

# **COMPUTER NETWORKS LAB**



LAB TASK # 05

Submitted By

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5A

Submitted To

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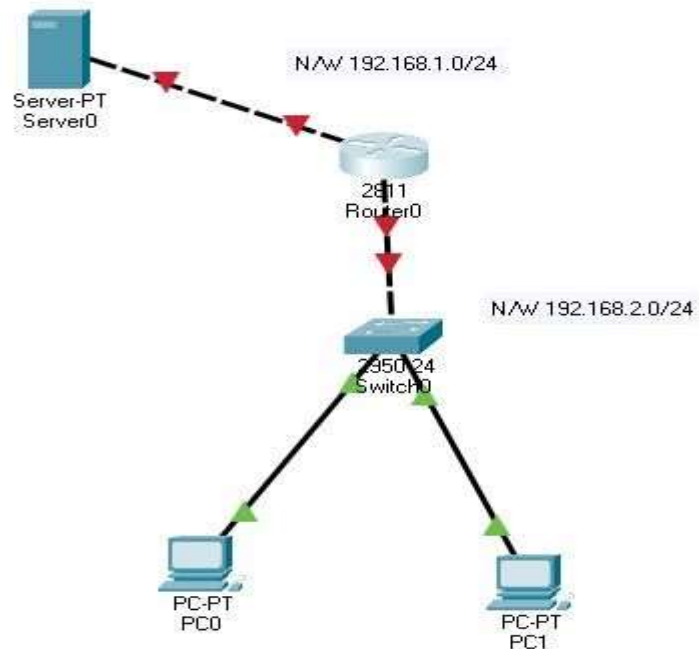
**Fast National University of Computer and Emerging**

**Sciences, Peshawar**

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## Task 1: Configuring an IP helper address:

### 1. Topology:



2. Assign a static IP address to the server. Server: IP address: 192.168.1.2  
Subnet mask: 255.255.255.0 Default gateway: 192.168.1.1

Physical Config Services **Desktop** Programming Attributes

**IP Configuration** [X]

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.1.2

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::290:21FF:FE31:8220

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

### 3. Router interface configurations:

Physical Config **CLI** Attributes

IOS Command Line Interface

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: no

Press RETURN to get started!

```
Router>interface fa 0/0
% Invalid input detected at '^' marker.

Router>enable
Router#config ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fa 0/0
Router(config-if)#ip address 192.168.2.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-S-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#interface fa 0/1
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-S-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Router(config-if)#
```

Ctrl-F6 to exit CLI focus

Copy Paste

### 4. Click on DHCP Server->Services->DHCP:

Physical Config **Services** Desktop Programming Attributes

**SERVICES**

- HTTP
- DHCP**
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

**DHCP**

Interface: FastEthernet0 Service ☒ On ☐ Off

Pool Name: SALES

Default Gateway: 192.168.2.1

DNS Server: 192.168.1.2

Start IP Address: 192.168.2.0

Subnet Mask: 255.255.255.0

Maximum Number of Users: 255

TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max Users	TFTP Server	WLC Address
SALES	192.168.2.1	192.168.1.2	192.168.2.1	255.255.255.0	255	0.0.0.0	0.0.0.0
serverPool	0.0.0.0	0.0.0.0	192.168.1.1	255.255.255.0	255	0.0.0.0	0.0.0.0

5. Add the command `ip helper-address 192.168.1.2` on the interface configuration mode of fa 0/0 of Router 2, just as we've done before:

```
Router(config-if)#ex
Router(config)#interface fa 0/0
Router(config-if)#ip helper-address 192.168.1.2
Router(config-if)#
```

6. Lastly enable DHCP on the PCs in SALES LAN. The PCs will obtain their address from the DHCP server.

The screenshot shows a network configuration window titled "IP Configuration" with a close button (X). The "Interface" dropdown is set to "FastEthernet0".

**IP Configuration**

☒ DHCP ☐ Static DHCP request successful

IPv4 Address: 192.168.2.2

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.2.1

DNS Server: 192.168.1.2

**IPv6 Configuration**

☐ Automatic ☒ Static

IPv6 Address: [ ] / [ ]

Link Local Address: FE80::201:64FF:FE75:86EB

Default Gateway: [ ]

DNS Server: [ ]

