Chapter-6
Dynamic Host Configuration Protocol

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Chapter Objectives

- DORA Process
- Configuring a DHCP Client
- Configure DHCP server

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DHCP – DORA Process

- What is DORA Process?

DHCP (Dynamic Host Configuration Protocol) is a protocol use to allot IP address, Subnet Mask, Default Gateway, DNS to the legitimate client. The process of allocating these things are called DORA. DHCP process goes through 4 stages while assigning an IP address to the client. These stages are often abbreviated as DORA for discovery, offer, request, and acknowledgement.

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DORA Process Continue

- DORA process in DHCP is stands for following message flows between the client and the server.
  - Discover
  - Offer
  - Request
  - Acknowledge

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DORA Process (Cont..)



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DHCP - DISCOVER

DHCPDISCOVER: DHCP client broadcasts a DHCP discover message on the network containing its MAC address destined for UDP port number 68 (used by BOOTP and Dynamic Host Configuration Protocol (DHCP) servers).

Description	Value
Message Direction	DHCP Client to DHCP Server
Source MAC Address	Interface MAC Address of DHCP Client
Destination MAC Address	ff:ff:ff:ff:ff:ff (Broadcast MAC Address)
Source IPv4 Address	0.0.0.0
Destination IPv4 Address	255.255.255.255 (Limited Broadcast)
Source Port Number	UDP 68
Destination Port Number	UDP 67

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DHCPOFFER

DHCPOFFER: DHCPDISCOVER Message was delivered to every connected computers in the Broadcast Domain. Every DHCP Server in the Broadcast Domain which received the DHCPDISCOVER message responds with a DHCPOFFER message. Other computers simply drop the DHCPDISCOVER Message.

Description	Value
Message Direction	DHCP Server to DHCP Client
Source MAC Address	Interface MAC Address of DHCP Server
Destination MAC Address	ff:ff:ff:ff:ff:ff (Broadcast MAC Address)
Source IPv4 Address	Interface IPv4 Address of DHCP Server
Destination IPv4 Address	255.255.255.255 (Limited Broadcast)
Source Port Number	UDP 67

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DHCPREQUEST

DHCPREQUEST: DHCP client accepts an offer and broadcasts a DHCPREQUEST datagram.

Description	Value
Message Direction	DHCP Client to DHCP Server
Source MAC Address	Interface MAC Address of DHCP Client
Destination MAC Address	ff:ff:ff:ff:ff:ff (Broadcast MAC Address)
Source IPv4 Address	0.0.0.0
Destination IPv4 Address	255.255.255.255 (Limited Broadcast)
Source Port Number	UDP 68
Destination Port Number	UDP 67

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DHCPACK

DHCPACK: When the DHCP server from which the offer was selected receives the DHCPREQUEST datagram, it constructs a DHCPACK datagram.

Description	Value
Message Direction	DHCP Server to DHCP Client
Source MAC Address	Interface MAC Address of DHCP Server
Destination MAC Address	ff:ff:ff:ff:ff:ff (Broadcast MAC Address)
Source IPv4 Address	Interface IPv4 Address of DHCP Server
Destination IPv4 Address	255.255.255.255 (Limited Broadcast)
Source Port Number	UDP 67
Destination Port Number	UDP 68

