

## **WORKSHEET : 3.2**

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**Semester: 4th Semester**

**Date of Performance: 25 March**

**Subject Name: Computer Networks**

**Aim: -**

### **Create a network to implement the DHCP server Solution:**

A **DHCP Server** is a network server that automatically provides and assigns IP addresses, default gateways and other network parameters to client devices. It relies on the standard protocol known as Dynamic Host Configuration Protocol or DHCP to respond to broadcast queries by clients.

A DHCP server automatically sends the required network parameters for clients to properly communicate on the network. Without it, the network administrator has to manually set up every client that joins the network, which can be cumbersome, especially in large networks. DHCP servers usually assign each client with a unique dynamic IP address, which changes when the client's lease for that IP address has expired.

### **When to use a router/switch as your DHCP Server**

There are many enterprise companies who are still using DHCP for IPv4 on their routers/switches. This is typically done by the network administrator who needs to get a DHCP capability up and running quickly but does not have access to a DHCP server. Most routers/switches have the ability to provide the following DHCP server support:

- a DHCP client and obtain an interface IPv4 address from an upstream DHCP service
- a DHCP relay and forward UDP DHCP messages from clients on a LAN to and from a DHCP server
- a DHCP server whereby the router/switch services DHCP requests directly. However, there are limitations to using a router/switch as a DHCP server
- Running a DHCP server on a router/switch consumes resources on the network device. These DHCP packets are handled in software (not hardware accelerated forwarding). The resources required make this practice not suitable for a network with a large number ( $> 150$ ) of DHCP clients.
- Does not support dynamic DNS. The router/switch DHCP server cannot create an entry into DNS on behalf of the client based on the IPv4 address that was leased to the client.



- No ability to easily manage the scope and see the current DHCP bindings and leases across multiple routers. Administrator must log into the switch/router individually to get information about DHCP bindings.
- No high availability or redundancy of the DHCP bindings. This could cause problems if the current DHCP server and default gateway fails.
- It is more difficult to configure DHCP options on router/switch platform.
- The DHCP service running on a router/switch is not integrated with IP address management (IPAM) for address tracking and scope utilization or security forensics.

