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| **Experiment No: 5** | |
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| **Date of**  **Performance** | 28h August 2024 |
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| **Title** | Connecting the PC’s to servers namely, DHCP, DNS and Web Server |
| **Theory (short)** | When personal computers (PCs) connect to servers such as DHCP (Dynamic Host Configuration Protocol), DNS (Domain Name System), and web servers, they interact with them to ensure smooth network connectivity and access to internet resources.   **DHCP Server:**   A DHCP server automatically provides IP addresses to PCs in a network. When a PC joins to a network, it makes a broadcast request for an IP address. The DHCP server responds with an available IP address, as well as additional network setup information such as the subnet mask, default gateway, and DNS server addresses. This automation simplifies network administration by guaranteeing that each device is assigned a unique IP address and is able to connect within the network.    **DNS Server:**  The DNS server converts domain names (e.g., www.example.com) to IP addresses for network identification. When a PC attempts to access a website, it requests the DNS server to convert the domain name into an IP address. This procedure enables users to browse websites without having to remember numerical IP addresses, making online browsing more convenient.    **Web Server:**  A web server hosts websites and serves web pages to PCs upon request. When a PC sends a request for a webpage (via a browser), the request is routed to the web server hosting the site. The server processes the request and sends back the webpage data, which the browser then renders for the user. This interaction enables users to access and interact with web-based content and services.    Together, these servers provide essential services that enable PCs to function effectively on a network, allowing for automated IP address assignment, easy access to online resources, and seamless web browsing. Without these |

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|  | servers, network management and internet access would be much more complex and less efficient. |
| **Procedure** | **Step 1: Set Up the Network Topology**   1. **Open Cisco Packet Tracer** and create a new project. 2. **Add Network Devices:** o Drag and drop one **Router** onto the workspace. o Add a **Switch** connected to the router. o Add three **PCs** connected to the switch. o Add three **Servers**: one for DHCP, one for DNS, and one as the Web Server.   **Step 2: Configure the DHCP Server**   1. **Select the Server for DHCP:** o Click on the server, go to the **Config** tab.    * In the left-hand menu, select **DHCP**. 2. **Enable DHCP Service:** o Turn on the **DHCP service**.    * Set the **IP Address** of the server (e.g., 192.168.1.2) and **Subnet Mask** (e.g., 255.255.255.0).    * Set the **Gateway** to the router's interface IP address (e.g., 192.168.1.1). o Define the **IP Address Range** (e.g., 192.168.1.10 to 192.168.1.50). 3. **Save Configuration.**   **Step 3: Configure the DNS Server 1. Select the Server for DNS:** o Click on the server, go to the **Config** tab.   * + In the left-hand menu, select **DNS**.  1. **Enable DNS Service:** o Turn on the **DNS service**. o Add a **DNS Record** for a website (e.g., Name: example.com, IP Address: 192.168.1.3 for the Web Server).   o Assign an **IP Address** to the DNS server (e.g., 192.168.1.3).   1. **Save Configuration.**   **Step 4: Configure the Web Server**  **1. Select the Server for Web:**  o Click on the server, go to the **Config** tab. o In the left-hand menu, select **HTTP**. |

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|  | 1. **Enable HTTP Service:** o Turn on the **HTTP service**. o You can customize the default web page content if needed.   o Assign an **IP Address** to the Web Server (e.g., 192.168.1.4).   1. **Save Configuration.**   **Step 5: Configure the Router**   1. **Select the Router:** o Click on the router and go to the **Config** tab. o Assign an IP address to the router’s interface that connects to the switch (e.g., 192.168.1.1).   o Ensure that the **interface is turned on**.   1. **Set Up Routing:** o Although not necessary for this simple setup, if you had multiple networks, you would configure routing here.   **Step 6: Configure the PCs**   1. **Set PCs to Use DHCP:** o Click on each PC, go to the **Desktop** tab, and open **IP Configuration**. o Select **DHCP** to automatically obtain an IP address from the DHCP server. 2. **Verify Network Configuration:** o Check if the PCs have received IP addresses from the DHCP server.   o Ensure the default gateway and DNS server addresses are correctly assigned.  **Step 7: Test the Network**   1. **Ping the DHCP Server:**     * From any PC, open the **Command Prompt** and ping the DHCP server's IP address to ensure connectivity. 2. **Ping the DNS Server:** o From any PC, ping the DNS server's IP address to verify connection.    * Test DNS resolution by pinging the domain name you configured (e.g., ping example.com). 3. **Access the Web Server:** o Open a web browser on any PC and enter the domain name (e.g., example.com) or the Web Server’s IP address.    * Verify that the default web page loads correctly.   **Step 8: Troubleshoot (if necessary)**   * **No IP Address:** Check the DHCP server configuration and make sure the DHCP pool is correctly defined. * **DNS Issues:** Ensure the DNS server is properly configured with the correct IP-to-domain mappings. |

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|  | • **Web Server Unreachable:** Confirm the HTTP service is enabled on the Web Server and that the PC can reach the server's IP. |
| **Output**  **Screenshots** | Figure 1- A working URL |
|  | Figure 2- The PC is now connected to the DHCP server |
| **Observation** | Although we have only one PC, multiple PCs will reflect the DNS Server similar to that of DNS server we made. |
| **Self-**  **assessment Q&A** | NA |
| **Conclusion** | By following the outlined steps in Cisco Packet Tracer, we successfully configured a network where PCs are connected to essential servers like DHCP, DNS, and Web Servers. This setup not only automates IP address assignment and domain name resolution but also enables seamless access to web resources. Each component plays a critical role in ensuring the network operates efficiently and that users can interact with services without needing to manually configure network settings. |