

# Viewing DHCP Client and DNS Client Status

Dynamic Host Configuration Protocol (DHCP) is a network management protocol that automates the process of assigning IP addresses to devices on a network. It eliminates the need for manual configuration and ensures that each device receives a unique and valid IP address along with other necessary network settings. DHCP operates in a client-server model, where the DHCP server provides network configuration details to the DHCP clients (computers, smartphones, IoT devices).

## How DHCP Works (Step-by-Step Process)

When a device connects to a network, it must obtain an IP address before it can communicate with other devices. DHCP simplifies this by automating the process through a four-step procedure:

### *Step 1: DHCP Discovery (Client to Server)*

- When a device (client) joins the network, it sends a DHCPDISCOVER message as a broadcast packet (to IP `255.255.255.255`) to find available DHCP servers.
- Since the client does not have an IP address yet, the source IP of this request is `0.0.0.0`.

### *Step 2: DHCP Offer (Server to Client)*

- The DHCP server responds with a DHCPOFFER message containing: An available IP address, Subnet mask, Default gateway, DNS server information & Lease duration (how long the client can use this IP)
- This offer is sent as a broadcast or unicast message.

### *Step 3: DHCP Request (Client to Server)*

- The client responds with a DHCPREQUEST message, confirming that it wants to use the IP address.
- If multiple DHCP servers responded in step 2, the client selects one and requests a lease from it.

### *Step 4: DHCP Acknowledgment (ACK) (Server to Client)*

- The DHCP server finalizes the process by sending a DHCPACK (acknowledgment) message.
- This message contains the confirmed IP address lease and network settings.
- The client now configures its network settings and starts using the assigned IP.

## *DHCP Lease and Renewal Process*

DHCP assigns IP addresses on a lease basis, meaning each device gets an IP for a set period. Once the lease expires, the IP must be renewed.

## *DHCP Components*

- (a) DHCP Server - A dedicated server (or router) that manages the allocation of IP addresses and network configurations.
- (b) DHCP Client - Any device that requests an IP address from a DHCP server.
- (c) DHCP Relay Agent - If a client is on a different subnet, a DHCP relay agent forwards DHCP requests between clients and the server.

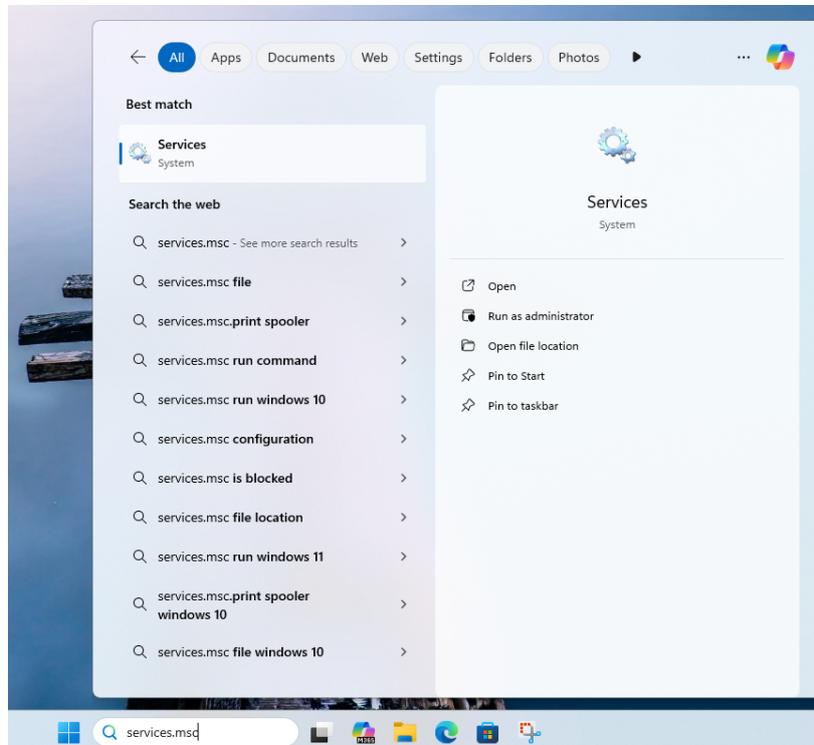
## *DHCP Address Allocation Methods*

DHCP servers can assign IP addresses in three ways:

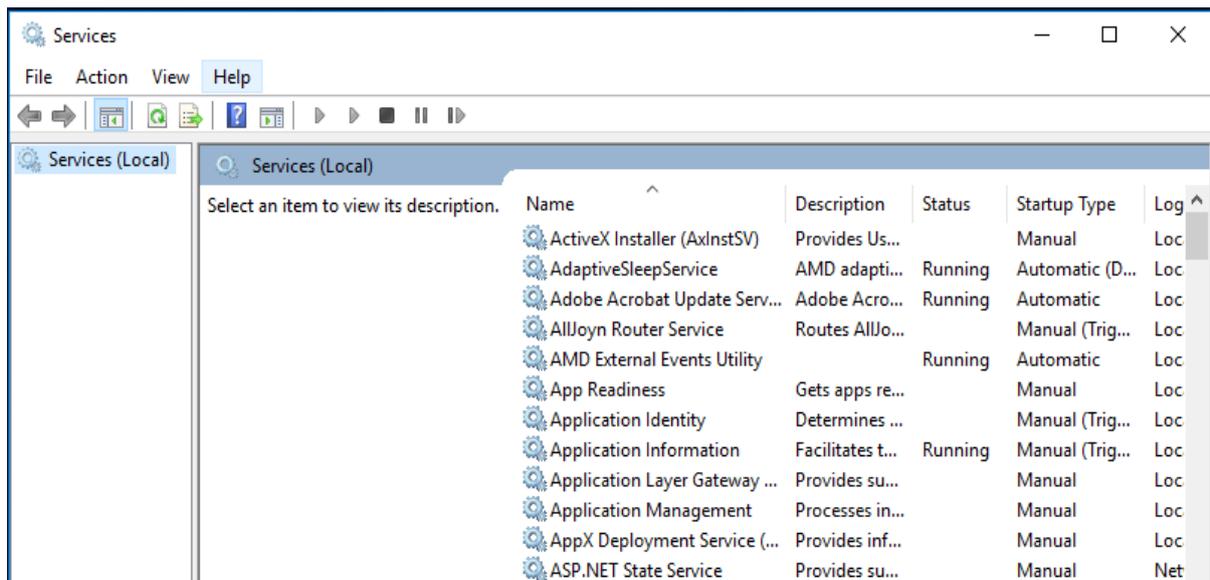
1. Dynamic Allocation (Most Common) - The server assigns an IP address dynamically from a pool.
  - When the lease expires, the IP is returned to the pool for reuse.
2. Automatic Allocation - Server permanently assigns an IP address to a device based on its MAC address.
3. Static Allocation (Reservation) - A specific IP is manually reserved for a device using its MAC address. This is useful for printers, servers, and critical devices.

In this part, you use the Services control panel to view the status of DNS Client and DHCP Client services and then use the command line to view the same information.

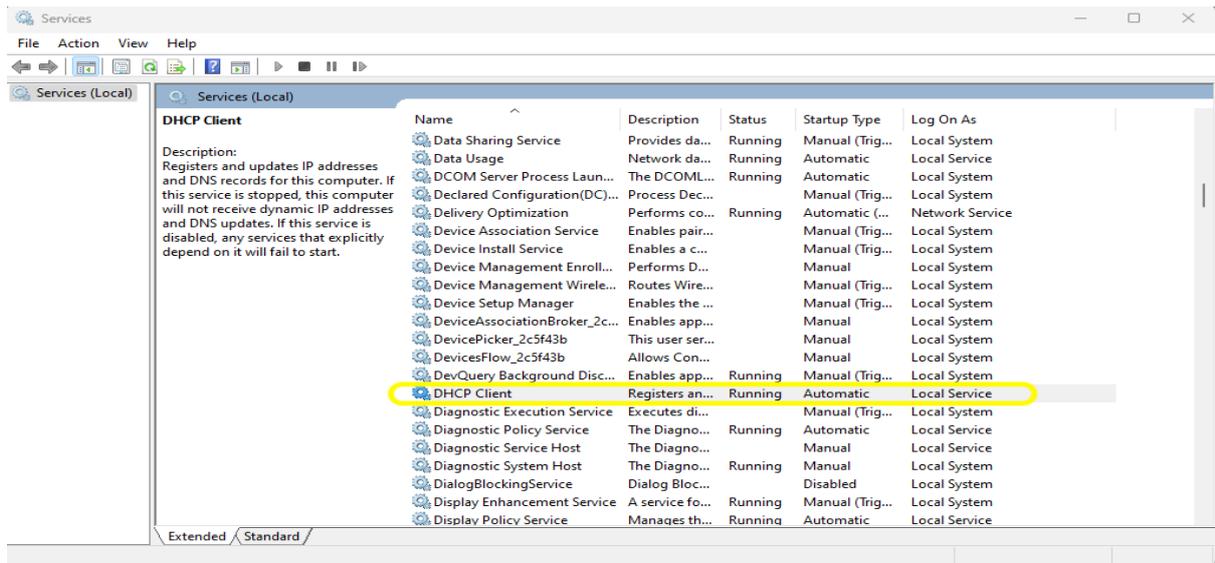
1. On the bottom search area, type **services.msc**, and press Enter to open the **Windows Services** control panel.