**802.1X**

☐ Use 802.1X Security

Authentication: MD5

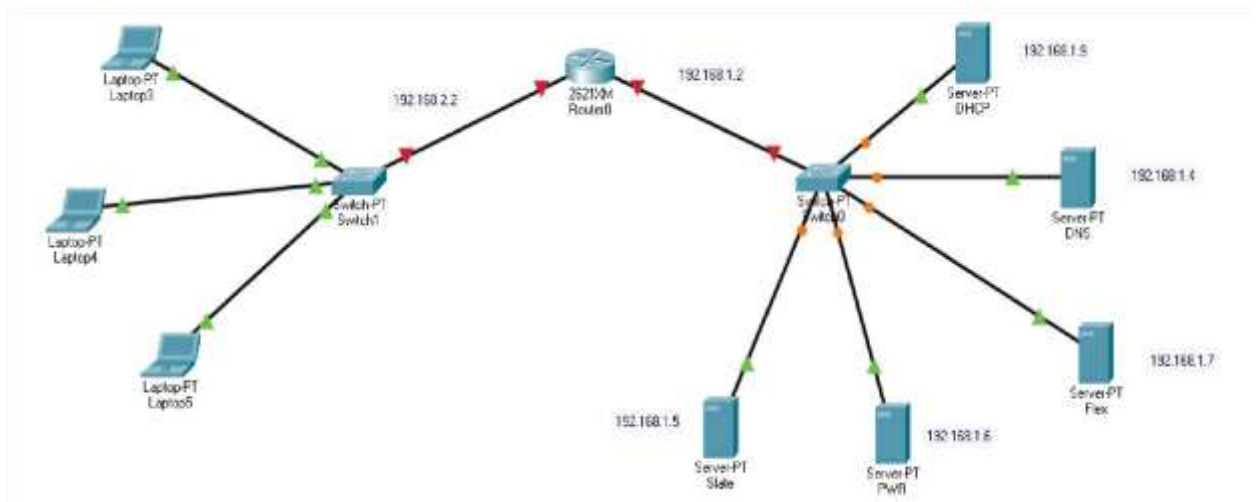
Username: [ ]

Password: [ ]

**Task 2:** Students should make the scenario exactly implemented in Lab 4 and implement the following:

1. We have three website each of them is stored on separate Web Server,
  - (www.slate.nu.edu.pk or state.nu.edu.pk) having IP address 192.168.1.5
  - (www.pwr.nu.edu.pk or pwr.nu.edu.pk) having IP address 192.168.1.6
  - (www.flex.nu.edu.pk or flex.nu.edu.pk) having IP address 192.168.1.7
2. A DHCP server and a DNS server configured as follow:
  - DHCP IP : 192.168.1.9
  - DNS Server IP : 192.168.1.4
3. We are going to make Two Labs “Lab A” and “Lab B”. In each Lab there are three PC’s. We want to use DHCP Server to avoid static IP’s. We also have our own DNS Server. Use the Class C IP Address like 192.168.1.0 or 192.168.2.0:

I. Topology:



## II. Router interface configurations:

Physical **Config** CLI Attributes

**GLOBAL**

- Settings
- Algorithm Settings

**ROUTING**

- Static
- RIP

**INTERFACE**

- FastEthernet0/0**
- FastEthernet0/1

**FastEthernet0/0**

Port Status ☒ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☒ Half Duplex ☐ Full Duplex ☒ Auto

MAC Address 0005.5E44.C901

IP Configuration

IPv4 Address 192.168.1.2

Subnet Mask 255.255.255.0

Tx Ring Limit 10

**Equivalent IOS Commands**

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.1.2 255.255.255.0
Router(config-if)#ip address 192.168.1.2 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
```

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.1.2 255.255.255.0
Router(config-if)#ip address 192.168.1.2 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#ip address 192.168.2.2 255.255.255.0
Router(config-if)#ip address 192.168.2.2 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Router(config-if)#ex
Router(config)#dhcp pool P1
~
% Invalid input detected at '^' marker.

Router(config)#ip dhcp pool P1
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.1.2
Router(dhcp-config)#ip dhcp pool P2
Router(dhcp-config)#network 192.168.2.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.2.2
Router(dhcp-config)#
```

Ctrl+F6 to exit CLI focus

Copy

III. Assign static IP to DHCP and Enable DHCP Services and Add Pool P1 and Pool P2 with respective IP Addresses:

The DHCP Configuration window is shown with the 'Desktop' tab selected. It contains two main sections: IP Configuration and IPv6 Configuration. In the IP Configuration section, the 'Static' radio button is selected, and the following values are entered: IPv4 Address: 192.168.1.4, Subnet Mask: 255.255.255.0, Default Gateway: 192.168.1.2, and DNS Server: 192.168.1.9. The IPv6 Configuration section has the 'Static' radio button selected, with IPv6 Address, Link Local Address (FE80::204:9AFF:FE08:862), Default Gateway, and DNS Server fields. Below these is a section for 802.1X configuration, with 'Use 802.1X Security' unchecked, Authentication set to MD5, and Username/Password fields empty. A 'Top' button is at the bottom left.

