**IP Addressing Scheme**

The network design for Holmview Primary School adopts the private IP address space 10.10.0.0/16 to allow for scalability and efficient allocation of IP addresses across the various departments and functions within the school. To support logical separation and improved network performance, the network is segmented into VLANs by user type and service category. Each VLAN is assigned its own subnet, with address ranges tailored to anticipated device counts and future growth.

The student VLAN, which serves the highest number of users, is allocated a /22 subnet (10.10.30.0/22). This subnet provides 1022 usable IP addresses, which is sufficient to support 1000+ students and their devices, with room for BYOD policies and growth over time.

The table below outlines the proposed IP addressing scheme:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **VLAN ID** | **Purpose** | **Subnet (CIDR)** | **Usable IPs** | **IP Range** | **Default Gateway** |
| 10 | Admin/ Management | 10.10.10.0/24 | 254 | 10.10.10.1 - 10.1010.254 | 10.10.10.1 |
| 20 | Staff | 10.10.20.0/24 | 254 | 10.10.20.1 - 10.10.20.254 | 10.10.20.1 |
| 30 | Students | 10.10.30.0/22 | 1022 | 10.10.30.1 - 10.10.33.254 | 10.10.30.1 |
| 40 | Guest WiFi | 10.10.40.0/24 | 254 | 10.10.40.1 - 10.10.40.254 | 10.10.40.1 |
| 50 | IoT Devices (CCTV, etc.) | 10.10.50.0/24 | 254 | 10.10.50.1 - 10.10.50.254 | 10.10.50.1 |
| 60 | Servers/ Infrastructure | 10.10.60.0/24 | 254 | 10.10.60.1 - 10.10.60.254 | 10.10.60.1 |

Each subnet is routed through a Layer 3 switch or router, with firewall rules and access controls applied at the VLAN boundary to ensure data privacy and network security. This structed IP addressing approach ensures the network is easy to manage, scalable, and aligned with industry standards.

This IP addressing scheme was developed to ensure scalability and efficient allocation of IP addresses across Holmview Primary School’s network. Each VLAN is assigned its own subnet to segment traffic by user type and service category, supporting performance and security requirements. The configuration has been implemented and verified in Packet Tracer with successful connectivity tests between VLANs.

**Future growth and Planning**

The /22 subnet for the Student VLAN provides over 1000 usable IP addresses to accommodate current devices and future BYOD (Bring Your Own Device) growth. Smaller /24 subnets were allocated for Admin, Staff, Guest WiFi, IoT Devices, and Servers to maintain efficiency while ensuring enough address space for their respective user groups.