
# COMPUTER NETWORKS AND DATA COMMUNICATION

# PROJECT REPORT

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# INTRODUCTION

This report presents the design and implementation of the networking infrastructure for SZABIST Karachi campus. The objective is to provide a robust and scalable network that supports the various departments and buildings within the campus. The report outlines the requirements for each building and provides details on the network design, IP pooling, subnetting, VLAN implementation, inter-VLAN routing, DHCP configuration, port security, NAT, ACLs, dynamic routing, connectivity, remote management, and security measures.

**NOTE:**
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Telnet password = cisco

# Network Design and Implementation

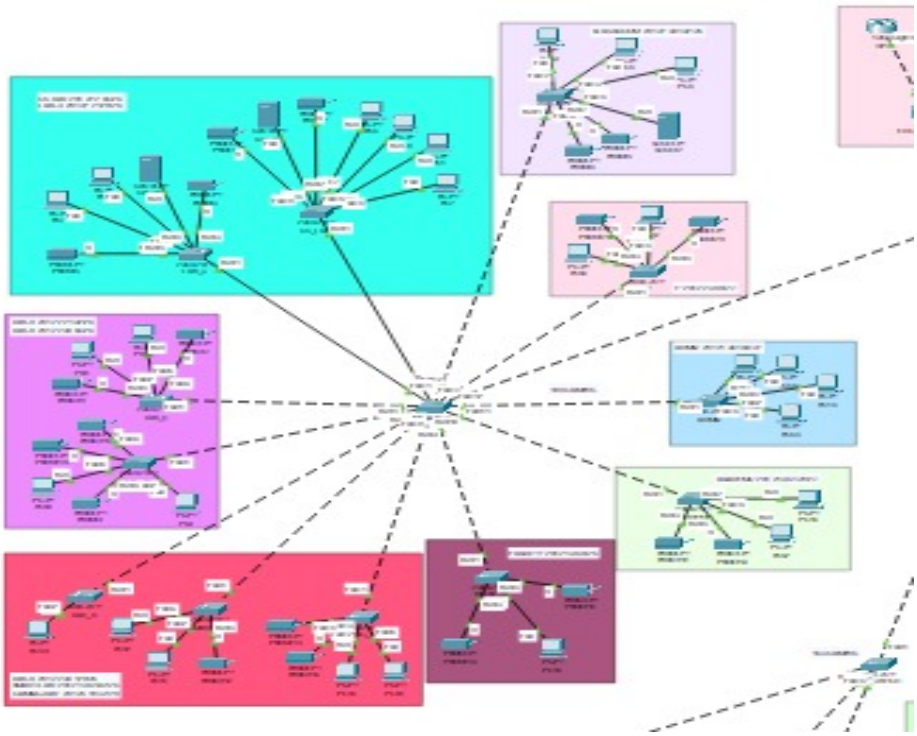
This section describes the networking infrastructure for each building within the SZABIST Karachi campus.

## 100 Campus Building

The 100 Campus Building consists of seven labs, classrooms, and departments. The following devices are present in each lab:

CS Lab: 58 PCs, 2 Printers, 1 FTP server
Lab-3: 38 PCs, 2 Printers, 1 FTP server
Lab-4: 35 PCs, 2 Printers
Lab-5: 35 PCs, 2 Printers, 1 FTP server
Lab-6: 35 PCs
Smart Lab: 40 PCs, 1 Printer
Gaming Lab: 9 PCs, 2 Printers
Additionally, there are classrooms, faculty PCs, printers, and department-specific devices. The networking infrastructure for the 100 Campus Building will be designed and implemented to accommodate these requirements.

