COMPUTER NETWORKS AND DATA COMMUNICATIONS
PROJECT REPORT
ON
SZABIST NETWORK

CREATED BY:
ASMA HAFIZ MIRNAWAZ: 2112106
ROHA ALI: 2112124
SYEDA MAHNOOR HASAN: 2112135
HUSSAM WASTI: 2112113

SUBMITTED TO:
IDREES DARBAR
MUBEEN AHMED

ACKNOWLEDGEMENT

We would like to thank our esteemed university Shaheed Zulfiqar Ali Bhutto Institute of Science and Technology (SZABIST) under whose roof we have studied and completed our tasks, without which we would stand nowhere. Many thanks to our wonderful lecturer, Muhammad Shahzad Haroon and Sir Mubeen Ahmed Khan for guiding us with clear instructions and always giving us constructive feedback. He has been the primary source of information to help us out with any issues involving the coding aspect as well as other techniques, the result of which is this beautifully presented work. Moreover, we would like to thank our parents who have been consistently supporting us financially and morally. The list cannot be completed unless we say thanks to our friends who spent their precious time standing with us whenever we needed help with our project or even just to cheer us up. Their support has also played a vital role. Thank you.

TABLE OF CONTENT

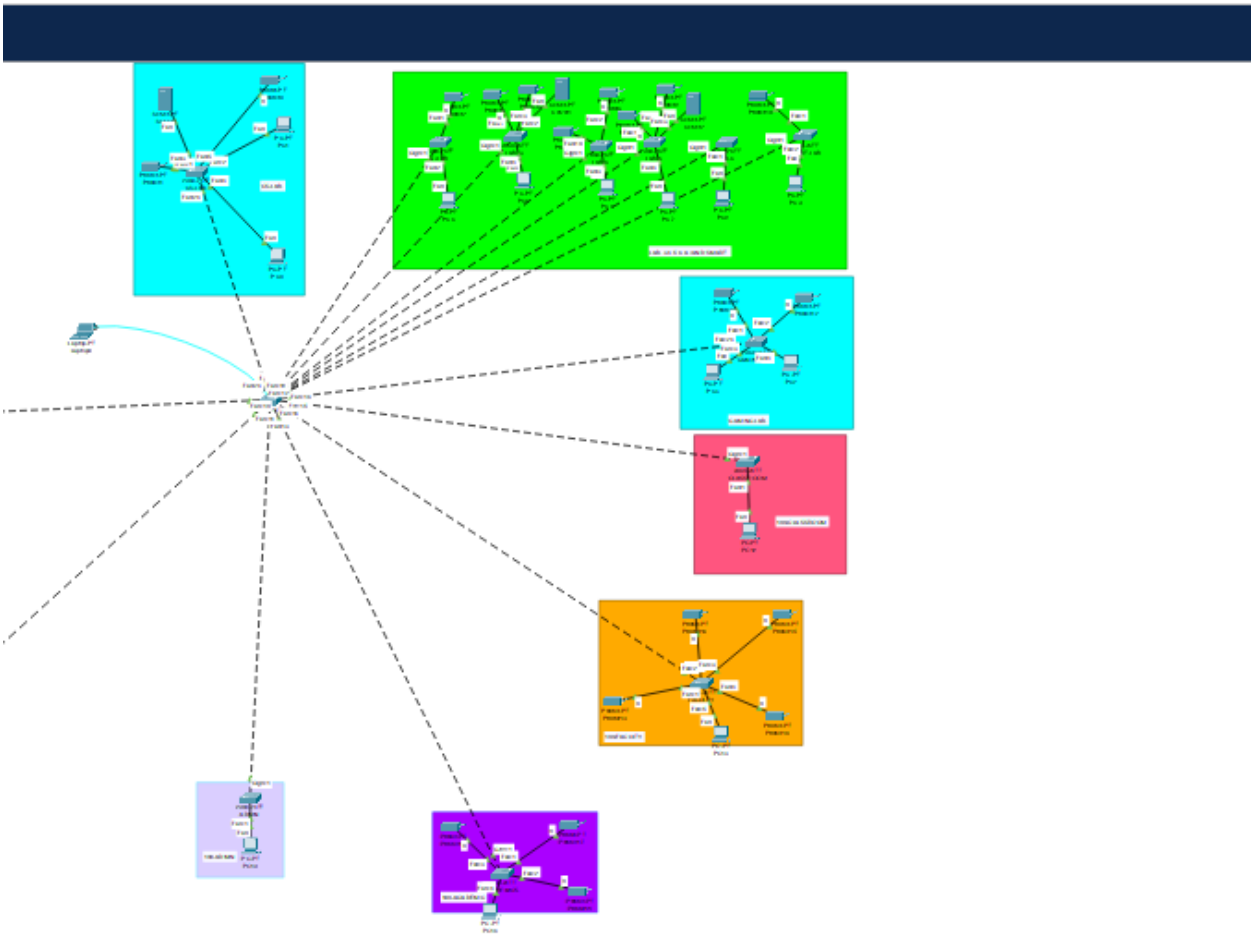
INTRODUCTION

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.

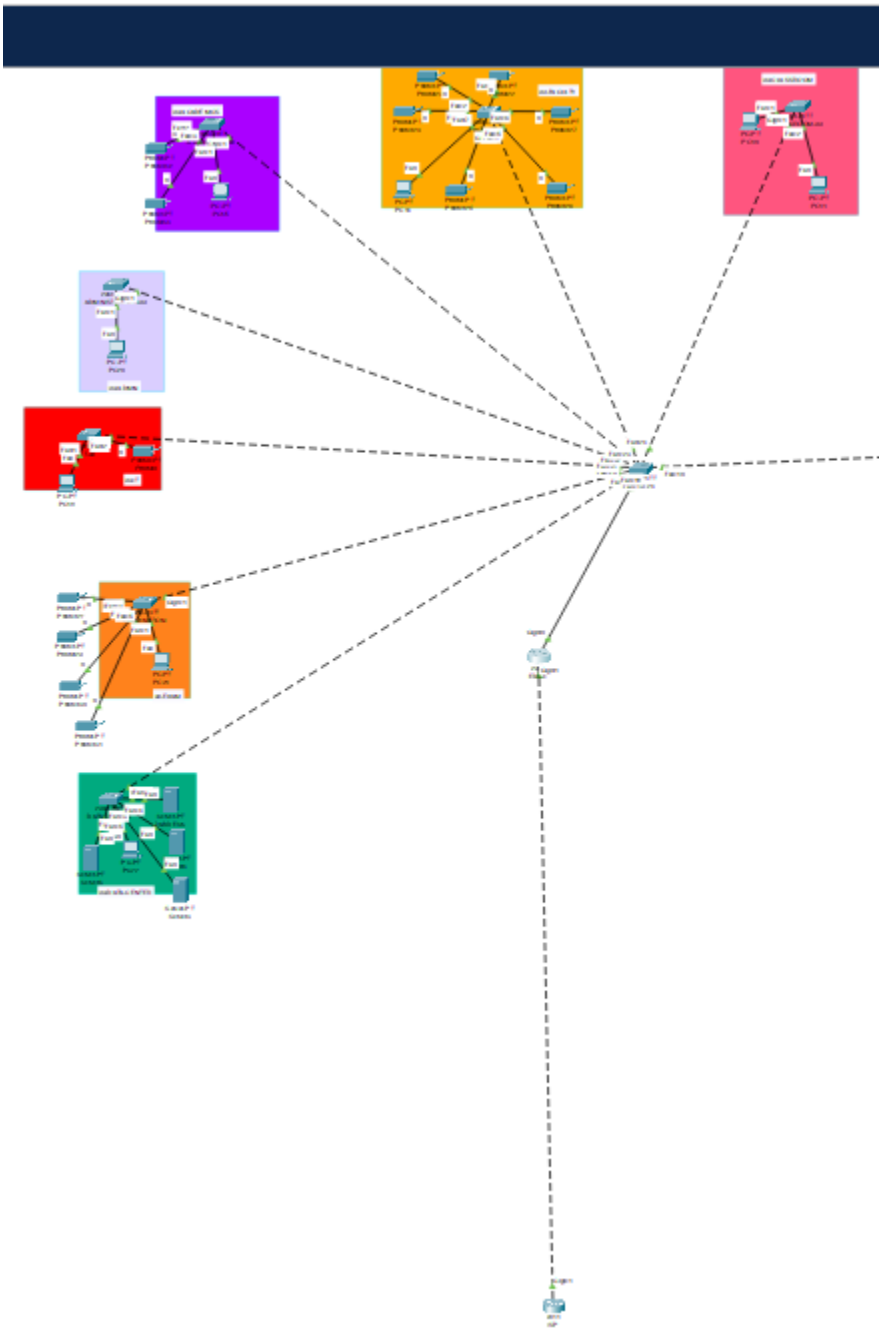
NOTE:
Line console password = 111
Privilege mode password = 777
Telnet password = 333

