

1.cyber security

problem statement: choose a university/college campus and analyze its network topology.Map the network using cisco packet Tracer and identify the security controls that are in place,such as network segmentation,intrusion detection system,firewalls,and authentication and authorization systems.

METHODOLOGY

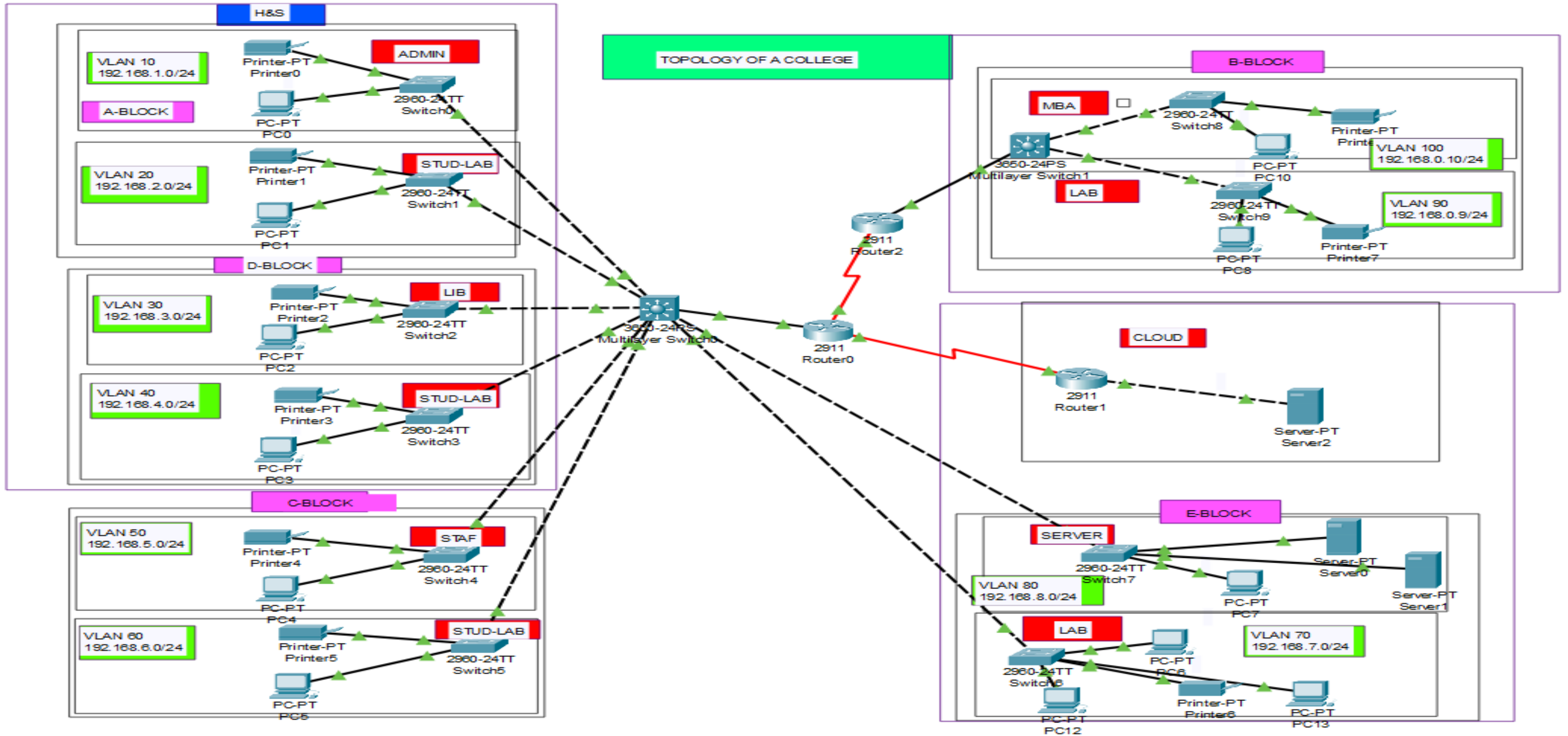
Cisco Packet Tracer(CPT) is the main technology that we depended on designing and simulating a secure campus network.CPT is a visual simulation tool that has been created and designed by cisco system.CPT has been used as an effective tool to teach and learn network communication in realistic way.it offers a realistic visualization and simulation tool that for learning .That what help the users especially student to create,design,configure,and troubleshoot different type of networks such as LAN and WAN

Implementation:-

In order to design a secure campus network (SCN), we used different devices wired and wireless. Also, we used different types of communication media to connect the devices. After connecting the devices, we implemented many important configurations as VLANs, dynamic host configuration protocol (DHCP), and routing information protocol (RIP). Moreover, we applied security and management techniques in the main devices of the network; to make the campus network safer and to protect it from interior and exterior attackers. So, the sanctity and the privacy of the user will be granted.