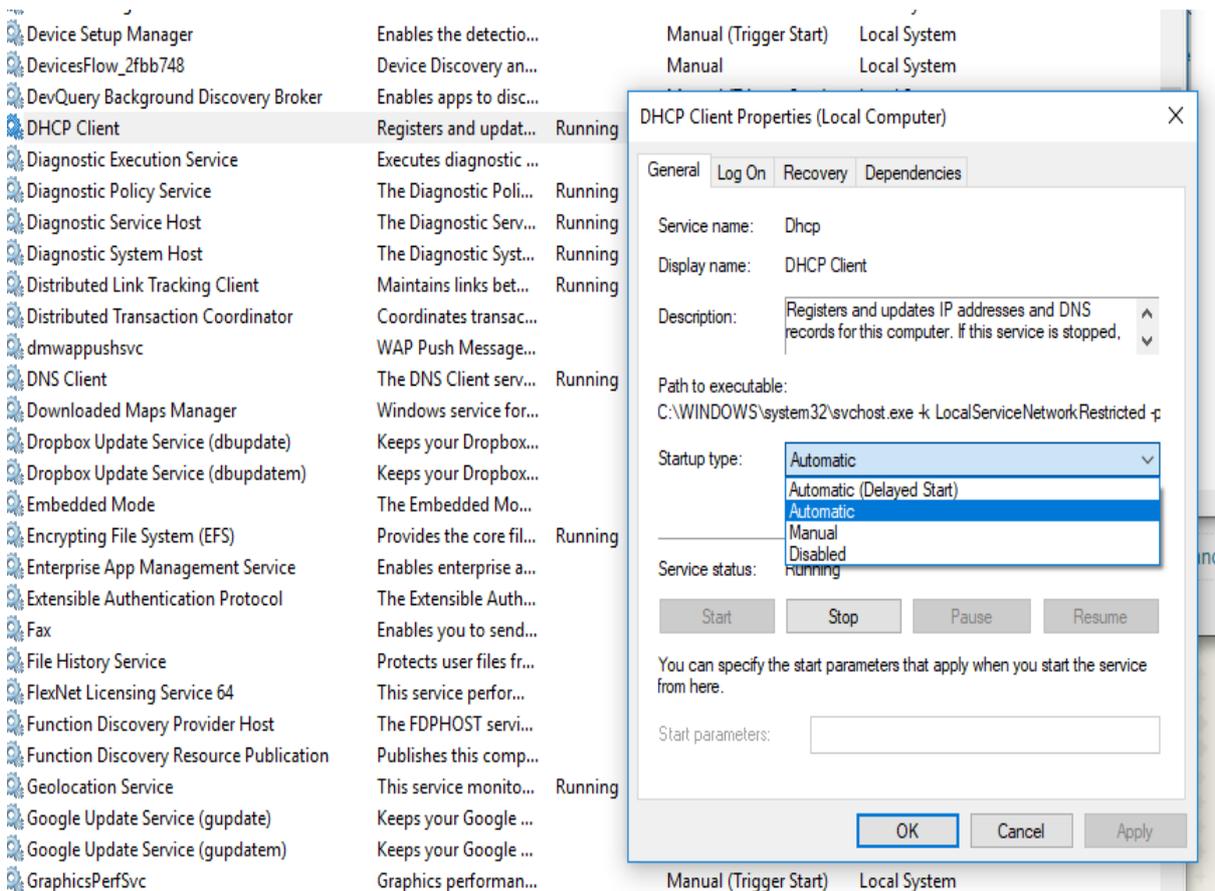
The Services control panel is somewhat different from the Services tab in Task Manager, which enables you to stop or start a service and view its status but not change other properties, such as its start-up type or how it logs on to the system.



