DHCP Client-Server Configuration

**Introduction:**

Dynamic Host Configuration Protocol (DHCP) is type of a client to server-based communication protocol where it assigns automatic internet protocol (IP) addresses to devices as well as other configurations.

There are two ways the IP address gets assigned to a computer which are static and dynamic. A static IP address is when the user manually assigns an IP address to the computer. This way of assigning the IP address with user interaction is tedious and error prone. The other way of assigning the IP address is by dynamically receive a request from the DHCP server. This process also includes assigning the subnet mask, default gateway, and DNS.

**How DHCP Server Works:**

The computer requests for an IP address on its network by using packets, then the packet reaches a nearby DHCP server, and the router will configure the broadcasting and server location. The server then receives the request sent from the computer and it allocates a free IP address and sends the information to the host with a DHCP packet. When a computer does not have a host, the DHCP identifies one using the ethernet address.

**Screenshot of Topology:**

Graphical user interface

Description automatically generated

Figure

Topology description:

Changing the structure from static to DHCP the server will generate and allocate the IP address to the computers named PC0, PC1, PC2 as shown above. All the PC’s will receive their IP addresses from the server when the switch happens, and the service is turned on.

**Screenshot of Result Topology:**

Graphical user interface, calendar

Description automatically generated

Figure

Result Topology Description:

Testing the data packets if they are able to deliver from one PC to the other using the ping command in the command prompt.

**Answering the following questions:**

1. Which ports are used by the DHCP?

The DHCP server uses port number 67 for User Datagram Protocol (UDP) for destination and port number 68 for the client.

1. Can DHCP support IPv6 addressing?

DHCP supports IPv6 addressing because it offers the capabilities of automatic allocation of network addresses. The similar version being supported is the equivalent of Address Resolution Protocol (ARP) which is Neighbor Discovery Protocol (NDP).

1. Maximum clients that a DHCP server can support?

There is no limit to how many clients a DHCP can support. However, the user can set the limit by overriding the default setting to make it with range 1 to 500, 000.

1. What happens when DHCP fails?

When the DHCP fails, the network communications will break down. Basically, the impact will be on the new computers trying to request new IP addresses which they will not be successful by joining the network. Therefore, having this issue might lead to manual IP addresses, subnet masks, and default gateway distributions.

1. What will happen if DHCP server assigns the same IP address to 2 clients?

By assigning same IP address to 2 clients will lead to duplicate IP error and the network will not use them correctly. The problem can happen by having router malfunctions and other relations such as user assigning the static IP address instead of DHCP. To fix the problem with duplicate IP address, the computer must restart to reconfigure the DHCP IP address request again. Then new IP address will be assigned.

1. Summary on how you performed the DHCP client-server configuration?

By using the Cisco Packet Tracer, I acquired a Server, Switch, and 3 computers PC0, PC1, PC2 from the component’s palette. When using these components, I build the provided topology where there is the server connected to the switch with automatic type connection wire, and the switch is distributed among the 3 computers with the automatic type of connection wire. By clicking on the server, I picket the IP configuration in desktop command and assigned the given IP address and automatically the subnet gets configured. Also, by selecting the server, I hovered over the DHCP and turn the service on as well as assigned the given default gateway and given DNS server. I clicked on all PC’s and changed their type from static to DHCP to automatically generate the IP address for each. Then the server dynamically allocated the IP addresses, and I was able to ping the given IP address by using the command prompt to see if the data was sent from one computer to the other.