



NOTRE DAME UNIVERSITY BANGLADESH

Computer Networks Lab Final

Course Code: CSE-3204

Course Title: Computer Networks Lab

Lab Final Task : VLSM Design for 172.05.0.0/16 Network

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Batch: CSE-20

Submission Date: May 29, 2025

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Objective

To implement and understand the working of **VLSM Design for 172.05.0.0/16 Network** using Cisco Packet Tracer, Optimize IP Address Utilization: Different departments (CSE, EECE, ICT, SH, Admin T) require different numbers of hosts. VLSM allows us to assign subnets based on actual need (e.g., 2000 hosts for CSE, only 125 for Admin T). This avoids wasting IP addresses compared to using a fixed-size subnet for all.

VLSM Table for 172.05.0.0/16

Network Name	Hosts Required	CIDR	Subnet Mask	Network Address	Usable IP Range
CSE	2000	/21	255.255.248.0	172.05.0.0	172.05.0.1
				172.05.7.255	172.05.7.254
ECE	1000	/22	255.255.252.0	172.05.8.0	172.05.8.1
				172.05.11.255	172.05.11.254
ICT	500	/23	255.255.254.0	172.05.12.0	172.05.12.1
				172.05.13.255	172.05.13.254
SH	200	/24	255.255.255.0	172.05.14.0	172.05.14.1
				172.05.14.255	172.05.14.254
Admin T	125	/25	255.255.255.128	172.05.15.0	172.05.15.1
				172.05.15.127	172.05.15.126

Router-to-Router Links (/30 subnets)

- N1–N2: 172.05.16.0/30 → 172.05.16.1 -- 172.05.16.2
- N1–N3: 172.05.16.4/30 → 172.05.16.5 -- 172.05.16.6
- N1–N4: 172.05.16.8/30 → 172.05.16.9 -- 172.05.16.10
- N2–CSE: 172.05.16.12/30 → 172.05.16.13 -- 172.05.16.14
- N3–ECE: 172.05.16.16/30 → 172.05.16.17 -- 172.05.16.18
- N4–ICT: 172.05.16.20/30 → 172.05.16.21 -- 172.05.16.22
- N3–SH: 172.05.16.24/30 → 172.05.16.25 -- 172.05.16.26
- N4–AdminT: 172.05.16.28/30 → 172.05.16.29 -- 172.05.16.30

Network Topology

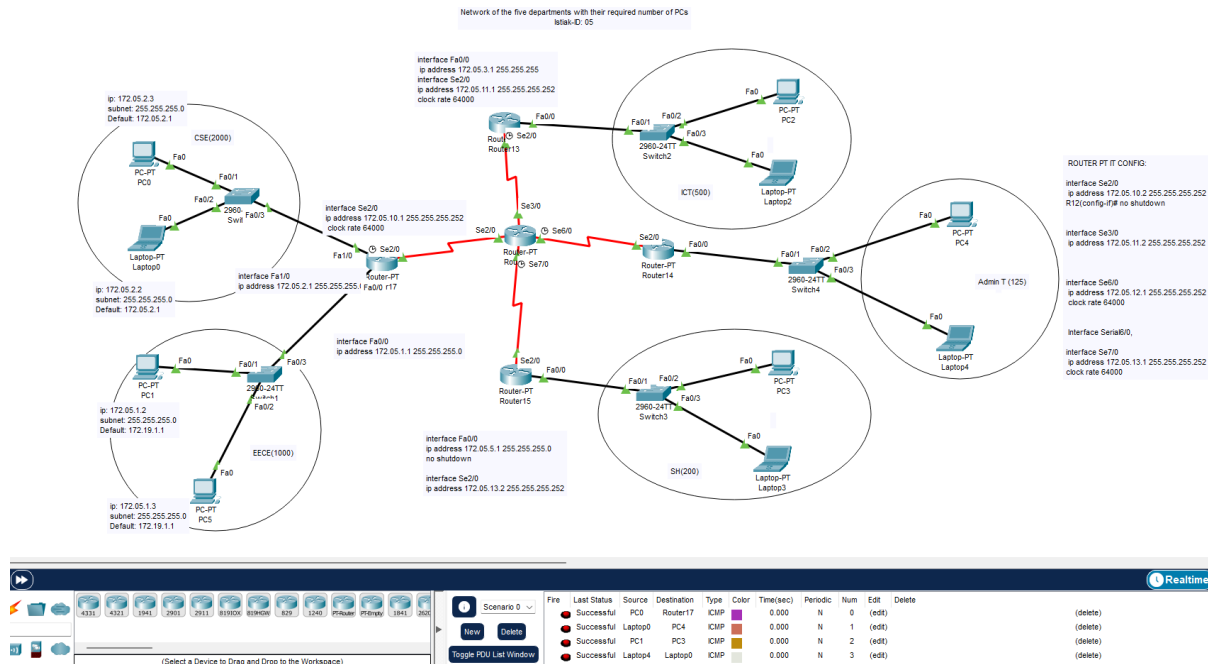


Figure 1: Topology

Router Configuration :