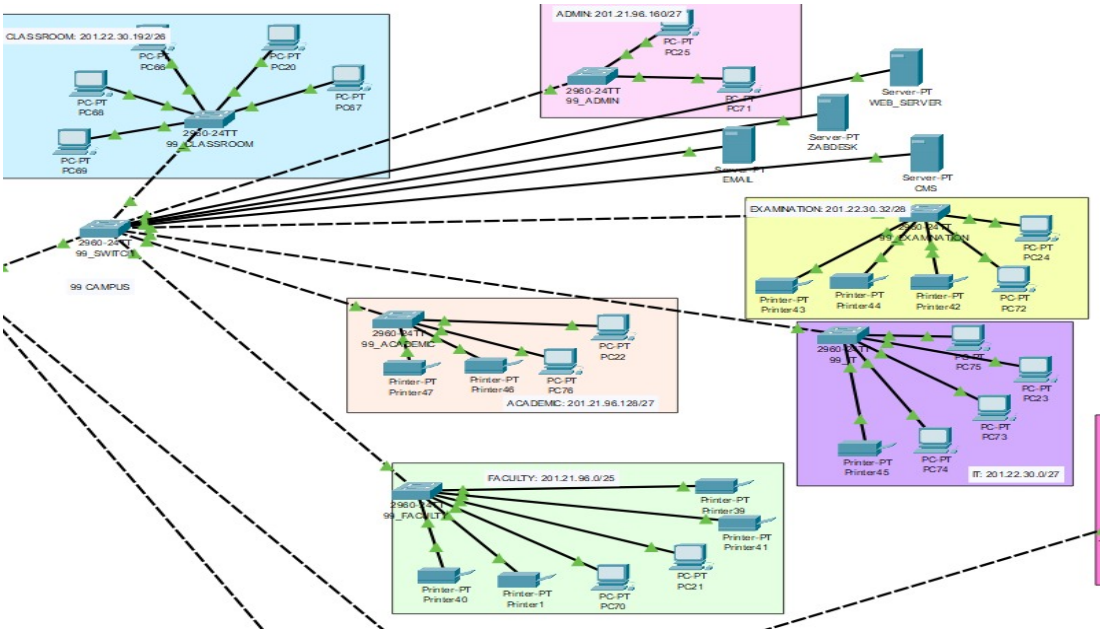
## 100 Campus Topology



# 99 Campus Building

The 99 Campus Building comprises classrooms, faculty PCs, printers, and departments such as Academic, IT, and Examination. The networking infrastructure for this building will be designed to meet the specific needs of each department.

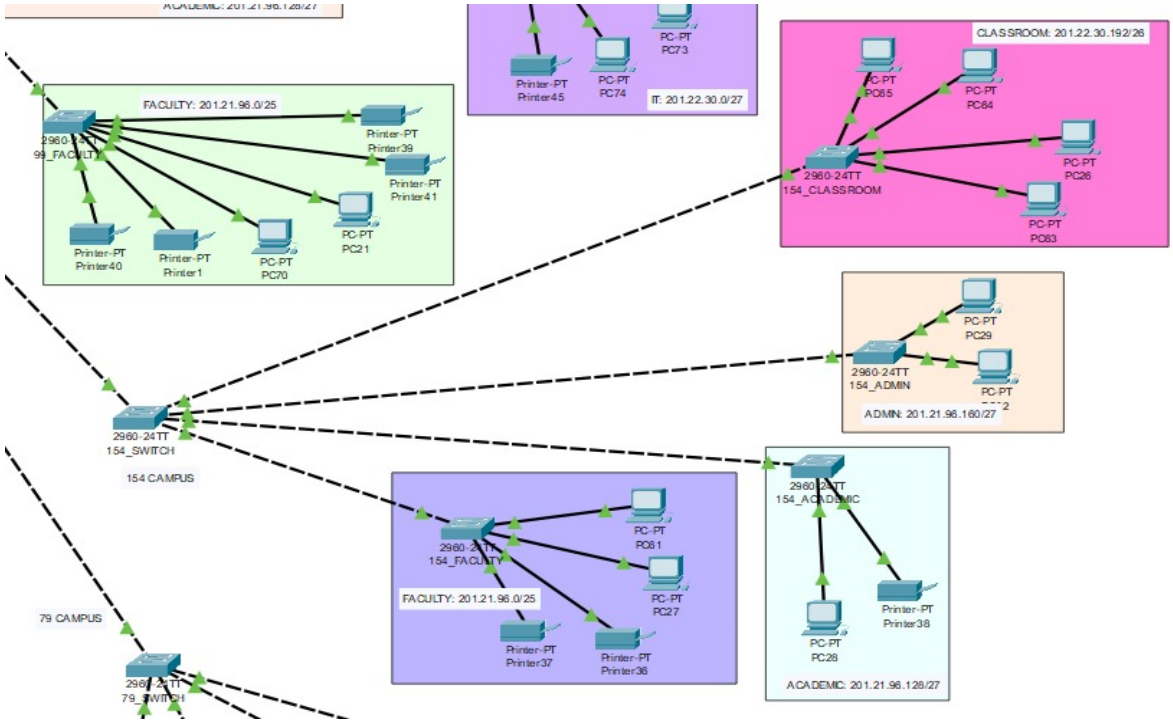
### Topology



# 154 Campus Building

The 154 Campus Building consists of classrooms, faculty PCs, printers, and the Mechatronics Labs. The networking infrastructure in this building will be designed to provide seamless connectivity and support the requirements of the Mechatronics Labs.

