (p2p) | 192.168.3.148/30 | 192.168.3.149 |

## 5. CIDR Quick Reference

/25 -> mask 255.255.255.128 -> 126 usable hosts  
/26 -> mask 255.255.255.192 -> 62 usable hosts  
/30 -> mask 255.255.255.252 -> 2 usable hosts

## 6. Notes & Recommendations

• Keep router loopback addresses if needed for routing (e.g., R0 loopback 192.168.4.1/32).  
• Configure static routes for small networks or use RIP v2 as per your design (remember to disable auto-summarization when using discontiguous networks).  
• Use .1 as gateway for consistency; adjust if you prefer .254.  
• Reserve 192.168.4.0/24 for expansion or future VLANs.