2. Scroll down until you find the **DHCP Client service**.



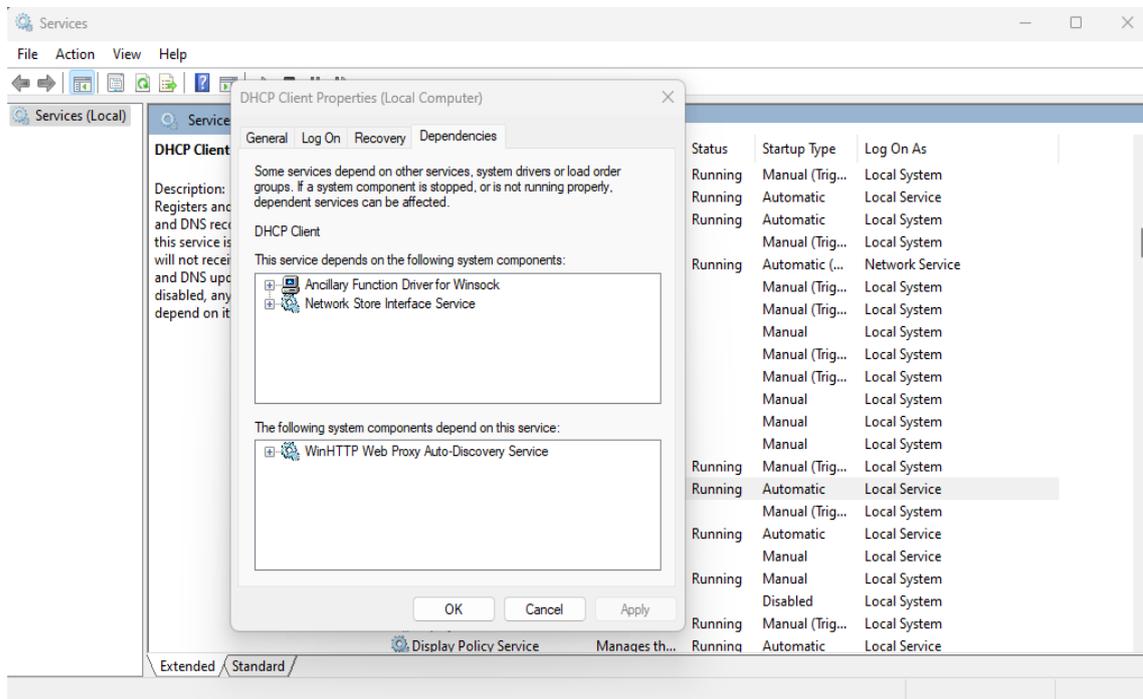
3. Notice that its status is Running. **Double-click the DHCP Client service to open its properties.**