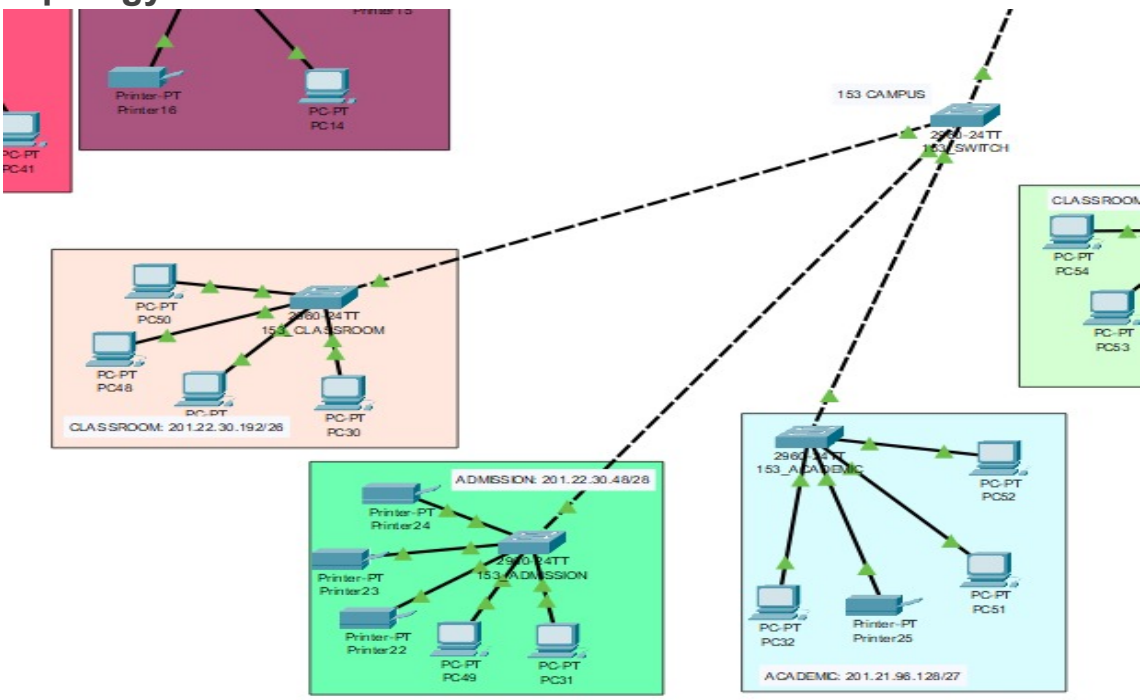
## Topology




# 153 Campus Building

The 153 Campus Building houses classrooms, the Admission department, and the Academic department. The networking infrastructure for this building will ensure reliable connectivity and support the specific needs of these department