Physical Config Services Desktop Programming Attributes

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.1.4

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.2

DNS Server: 192.168.1.9

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::204:9AFF:FE08:862

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

☐ Top

The DHCP Services configuration window is shown with the 'Services' tab selected. On the left is a 'SERVICES' list with DHCP selected. The main area is titled 'DHCP' and shows settings for the 'FastEthernet0' interface. The 'Service' is set to 'On'. The 'Pool Name' is 'P2', 'Default Gateway' is 192.168.2.2, and 'DNS Server' is 192.168.1.9. The 'Start IP Address' is 192.168.1.0 and the 'Subnet Mask' is 255.255.255.0. The 'Maximum Number of Users' is 255. The 'TFTP Server' and 'WLC Address' are both 0.0.0.0. Below these are 'Add', 'Save', and 'Remove' buttons. At the bottom is a table listing the configured pools.

Physical Config Services Desktop Programming Attributes

SERVICES

- HTTP
- DHCP**
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

DHCP

Interface: FastEthernet0 Service: ☒ On ☐ Off

Pool Name: P2

Default Gateway: 192.168.2.2

DNS Server: 192.168.1.9

Start IP Address: 192 168 1 0

Subnet Mask: 255 255 255 0

Maximum Number of Users: 255

TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

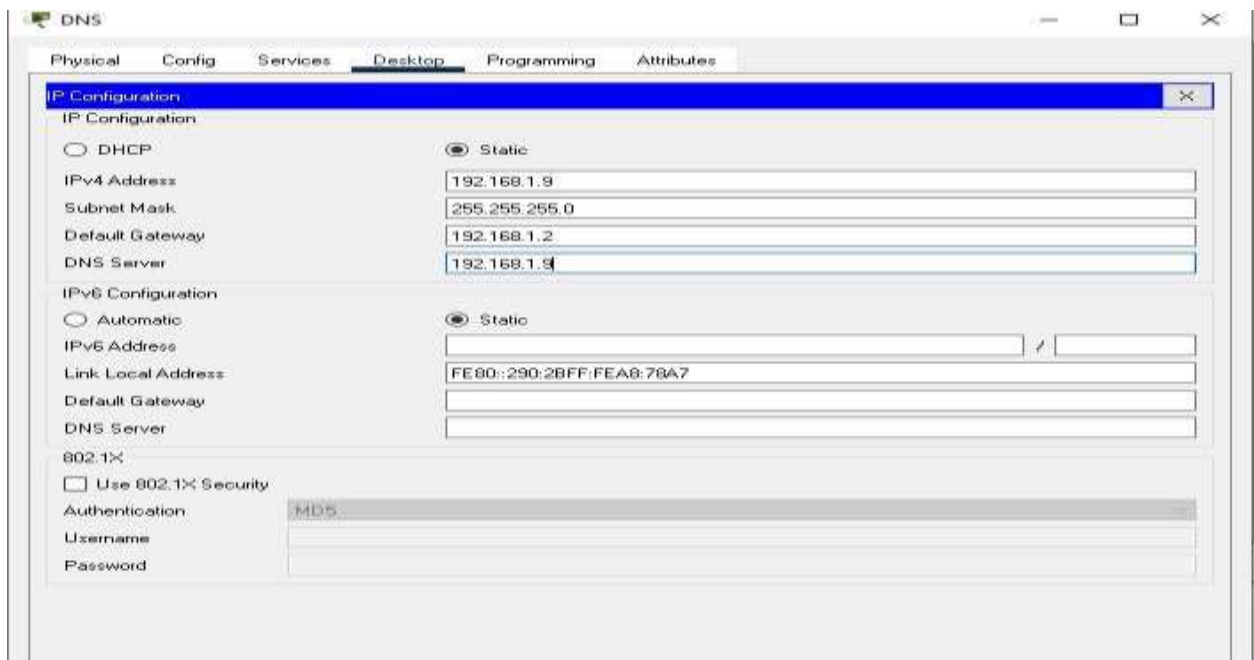
Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
P2	192.168.2.2	192.168.1.9	192.168.1.0	255.255.255.0	255	0.0.0.0	0.0.0.0
P1	192.168.1.2	192.168.1.9	192.168.1.0	255.255.255.0	255	0.0.0.0	0.0.0.0
serverPool	0.0.0.0	0.0.0.0	192.168.1.0	255.255.255.0	255	0.0.0.0	0.0.0.0