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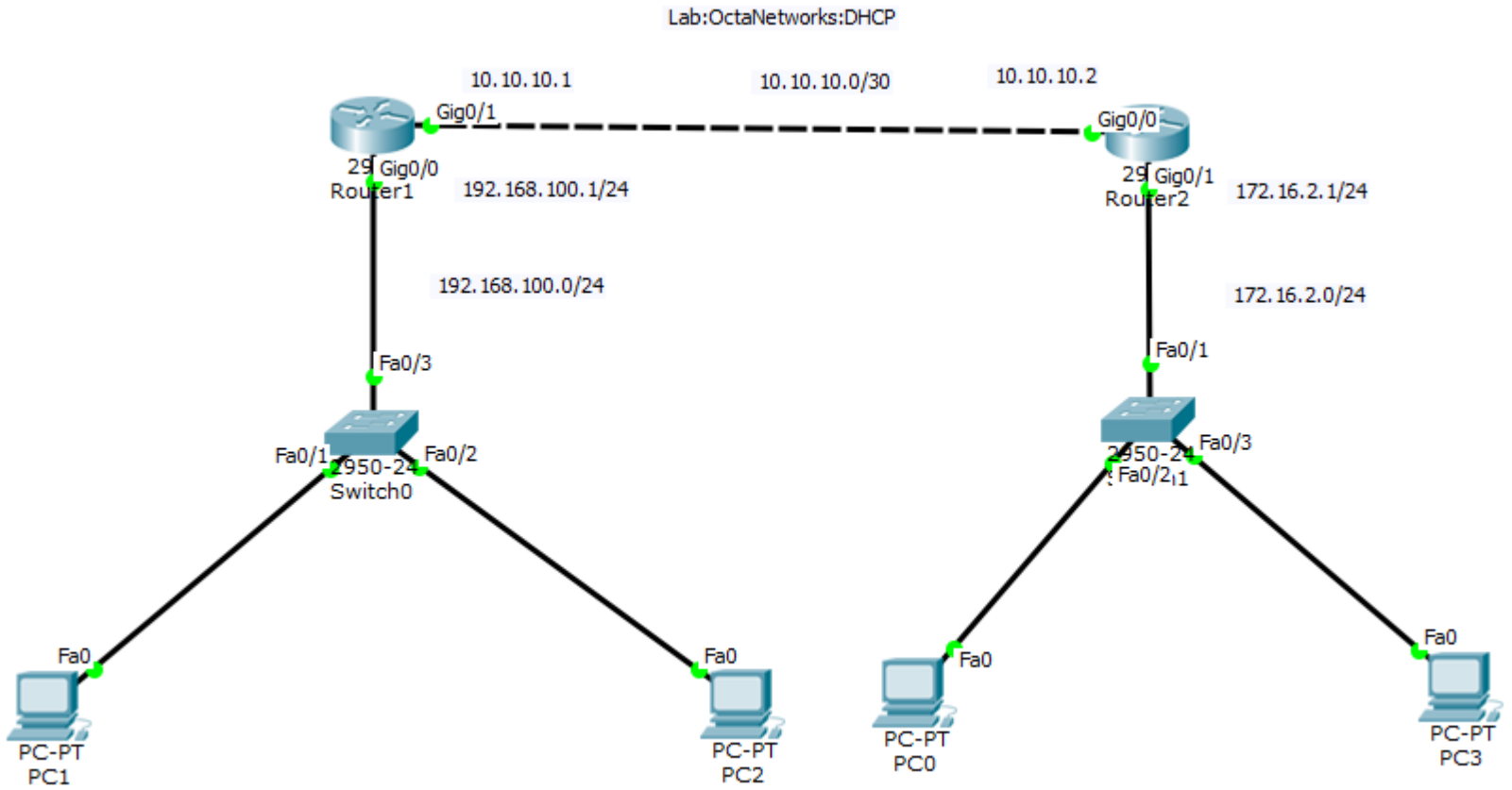
What is APIPA Address

- Automatic Private IP Addressing (APIPA) is a feature of Windows-based operating systems that enables a computer to automatically assign itself an IP address when there is no Dynamic Host Configuration Protocol (DHCP) server available to perform that function.

- If the client is unable to find the information, it uses APIPA to automatically configure itself with an IP address. The IP address range is 169.254.0.1 through 169.254.255.254. The client also configures itself with a default class B subnet mask of 255.255.0.0.

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Configure DHCP Server



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Configure DHCP Server (Cont.)

Step 1: Configure ip address on R1 Gig0/0

R1>enable

R1#Config ter

R1 (Config) # interface Gig0/0

R1 (Config) # ip address 192.168.100.1 255.255.255.0

R1 (Config) # no shutdown

R1(Config) # Exit

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Configure DHCP Server (Cont.)