Router N1

```

hostname N1
interface GigabitEthernet0/0
 ip address 172.05.16.1 255.255.255.252
 no shutdown
interface GigabitEthernet0/1
 ip address 172.05.16.5 255.255.255.252
 no shutdown
interface GigabitEthernet0/2
 ip address 172.05.16.9 255.255.255.252
 no shutdown
exit
ip routing
    
```

Router N2

```
hostname N2
interface GigabitEthernet0/0
  ip address 172.05.16.2 255.255.255.252
  no shutdown
interface GigabitEthernet0/1
  ip address 172.05.16.13 255.255.255.252
  no shutdown
exit
ip routing
```

Router N3

```
hostname N3
interface GigabitEthernet0/0
  ip address 172.05.16.6 255.255.255.252
  no shutdown
interface GigabitEthernet0/1
  ip address 172.05.16.17 255.255.255.252
  no shutdown
interface GigabitEthernet0/2
  ip address 172.05.16.25 255.255.255.252
  no shutdown
exit
ip routing
```

Router N4

```
hostname N4
interface GigabitEthernet0/0
  ip address 172.05.16.10 255.255.255.252
  no shutdown
interface GigabitEthernet0/1
  ip address 172.05.16.21 255.255.255.252
  no shutdown
interface GigabitEthernet0/2
  ip address 172.05.16.29 255.255.255.252
  no shutdown
exit
ip routing
```

DHCP Configuration Examples

CSE

```
ip dhcp pool CSE
network 172.05.0.0 255.255.248.0
default-router 172.05.0.1
dns-server 8.8.8.8
```

ECE

```
ip dhcp pool ECE
network 172.05.8.0 255.255.252.0
default-router 172.05.8.1
dns-server 8.8.8.8
```

ICT

```
ip dhcp pool ICT
network 172.05.12.0 255.255.254.0
default-router 172.05.12.1
dns-server 8.8.8.8
```

SH

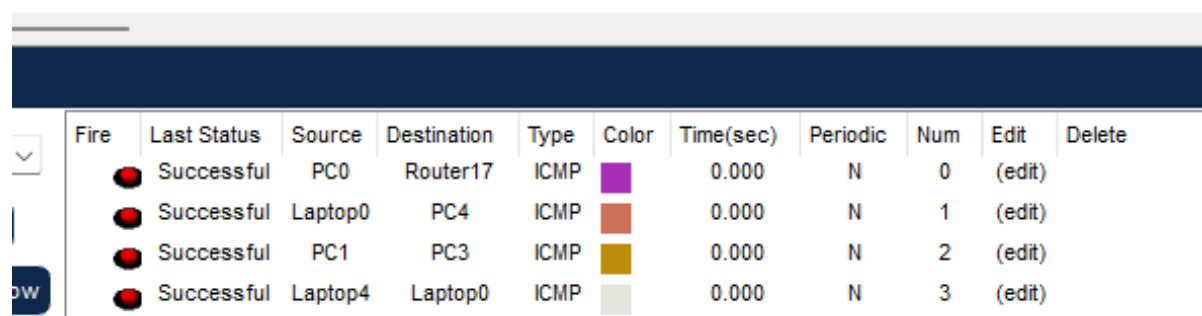
```
ip dhcp pool SH
network 172.05.14.0 255.255.255.0
default-router 172.05.14.1
dns-server 8.8.8.8
```

AdminT

```
ip dhcp pool AdminT
network 172.05.15.0 255.255.255.128
default-router 172.25.15.1
dns-server 8.8.8.8
```

Testing

In Cisco Packet Tracer, after giving packet on PC0 to Router17 & PC1 to PC3 (etc.) the packet send and receive is successful.



The screenshot shows a table with the following columns: Fire, Last Status, Source, Destination, Type, Color, Time(sec), Periodic, Num, Edit, and Delete. There are four rows of data, all with a 'Successful' status and a time of 0.000 seconds.

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	Router17	ICMP	Purple	0.000	N	0	(edit)	
	Successful	Laptop0	PC4	ICMP	Red	0.000	N	1	(edit)	
	Successful	PC1	PC3	ICMP	Yellow	0.000	N	2	(edit)	
	Successful	Laptop4	Laptop0	ICMP	Grey	0.000	N	3	(edit)	

Figure 2: Testing Packets