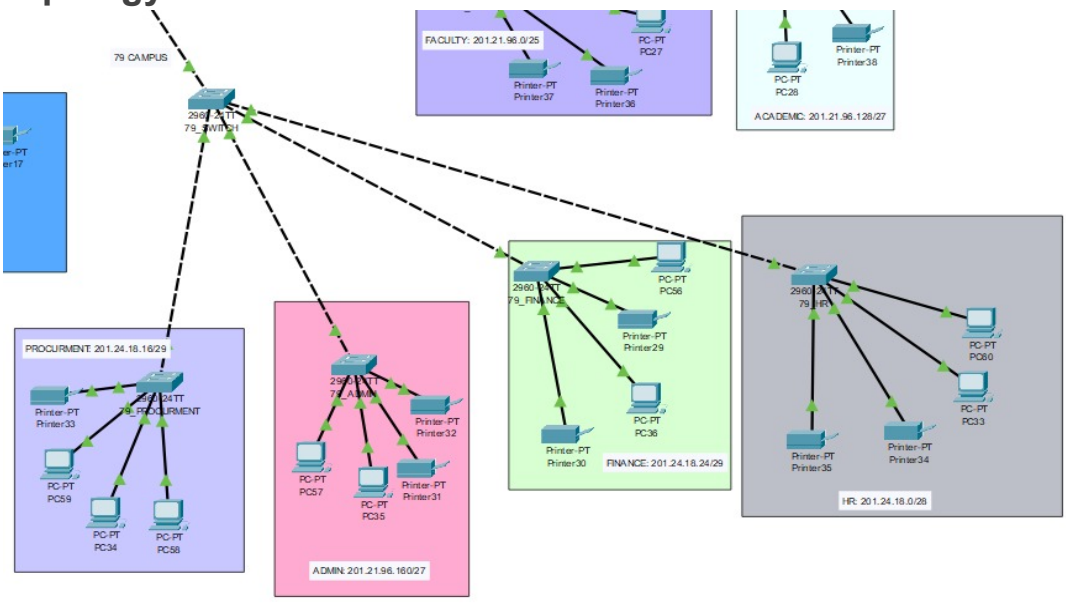
## Topology




# 79 Campus Building

The 79 Campus Building includes a library, HR department, Procurement department, ADMINISTRATION department, Finance department, and EDC department. The networking infrastructure will be designed to cater to the requirements of these department.

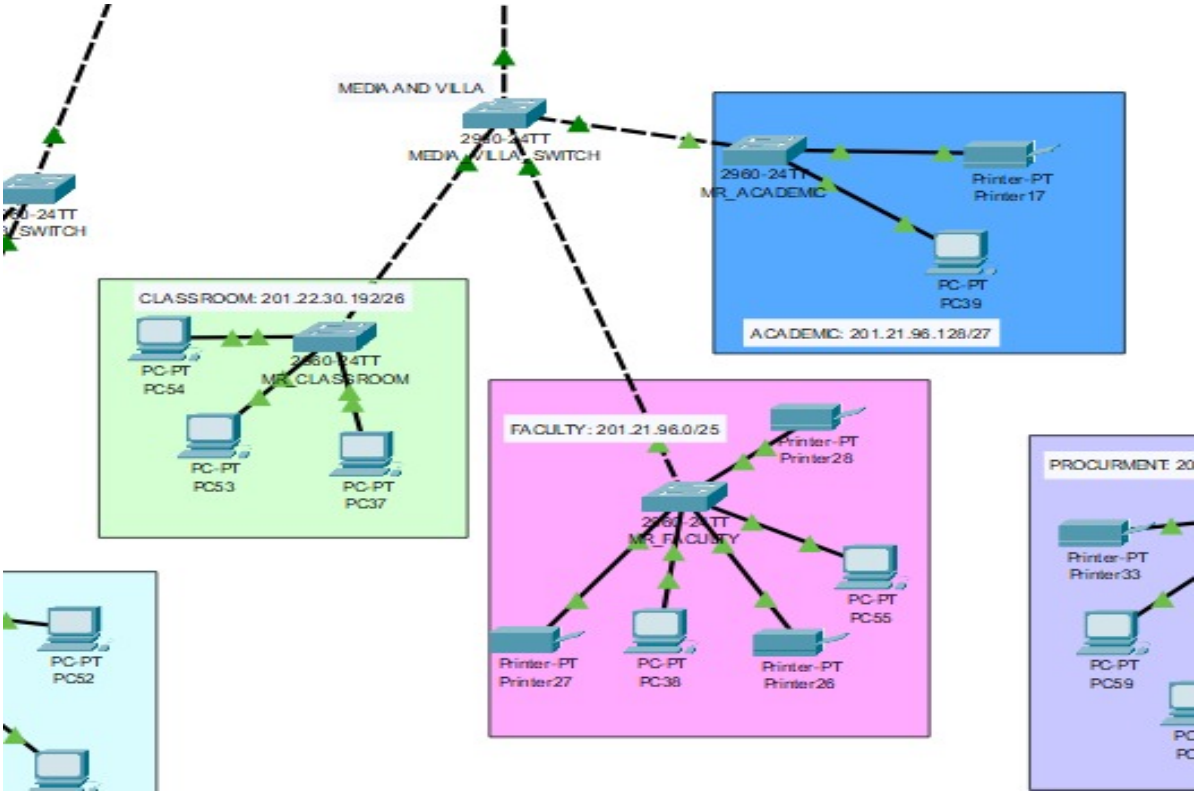
## Topology



## Media Villa and Research Villa

The Media Villa and Research Villa consist of classrooms, faculty PCs, printers, and the Academic department. The networking infrastructure will be designed to facilitate communication and collaboration within these buildings.

