EAST WEST UNIVERSITY

Department of Computer Science & Engineering

Project Title:

Design a full-fledged network for an organization with multiple subnets.

Semester: Fall-2024

Course code: CSE 405, Sec:03

Course Title: Computer Networks

Instructor:

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Department of Computer Science and Engineering

Submitted by

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ID: 2022-1-60-248

Introduction

Apex University is an enterprise like East West University, owns many computers, with a complex network infrastructure. Apart from wired internet access to all the classrooms, labs, employee PCs, library and other administrative and academic wings, the university also provides wireless internet access for every campus. On top of that the university runs complex networked systems to support several of its business process like admissions, advising, results, eTender, library management, accounts and so on.

This complex network infrastructure is subnetted and switching/routing mechanisms are in practice.

Required Tools

- Pcs, SmartPhone-PT, Laptop-PT
- Wireless End Device
- Switches (Model 2960 IO S 15)
- Routers(Generic Router-PT)
- Wireless Routers
- DNS Server
- Web Server
- DHCP Server
- Connectors(Copper Straight-Through,Serial DCE)

Objective

The goal is to design and implement a complete complex network model that reflects the University's structure, systems, and facilities by ensuring interconnectivity among various subnetworks. The key features of the network will include:

1. **University Web Page:** The network will feature a web page for 'Apex University.'

2. DNS Server Setup: A single DNS server will be installed to resolve the university's website, allowing access via the URL http://www.apex.edu.bd.

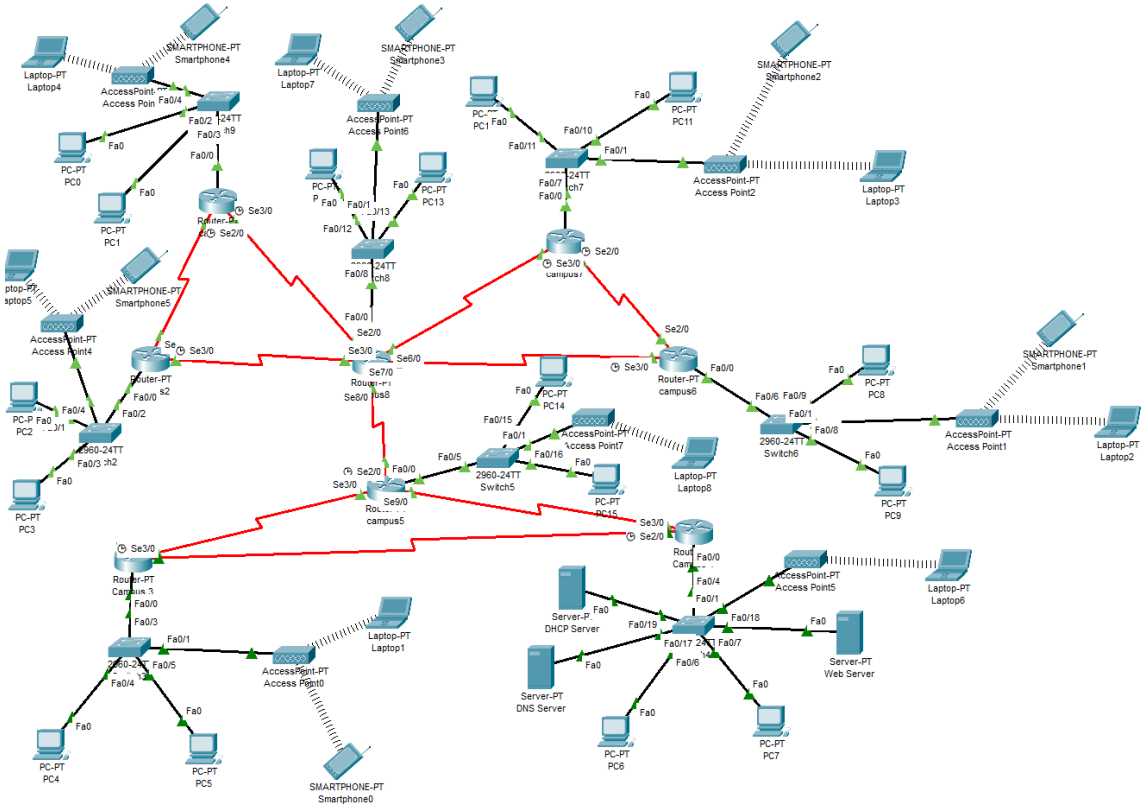
3. DHCP Configuration: The network will be configured to automatically assign IP addresses to hosts across all campuses using a single DHCP server.