SCN topology:-

The topology that is designed for the secure campus network consists of one main campus router, one main campus L3 switch, one Branch router, one cloud router and ten switch to connect the end devices. All the devices are connected with a switch that connects them directly to the main campus switch and the main switch is connected to the main campus router, as shown in figure1:-



Requried resources:-

we used different types of devices in our work to show different connectivity cases. most of the devices are connected using cables like PCs. However, some are connected by wireless such as printers.

- *3 Router (Cisco 2960)

- *2 switch (Cisco 3650-24ps)

- *10 switches (Cisco 2911)

- *10 PCs

- *9 printer

- *3 server

- *cables to connect the devices

ip address:-

ip address is an internet protocol address that assigns to each device in the network. Each device assigns a unique IP address to be recognizable and visible by other devices in the network so that it can send and receive data easily without any missing. Each one consists of a 32-bit number with the format of four-octet numbers separated by a dot as 192.168.1.0. The IP address has two versions IPv4 and IPv6. Where IPv4 has five classes A, B, C, D, and E each one has a different range of capacity. For example, class A provides a few very large sizes of network address. This can be written as 1.0.0.0 to 126.255.255.255. Thus, Class A provides a few very large sizes of networks. In our work, we used IP address with class C to connect end devices, however for the router's we used IP address of Class A.

in order to assign IPs for each device we did some of them manually and some of them by using DHCP protocol. The DHCP protocol that assigns an IP address to end devices depending on the configuration that makes on some devices like a server or router. A DHCP server allows computer to request IP address and networking parameter from their network service provider (ISP) automatically, eliminating the need for a network administrator or user to assign IP addresses to all network devices manually. In a secure campus network, we configured a server to provide the PCs with the IP address as it is shown in fig2:-

Router2

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

GigabitEthernet0/0

GigabitEthernet0/1

GigabitEthernet0/2

Serial0/1/0

Serial0/1/1

RIP Routing

Network

Network Address

192.168.1.0

192.168.2.0

Add

Remove

Equivalent IOS Commands

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down

Router(config-if)#int se0/1/0

Router(config-if)#no sh

Router(config-if)#ex

Router(config)#int se0/1/1

Router(config-if)#no sh

Router(config-if)#ex

Router(config)#

Router(config)#router rip

Router(config-router)#network 192.168.1.0

Router(config-router)#network 192.168.2.0

Router(config-router)#

Top

NewDelete

VLANs:

VLAN or virtual local area network is a group of local area network that are connected to each other add more security and manage broadcast domain into the LANs.therefore,in secure campus network

-switch configuration for VLANs

-we created ten VLANs 10,20,30.....100;and then we assigned fa0/2,fa0/ 3 etc.. we changed the remaining port GitabitEthernet0/2,configruation below:-

- sitch(config)#hostname sw1
- switch(config-if)#vlan 10
- same for all switch

```
Motherboard assembly number      : 73-10390-03
Power supply part number         : 341-0097-02
Motherboard serial number        : FOC10093R12
Power supply serial number       : AZS1007032H
Model revision number            : B0
Motherboard revision number      : B0
Model number                     : WS-C2960-24TT-L
System serial number             : FOC1010X104
Top Assembly Part Number        : 800-27221-02
Top Assembly Revision Number    : A0
Version ID                      : V02
CLEI Code Number                : COM3L00BRA
Hardware Board Revision Number  : 0x01

Switch Ports Model          SW Version        SW Image
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* 1 26 WS-C2960-24TT-L 15.0(2)SE4 C2960-LANBASEK9-M

Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version 15.0(2)SE4, RELEASE SOFTWARE (fc1)
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Compiled Wed 26-Jun-13 02:49 by mnguyen

Press RETURN to get started!

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up

Switch>
Switch>en
Switch#con t
% Ambiguous command: "con t"
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int gig0/1
Switch(config-if)#no sh
Switch(config-if)#exit
Switch(config)#
```

```
Cisco Packet Tracer SERVER Command Line 1.0
C:\>ping 10.10.10.1

Pinging 10.10.10.1 with 32 bytes of data:

Reply from 20.0.0.1: Destination host unreachable.
Reply from 20.0.0.1: Destination host unreachable.
Reply from 20.0.0.1: Destination host unreachable.
Reply from 20.0.0.1: Destination host unreachable.

Ping statistics for 10.10.10.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

conclusion:

To increase the security level in the network's system especially on campus ,we proposed a secure campus network(SCN) scenario designing and simulating using the cisco packet tracer program