☐ Top



IV. Assign Static IP to DNS and Enable DNS Services of DNS and add resources records:



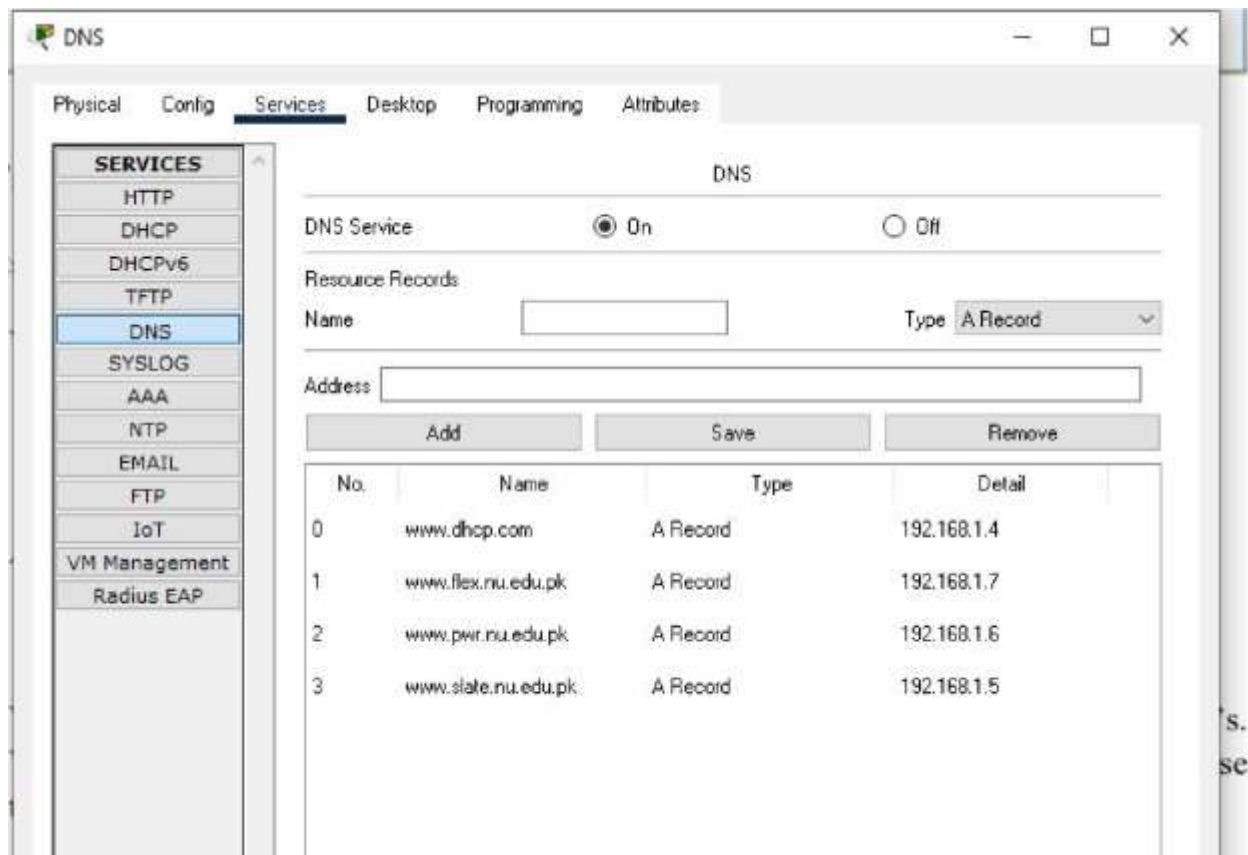
The screenshot shows the 'DNS' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing 'Static' IP settings. The fields are filled with the following values:

- IPv4 Address: 192.168.1.9
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.1.2
- DNS Server: 192.168.1.9

The 'IPv6 Configuration' section is also expanded, showing 'Static' settings. The fields are filled with the following values:

- IPv6 Address: (empty)
- Link Local Address: FE80::290:2BFF:FEA8:78A7
- Default Gateway: (empty)
- DNS Server: (empty)

The '802.1X' section is expanded, showing 'Use 802.1X Security' is unchecked. The 'Authentication' section is expanded, showing 'MD5' is selected for the 'Authentication' method. The 'Username' and 'Password' fields are empty.



The screenshot shows the 'DNS' configuration window with the 'Services' tab selected. The 'DNS Service' is enabled (On). The 'Resource Records' section is expanded, showing a list of records. The 'Name' field is empty, and the 'Type' is set to 'A Record'. The 'Address' field is empty.

The 'Resource Records' table is as follows:

No.	Name	Type	Detail
0	www.dhcp.com	A Record	192.168.1.4
1	www.flex.nu.edu.pk	A Record	192.168.1.7
2	www.pwr.nu.edu.pk	A Record	192.168.1.6
3	www.slate.nu.edu.pk	A Record	192.168.1.5