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.

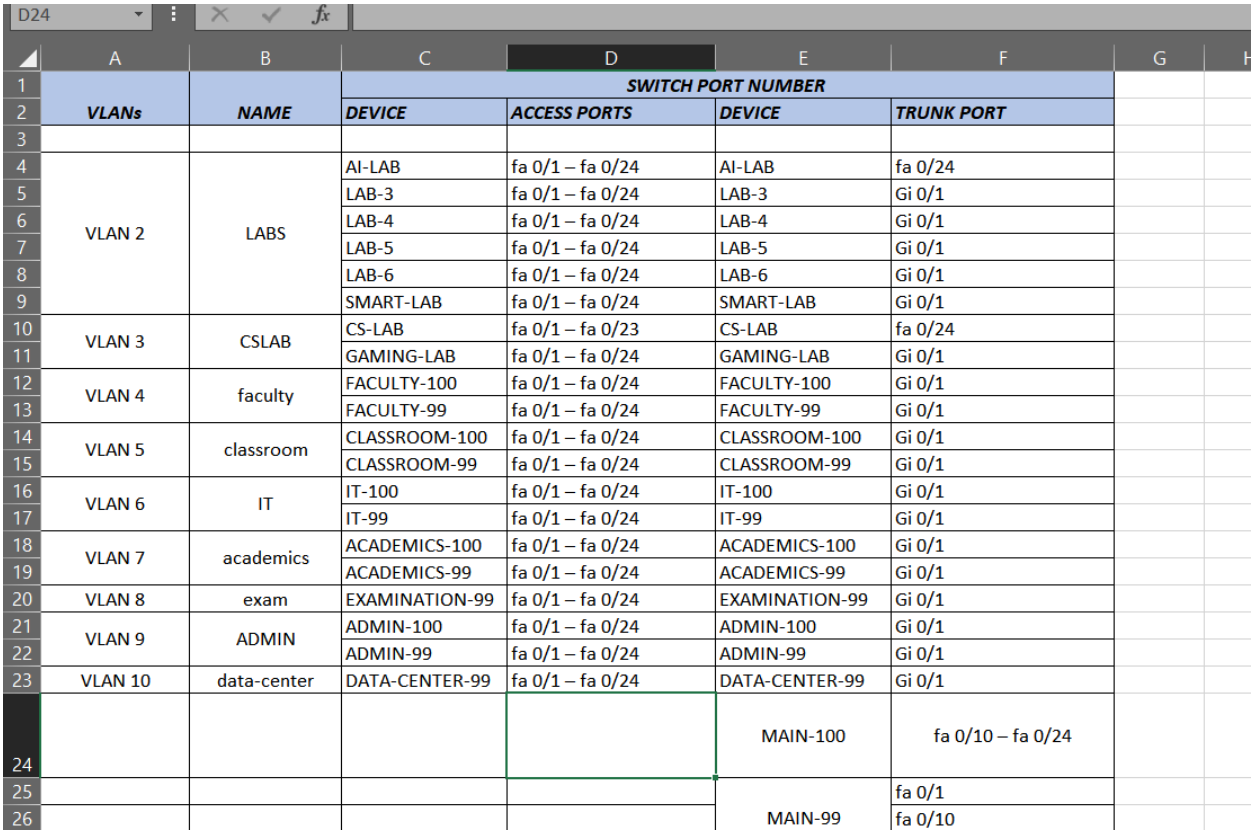
100-CAMPUS BUILDING



99-CAMPUS BUILDING



IP POOL & SUBNETTING



	A	B	C	D	E	F
1			SWITCH PORT NUMBER			
2	VLANs	NAME	DEVICE	ACCESS PORTS	DEVICE	TRUNK PORT
3						
4	VLAN 2	LABS	AI-LAB	fa 0/1 – fa 0/24	AI-LAB	fa 0/24
5			LAB-3	fa 0/1 – fa 0/24	LAB-3	Gi 0/1
6			LAB-4	fa 0/1 – fa 0/24	LAB-4	Gi 0/1
7			LAB-5	fa 0/1 – fa 0/24	LAB-5	Gi 0/1
8			LAB-6	fa 0/1 – fa 0/24	LAB-6	Gi 0/1
9			SMART-LAB	fa 0/1 – fa 0/24	SMART-LAB	Gi 0/1
10	VLAN 3	CSLAB	CS-LAB	fa 0/1 – fa 0/23	CS-LAB	fa 0/24
11			GAMING-LAB	fa 0/1 – fa 0/24	GAMING-LAB	Gi 0/1
12	VLAN 4	faculty	FACULTY-100	fa 0/1 – fa 0/24	FACULTY-100	Gi 0/1
13			FACULTY-99	fa 0/1 – fa 0/24	FACULTY-99	Gi 0/1