Step 2: Configure DHCP server

R1>enable

R1#Config ter

R1 (Config) # ip dhcp pool Pool1

R1 (dhcp-Config)# network 192.168.100.0 255.255.255.0

R1 (dhcp-Config)# dns-server 192.168.100.0

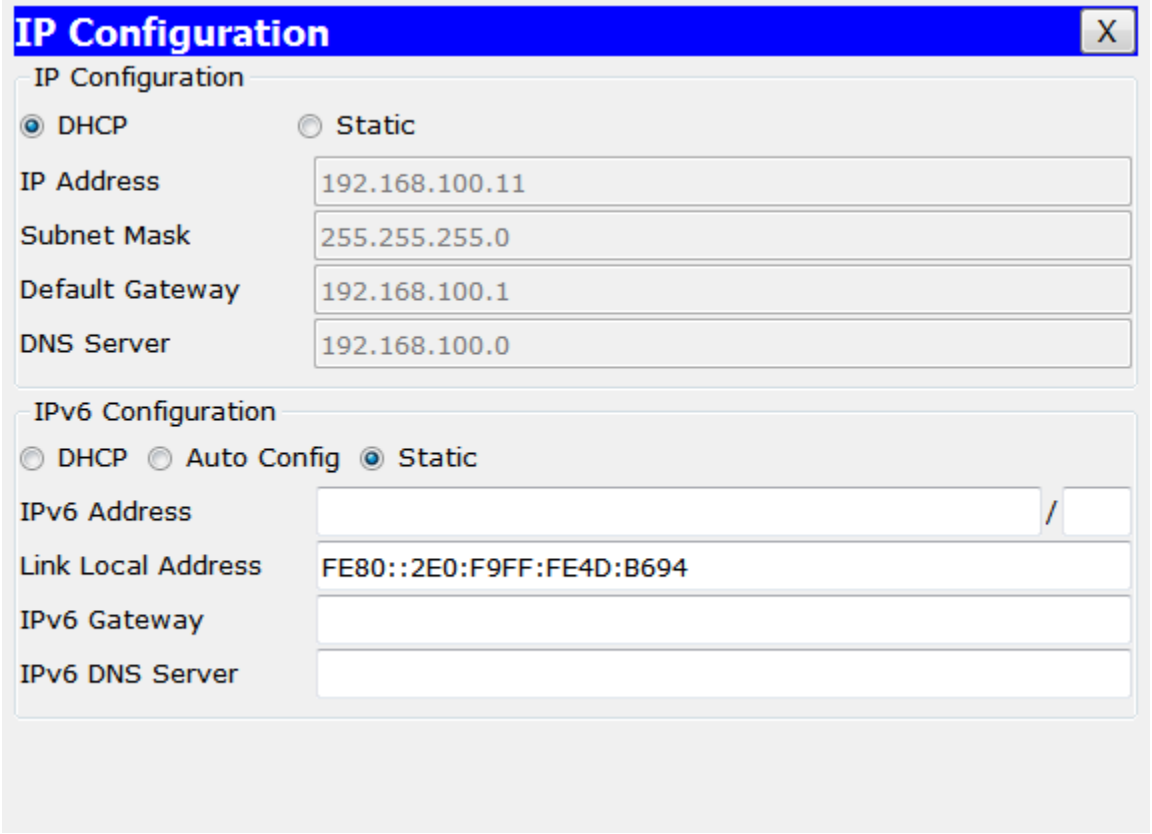
R1 (dhcp-Config)#default-router 192.168.100.1

R1(Config)# ip dhcp excluded address 192.168.100.1 192.168.100.10

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Configure DHCP Server (Cont.)