4. Hosts (Wired & Wireless): Both wired and wireless hosts will be included in the network for each campus.

5. Multi-Campus Network: The university's network will span eight campuses, interconnected with eight routers.

6. Host Connectivity: Full connectivity between all devices in the network will be ensured for smooth communication.

Network Diagram



Lines of Codes: Router Configuration code:

Campus 1/Router 1:

```
interface fa0/0
ip address 40.0.0.254 255.0.0.0
no shut
do wr
exit

interface se2/0
ip address 193.170.10.1 255.255.255.0
clock rate 64000
no shut
do wr
exit

interface se3/0
ip address 193.170.20.1 255.255.255.0
clock rate 64000
no shut
do wr
exit
```

Campus 2/Router 2:

```
interface fa0/0
ip address 41.0.0.254 255.0.0.0
no shut
do wr
```

exit

interface se2/0

ip address 193.170.10.2 255.255.255.0

no shut

do wr

exit

interface se3/0

ip address 193.170.30.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

Campus 3/Router 3:

interface fa0/0

ip address 194.168.20.254 255.255.255.0

no shut

do wr

exit

interface se2/0

ip address 193.170.80.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

interface se3/0

ip address 193.170.100.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

Campus 4/Router 4:

interface fa0/0

ip address 195.168.30.254 255.255.255.0

no shut

do wr

exit

interface se2/0

ip address 193.170.90.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

interface se3/0

ip address 193.170.100.2 255.255.255.0

no shut

do wr

exit

Campus 5/Router 5:

interface fa0/0

ip address 196.168.40.254 255.255.255.0

no shut

do wr

exit

interface se2/0

ip address 193.170.70.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

interface se3/0

ip address 193.170.80.2 255.255.255.0

no shut

do wr

exit

interface se9/0

ip address 193.170.90.2 255.255.255.0

no shut

do wr

exit

Campus 6/Router 6:

interface fa0/0

ip address 130.30.0.254 255.255.0.0

no shut

do wr

exit

interface se2/0

ip address 193.170.40.2 255.255.255.0

no shut

do wr

exit

interface se3/0

ip address 193.170.60.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

Campus 7/Router 7:

interface fa0/0

ip address 130.20.0.254 255.255.0.0

no shut

do wr

exit

interface se2/0

ip address 193.170.40.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

interface se3/0

ip address 193.170.50.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

Campus 8/Router 8:

interface fa0/0

ip address 42.0.0.254 255.0.0.0

no shut

do wr

exit

interface se2/0

ip address 193.170.20.2 255.255.255.0

no shut

do wr

exit

interface se3/0

ip address 193.170.30.2 255.255.255.0

no shut

do wr

exit

interface se6/0

ip address 193.170.50.2 255.255.255.0

no shut

do wr

exit

interface se7/0

ip address 193.170.60.2 255.255.255.0

no shut

do wr

exit

interface se8/0

ip address 193.170.70.2 255.255.255.0

no shut

do wr

exit

Routing Table Code:

Campus 1/Router 1:

router ospf 1

network 40.0.0.0 0.255.255.255 area 1

network 193.170.10.0 0.0.0.255 area 1

network 193.170.20.0 0.0.0.255 area 1

exit

Campus 2/Router 2:

router ospf 2

network 41.0.0.0 0.255.255.255 area 1

network 193.170.10.0 0.0.0.255 area 1

network 193.170.30.0 0.0.0.255 area 1

exit

Campus 3/Router 3:

router ospf 3

network 194.168.20.0 0.0.0.255 area 1

network 193.170.80.0 0.0.0.255 area 1

network 193.170.100.0 0.0.0.255 area 1

exit

Campus 4/Router 4:

router ospf 4

network 195.168.30.0 0.0.0.255 area 1

network 193.170.90.0 0.0.0.255 area 1

network 193.170.100.0 0.0.0.255 area 1

exit

Campus 5/Router 5:

router ospf 5

network 196.168.40.0 0.0.0.255 area 1

network 193.170.70.0 0.0.0.255 area 1

network 193.170.80.0 0.0.0.255 area 1

network 193.170.90.0 0.0.0.255 area 1

exit

Campus 6/Router 6:

router ospf 6

network 130.30.0.0 0.0.255.255 area 1

network 193.170.40.0 0.0.0.255 area 1

network 193.170.60.0 0.0.0.255 area 1

exit

Campus 7/Router 7:

router ospf 7

network 130.20.0.0 0.0.255.255 area 1

network 193.170.40.0 0.0.0.255 area 1

network 193.170.50.0 0.0.0.255 area 1

exit

Campus 8/Router 8:

router ospf 8

network 42.0.0.0 0.255.255.255 area 1

network 193.170.20.0 0.0.0.255 area 1

network 193.170.30.0 0.0.0.255 area 1

network 193.170.50.0 0.0.0.255 area 1

network 193.170.60.0 0.0.0.255 area 1

network 193.170.70.0 0.0.0.255 area 1

exit

Codes For single DHCP Setup:

For ALL Routers:

enable

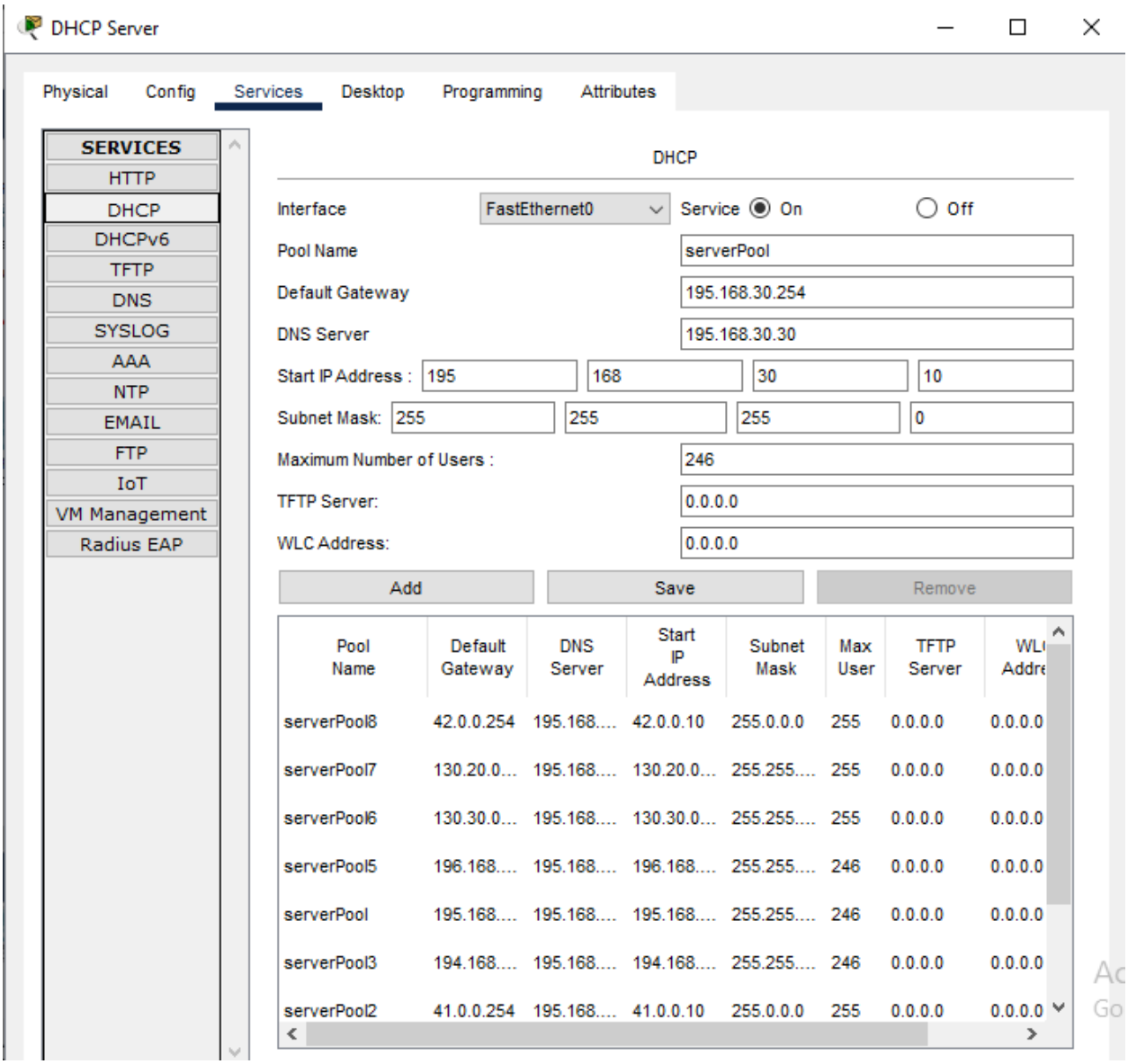
config

interface fa0/0

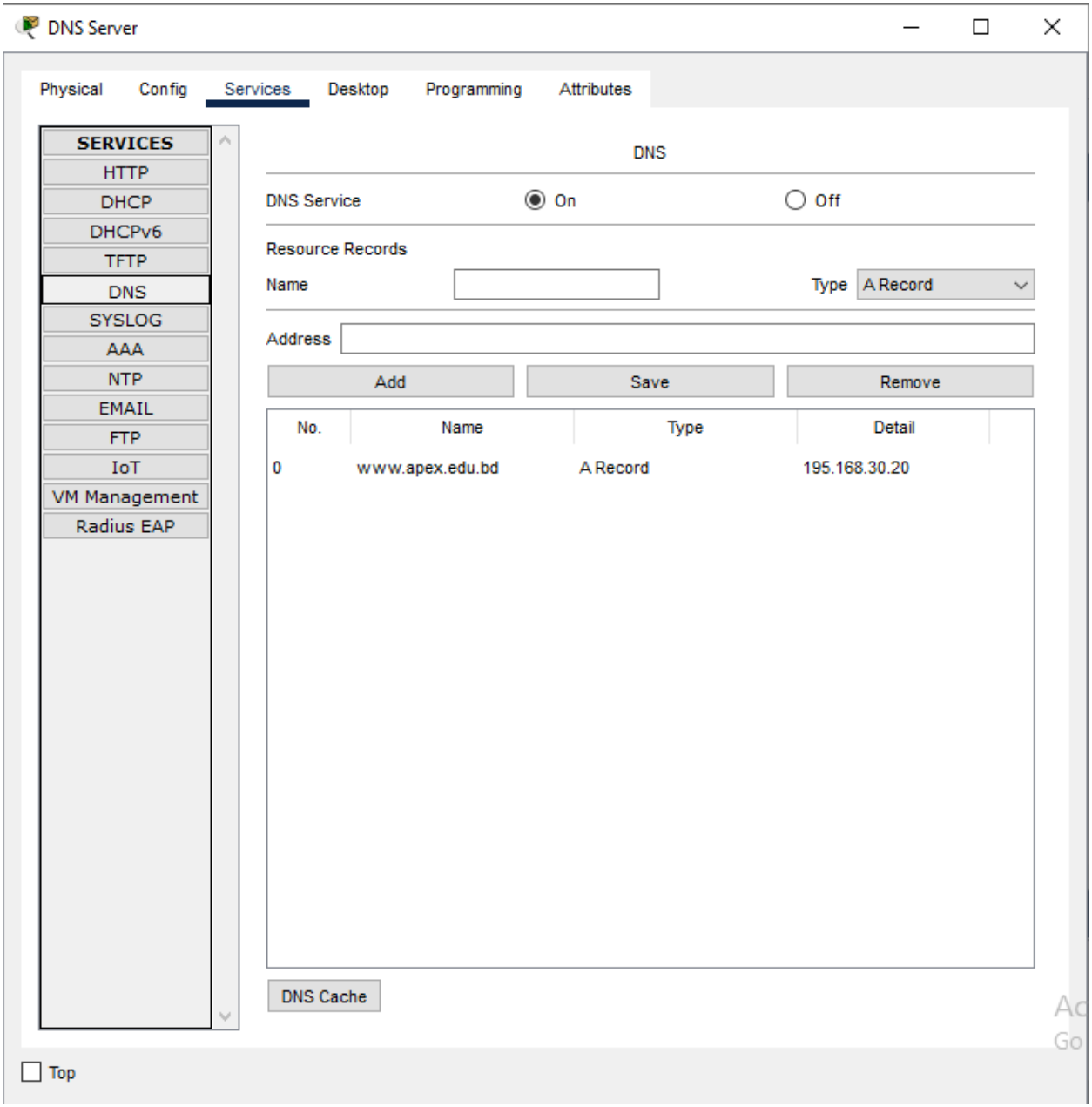