### **The Benefits of a dedicated DHCP Server**

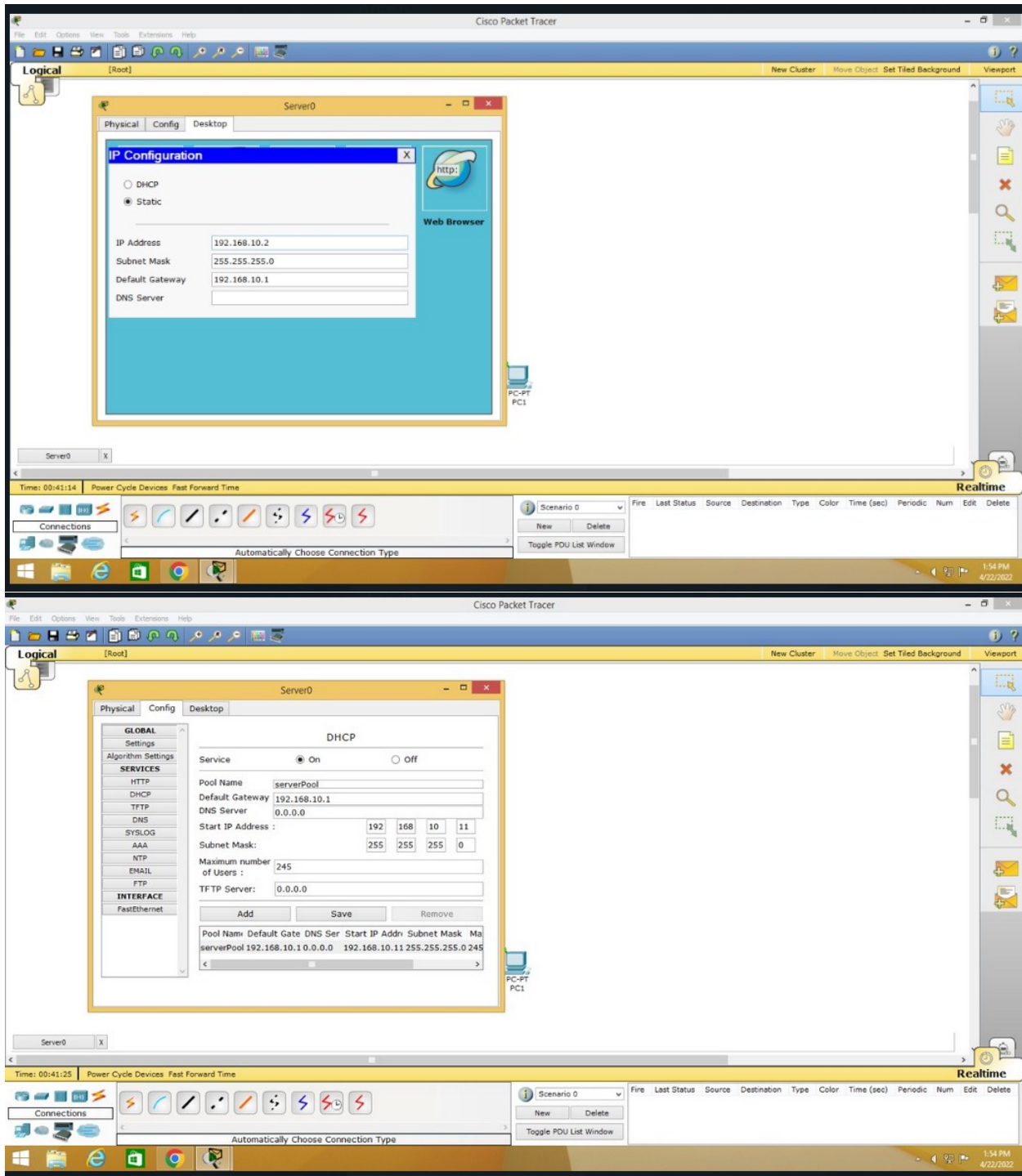
A better approach than trying to use DHCP on your router/switch is to use a centralized DHCP server. This is particularly true for network environments that require support of both DHCP for IPv4 and DHCP for IPv6 at the same time. Virtually all DHCP server vendors support both protocols so you can use the same management interface for IPv4 and IPv6. There are several benefits that make it advantageous for an enterprise to use DHCPv6.