14	VLAN 5	classroom	CLASSROOM-100	fa 0/1 – fa 0/24	CLASSROOM-100	Gi 0/1
15			CLASSROOM-99	fa 0/1 – fa 0/24	CLASSROOM-99	Gi 0/1
16	VLAN 6	IT	IT-100	fa 0/1 – fa 0/24	IT-100	Gi 0/1
17			IT-99	fa 0/1 – fa 0/24	IT-99	Gi 0/1
18	VLAN 7	academics	ACADEMICS-100	fa 0/1 – fa 0/24	ACADEMICS-100	Gi 0/1
19			ACADEMICS-99	fa 0/1 – fa 0/24	ACADEMICS-99	Gi 0/1
20	VLAN 8	exam	EXAMINATION-99	fa 0/1 – fa 0/24	EXAMINATION-99	Gi 0/1
21	VLAN 9	ADMIN	ADMIN-100	fa 0/1 – fa 0/24	ADMIN-100	Gi 0/1
22			ADMIN-99	fa 0/1 – fa 0/24	ADMIN-99	Gi 0/1
23	VLAN 10	data-center	DATA-CENTER-99	fa 0/1 – fa 0/24	DATA-CENTER-99	Gi 0/1
24					MAIN-100	fa 0/10 – fa 0/24
25					MAIN-99	fa 0/1
26						fa 0/10

INTER-VLAN ROUTING TABLE:

EDGE	G0/0.2	211.21.6.1	255.255.255.0	___
	G0/0.3	211.21.13.1	255.255.255.128	___
	G0/0.4	211.21.13.129	255.255.255.128	___
	G0/0.5	211.21.24.1	255.255.255.192	___
	G0/0.6	211.21.24.65	255.255.255.224	___
	G0/0.7	211.21.24.97	255.255.255.224	___
	G0/0.8	211.21.24.129	255.255.255.224	___
	G0/0.9	211.21.24.161	255.255.255.240	___
	G0/0.10	211.21.24.177	255.255.255.248	___

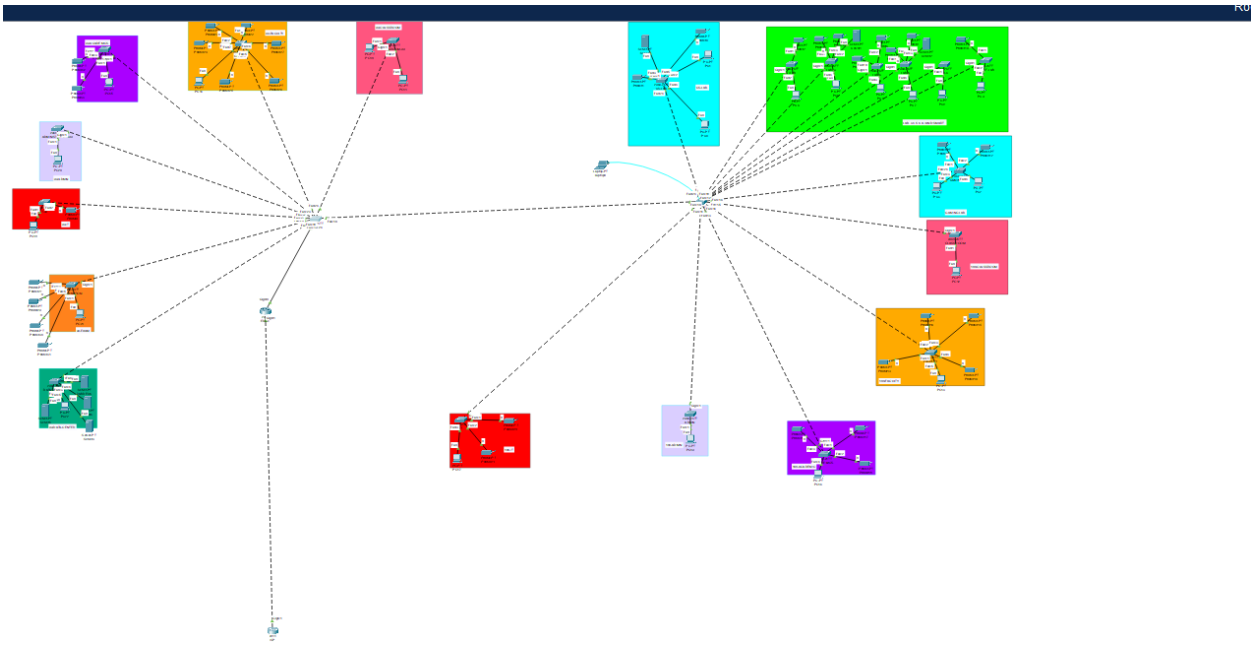
VLAN IMPLEMENTATION:

```
VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/2, Fa0/3, Fa0/4, Fa0/5
                                                 Fa0/6, Fa0/7, Fa0/8, Fa0/9
                                                 Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                 Fa0/15, Fa0/16, Fa0/17, Gig0/1
                                                 Gig0/2
2    LABS                              active
3    CSLAB                             active
4    faculty                           active
5    classroom                         active
6    IT                                active
7    academics                         active
8    exam                              active
9    ADMIN                             active
10   data-center                       active
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
```

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, enabling secure and efficient internet access. Access Control Lists (ACLs) will be implemented to control network traffic, allowing only authorized users and devices to access critical network resources. These measures collectively enhance network functionality, efficiency, and security at SZABIST Karachi campus.

COMPLETE TOPOLOGY DIAGRAM:



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, ACLs, 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.