ip helper-address 195.168.30.10

exit

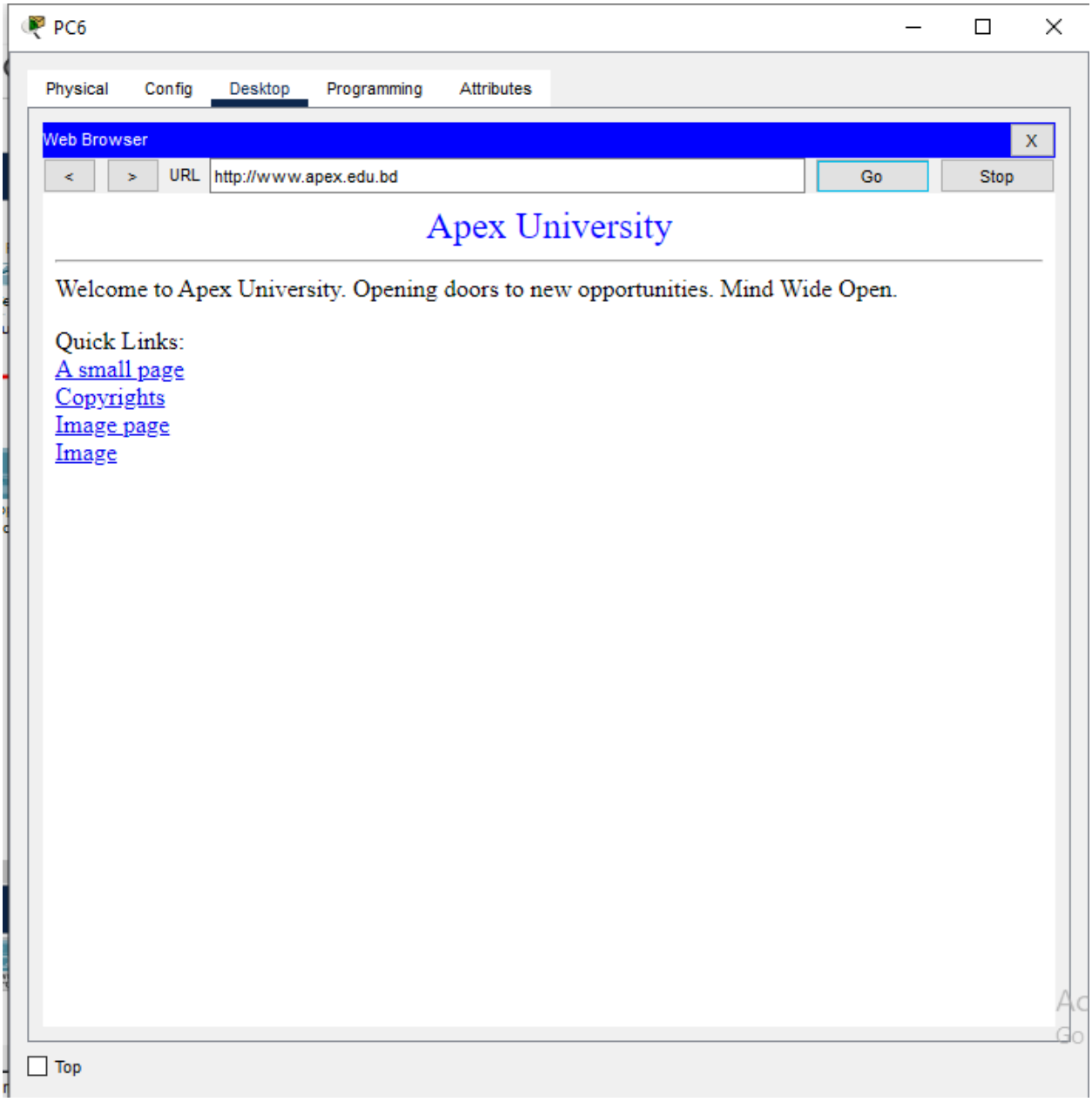
DHCP Server Setup



DNS Server Setup



Web Page


PC6
Physical
Config
Desktop
Programming
Attributes
Web Browser
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http://www.apex.edu.bd
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Apex University
Welcome to Apex University. Opening doors to new opportunities. Mind Wide Open.
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Image
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Conclusion:

In summary, university network systems are vital to the effective operation of modern educational institutions. These networks grant students, faculty, and staff seamless access to essential resources, including class schedules, online course materials, and email services. They also support communication and collaboration within the university community while streamlining administrative tasks such as grading and record management.

Ultimately, a robust, well-structured, and efficiently maintained network system is crucial to ensuring the productivity and success of any educational institution.