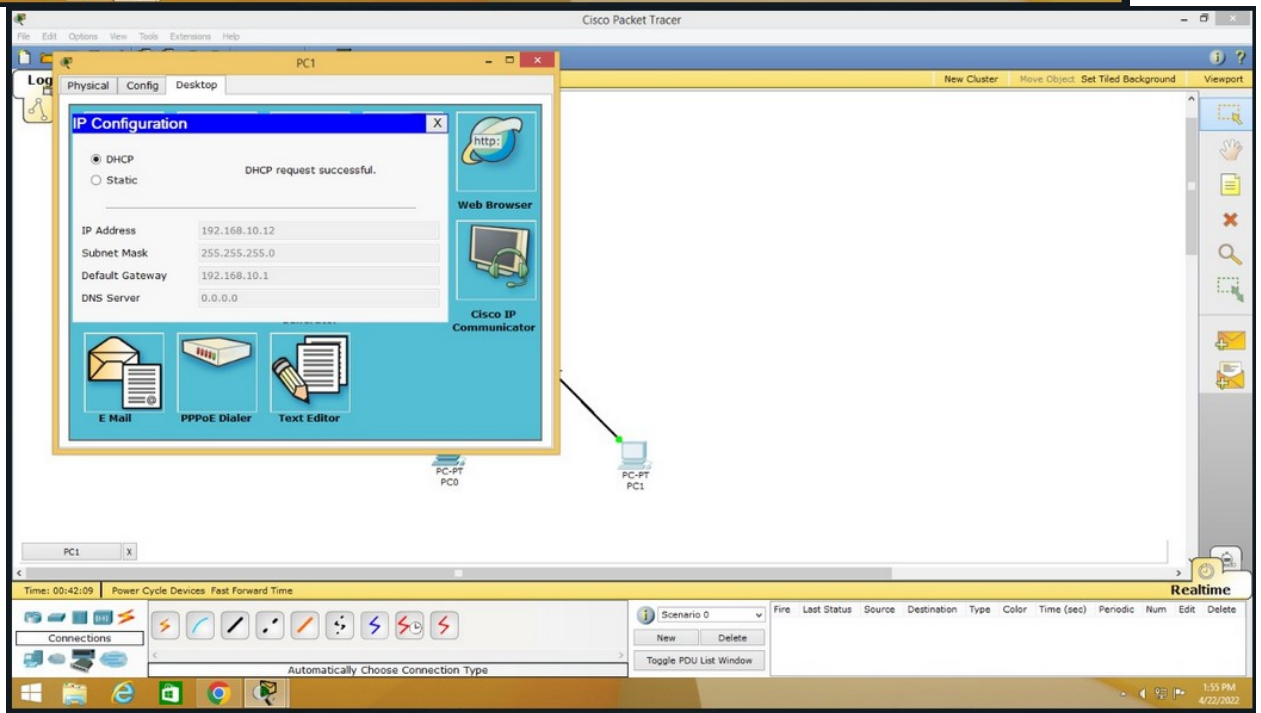
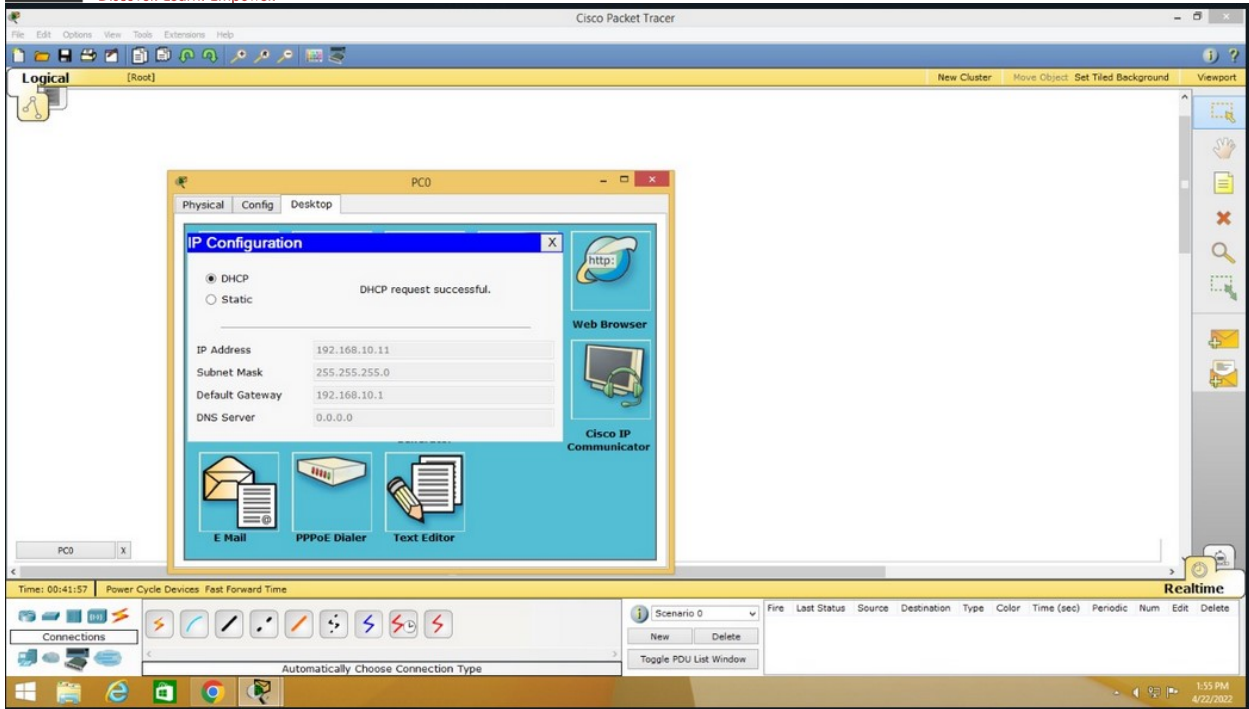
- Having a DHCPv6 server that is integrated into your IP Address Management (IPAM) system for IPv6 gives visibility to the IPv6-enabled client nodes.
- You also would want this same functionality for IPv4. As IPv4 address space becomes increasingly constrained, you will want to keep track of your DHCP scopes and determine if your lease time is adequate with the plethora of BYOD systems joining your networked environment.
- DHCP servers provide logging and management interfaces that aid administrators manage their IP address scopes. Your organization will want an accounting of what is on your network regardless of IP version being used.
- DHCP servers can provide redundancy and high availability. If one DHCP server were to fail, the clients will preserve their current IP addresses and not cause an interruption for the end-nodes.
- Organizations will prefer a DHCPv6 server that has been tried and tested. For example, The Infoblox DHCPv6 server has been certified as “IPv6 Ready” by the USGv6 certification laboratory.