### Topology



VLAN Implementation

VLANs are implemented for better network management and where necessary. VLAN segmentation will enable efficient traffic separation and enhance network security.

| Vlan | Name |
|---|---|
| 10 | CS Lab |
| 20 | Lab-3 |
| 30 | Lab-4 |
| 40 | Lab-5 |
| 50 | Lab-6 |
| 60 | Smart Lab |
| 70 | Gaming Lab |
| 80 | Faculty |
| 90 | Academic |
| 100 | Administration |
| 110 | IT |
| 120 | Examination |
| 130 | Admission |
| 140 | HR |
| 150 | Procurement |
| 160 | Finance |
| 170 | Classroom |

# Network Functionality and Security Enhancements

To optimize the network infrastructure at SZABIST Karachi campus, various measures will be implemented. Inter-VLAN routing will facilitate seamless communication between VLANs, promoting efficient data transfer and network connectivity. DHCP configuration will dynamically assign IP addresses to PCs, streamlining network management and device configuration. Static IP addresses will be allocated to servers and printers, ensuring consistent and reliable connectivity. Port security measures will enhance network security by implementing appropriate techniques to restrict unauthorized access to servers and lab devices. Network Address Translation (NAT) will establish a connection between SZABIST's network and the internet using a public IP pool.

# Complete Topology Diagram

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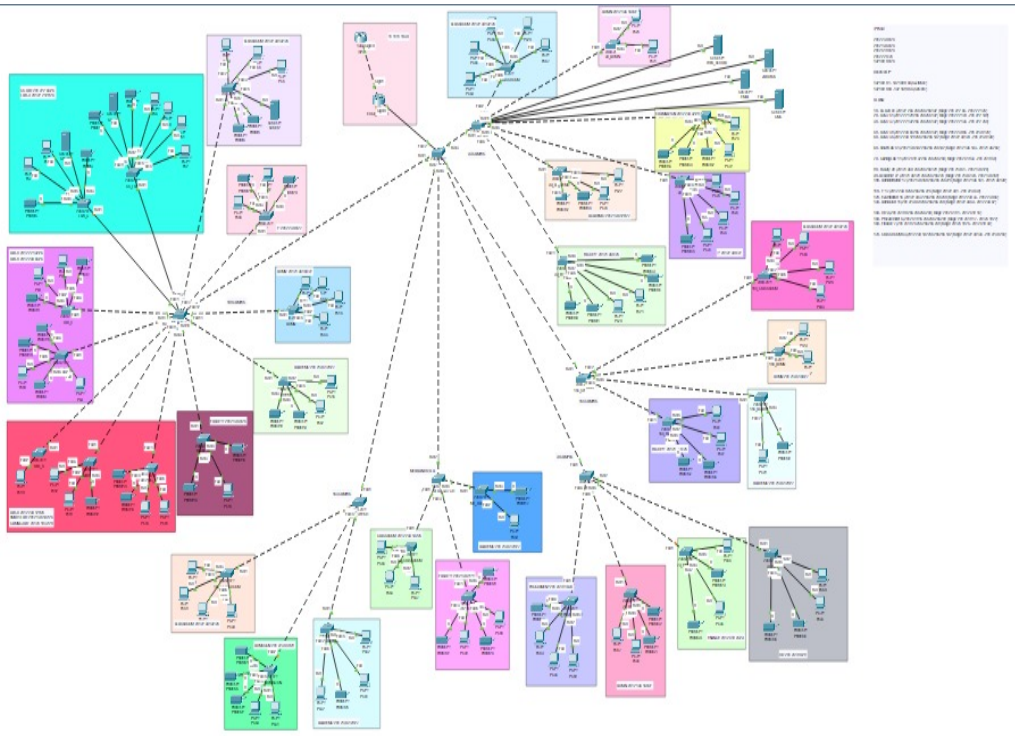

# Conclusion

In conclusion, the design and implementation of the networking infrastructure for SZABIST Karachi campus will deliver a resilient and adaptable network solution tailored to the diverse needs of different departments and buildings. By incorporating advanced techniques such as IP pooling, subnetting, VLANs, inter-VLAN routing, DHCP configuration, port security, NAT, dynamic routing, connectivity, remote management, and robust security measures, the network will offer seamless and secure operations throughout the campus. These comprehensive approaches guarantee efficient utilization of IP addresses, efficient traffic routing, centralized management, and protection against unauthorized access, resulting in a reliable and high-performing network infrastructure for SZABIST Karachi.