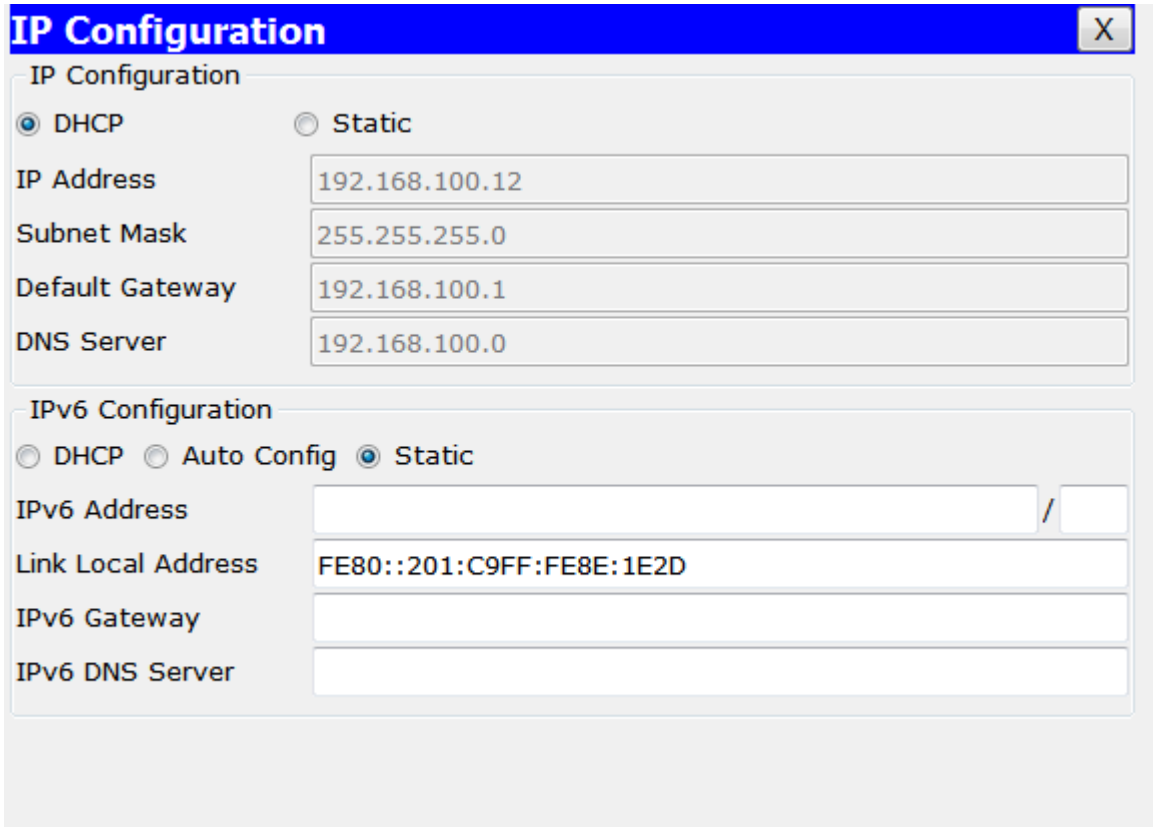
Step 3: Assign ip address to PC1 from DHCP



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Configure DHCP Server (Cont.)

Step 4: Assign ip address to PC2 from DHCP



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Verify DHCP on R1

Step 5: Verify DHCP on R1

```
R1#show ip dhcp binding
IP address       Client-ID/              Lease expiration        Type
                 Hardware address
192.168.100.11   00E0.F94D.B694           --                     Automatic
192.168.100.12   0001.C98E.1E2D           --                     Automatic
R1#
```


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Configure DHCP Server (Cont.)