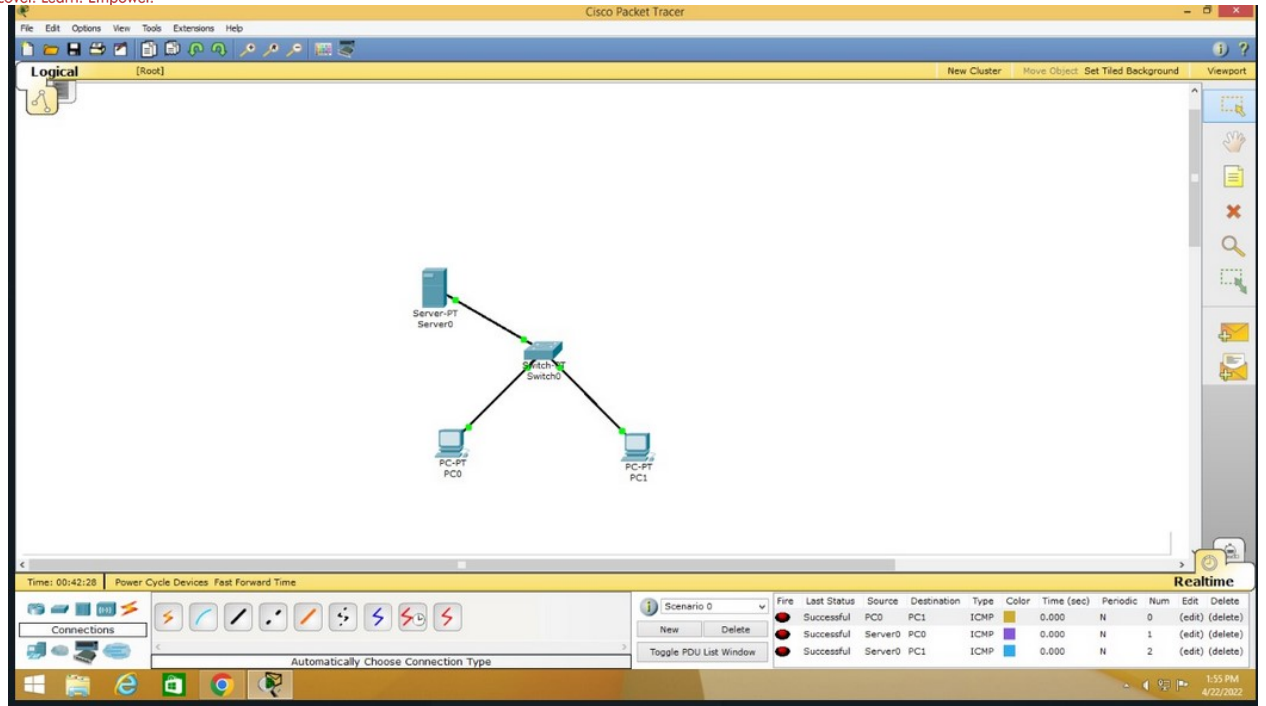
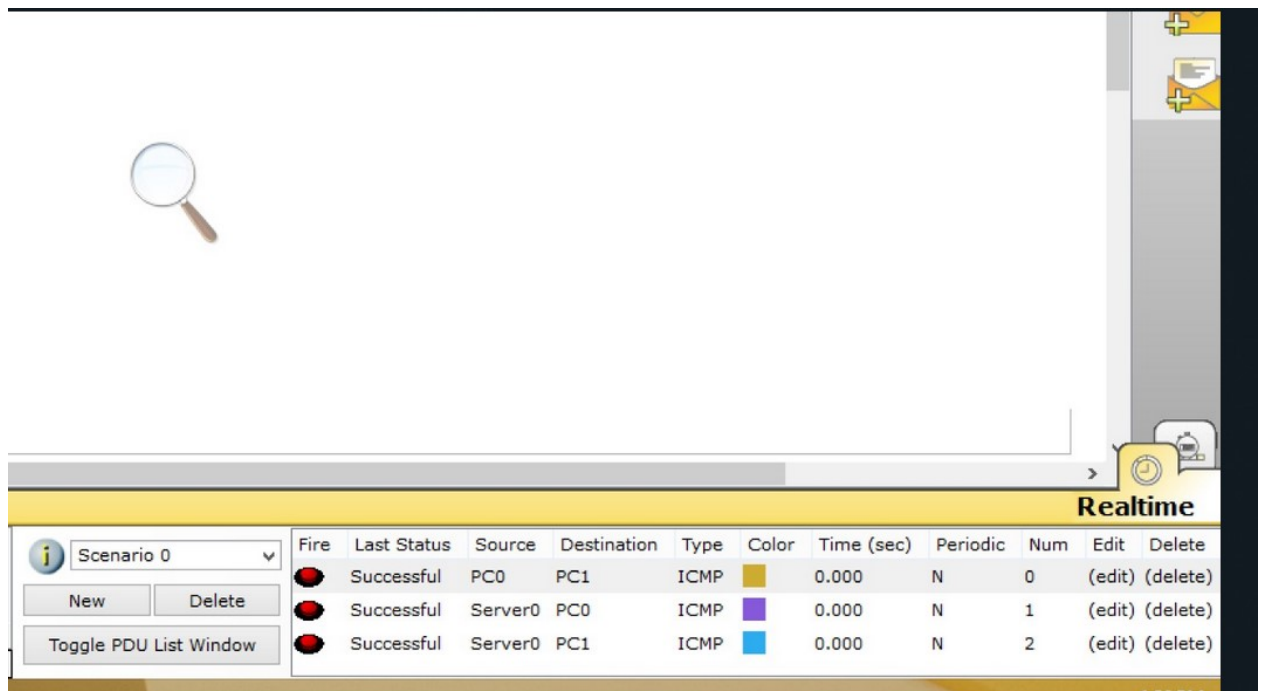
Organizations that are beginning to implement IPv6 should migrate DHCP for IPv4 scope off the routers/switches and put them on a robust DHCP server infrastructure. This change will also mean that your organization would want to have DHCP operate the same for both protocols. Enterprise organizations will want to take advantage of the centralized dual-protocol DHCP server to provide IPv4 and IPv6 addresses to client devices.

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# Output





The screenshot shows the Cisco Packet Tracer Realtime View. The network topology is the same as the Logical View. The bottom status bar shows the time as 00:42:28 and the power cycle devices as 'Fast Forward Time'. The 'Realtime' tab is active, displaying a table of network events.

Fire	Last Status	Source	Destination	Type	Color	Time (sec)	Periodic	Num	Edit	Delete
Successful	Successful	PC0	PC1	ICMP	Yellow	0.000	N	0	(edit)	(delete)
Successful	Successful	Server0	PC0	ICMP	Purple	0.000	N	1	(edit)	(delete)
Successful	Successful	Server0	PC1	ICMP	Blue	0.000	N	2	(edit)	(delete)