Step 2: Configure DHCP server for 172.16.2.0 Network

R1>enable

R1#Config ter

R1 (Config) # ip dhcp pool Pool2

R1 (dhcp-Config)# network 172.16.2.0 255.255.255.0

R1 (dhcp-Config)# dns-server 8.8.8.8

R1 (dhcp-Config)#default-router 172.16.2.1

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DHCP Helper address

Step 2: Configure ip helper address on R22Gig0/1

R2>enable

R2#Config ter

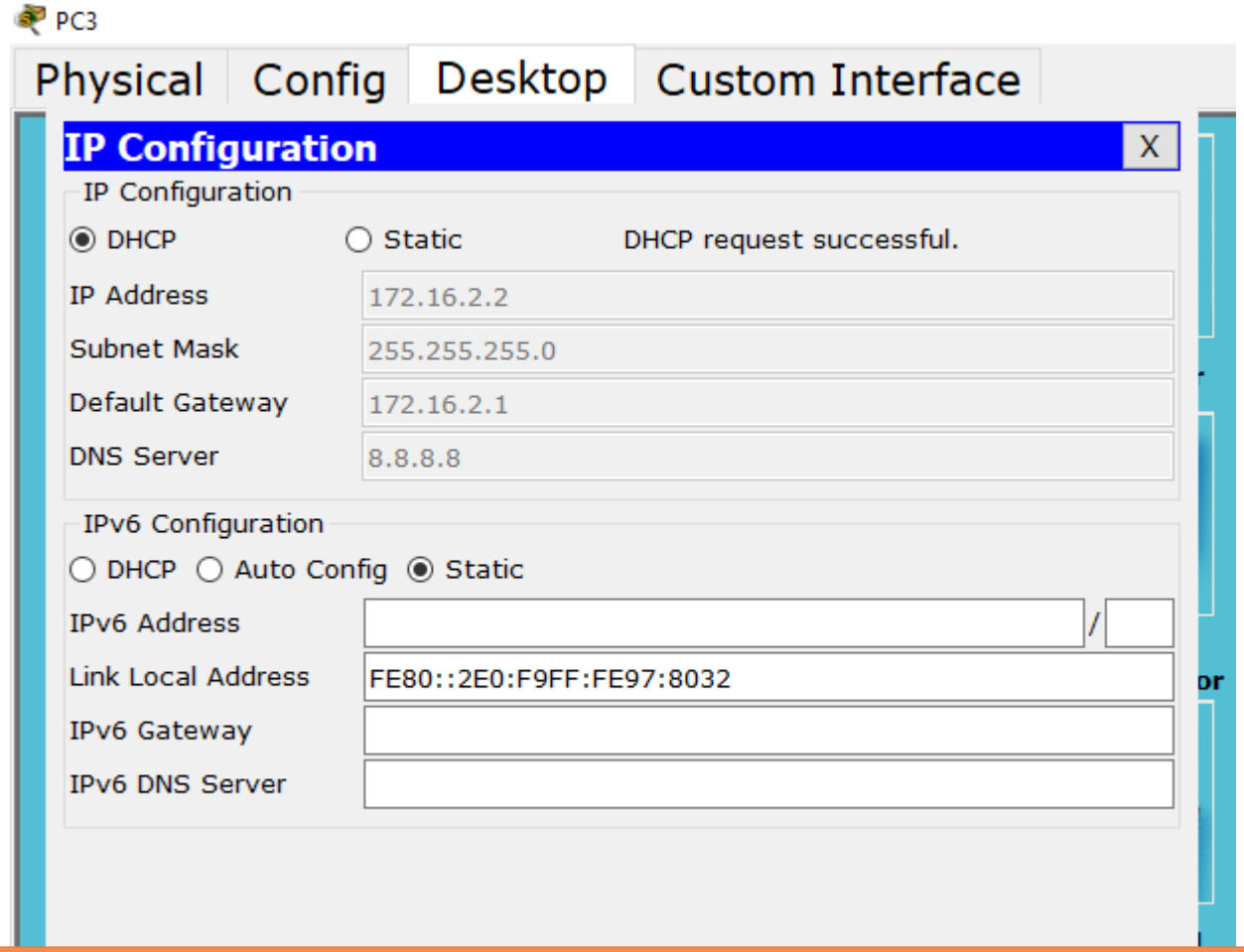
R2 (Config) # interface Gig0/1

R2 (Config) #ip helper-address 192.168.100.1

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Configure DHCP Server (Cont.)

Step 3: Assign ip address to PC3 from DHCP



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Questions and Answer

Q1: What is DHCP?

Q2: What is Client and Server?

Q3: What are the four steps of DHCP?

Q4:What information a DHCP server can provide to a host in Offer Message?

Q5: Port Number used in DHCP DORA Process?

Q6: 67 is server port or client port?

Q7: What is APIPA Address?

Q8:What is DHCP Relay agent?

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Thank You

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