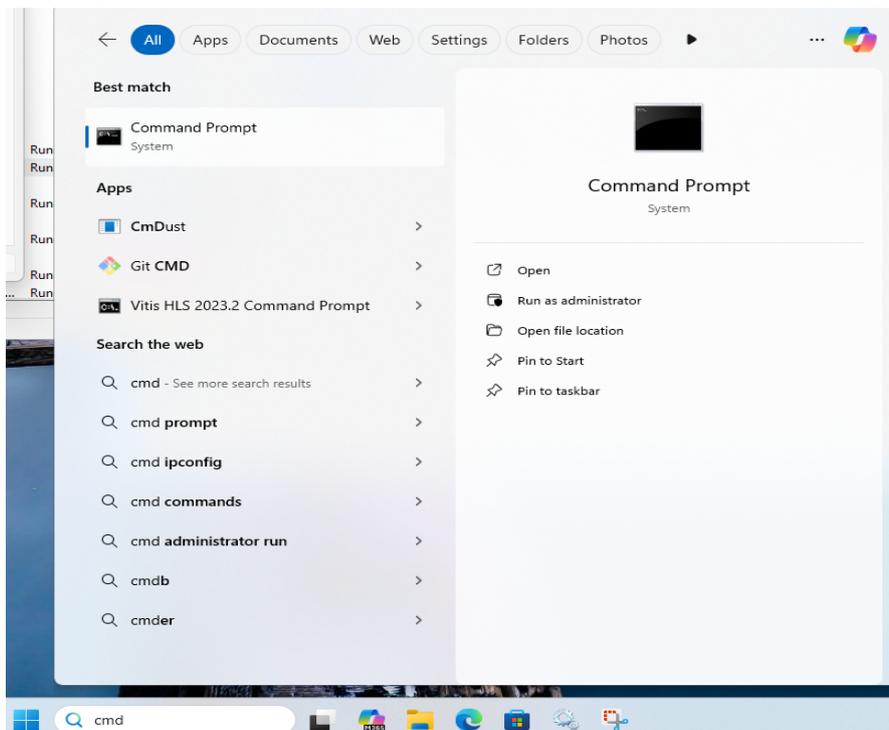
4. In the lab, you are prevented from running the command line as administrator therefore you will find that your choices are limited. However, on your own windows computer, you could for instance **click the Startup type list arrow** to view the available options (as shown above). You should not disable or stop (unless you restart it again) the DHCP Client because it's used



7. **Click the Dependencies tab.** Here you can view other processes or services this service depends on to run and other processes or services that depend on this service. Before stopping a service, you think you do not need, check the dependencies to make sure another service you do need is not affected. **Click Cancel.**

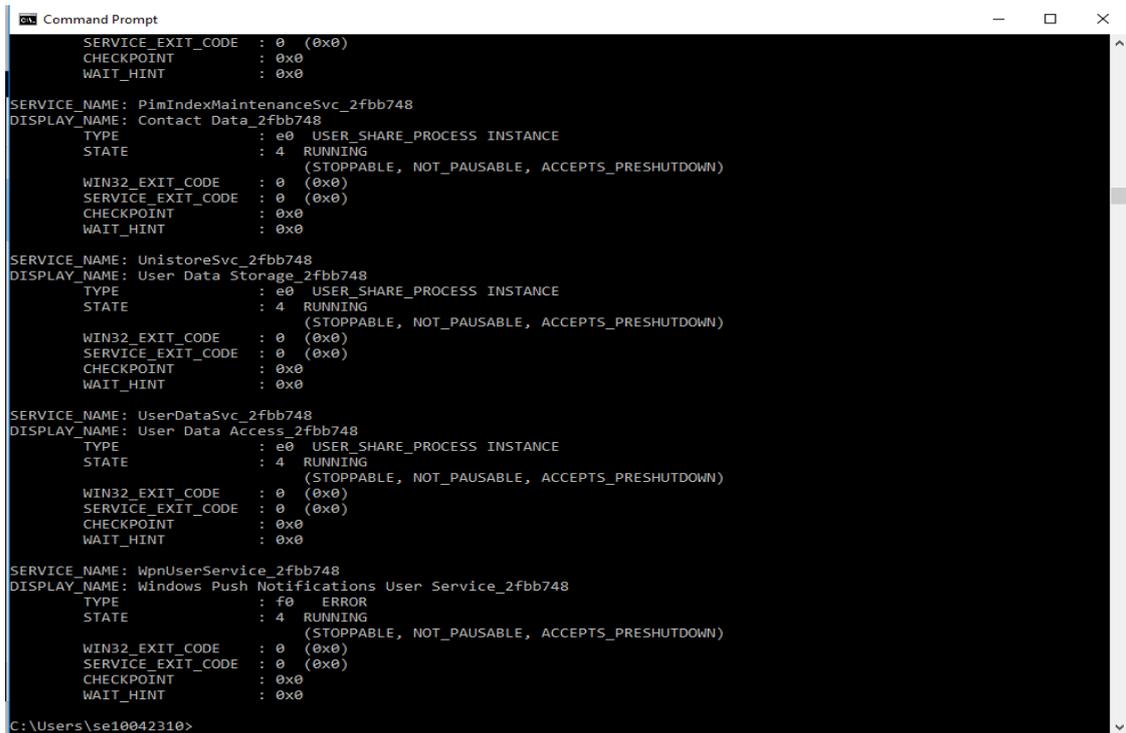


8. Next, open a command prompt window.



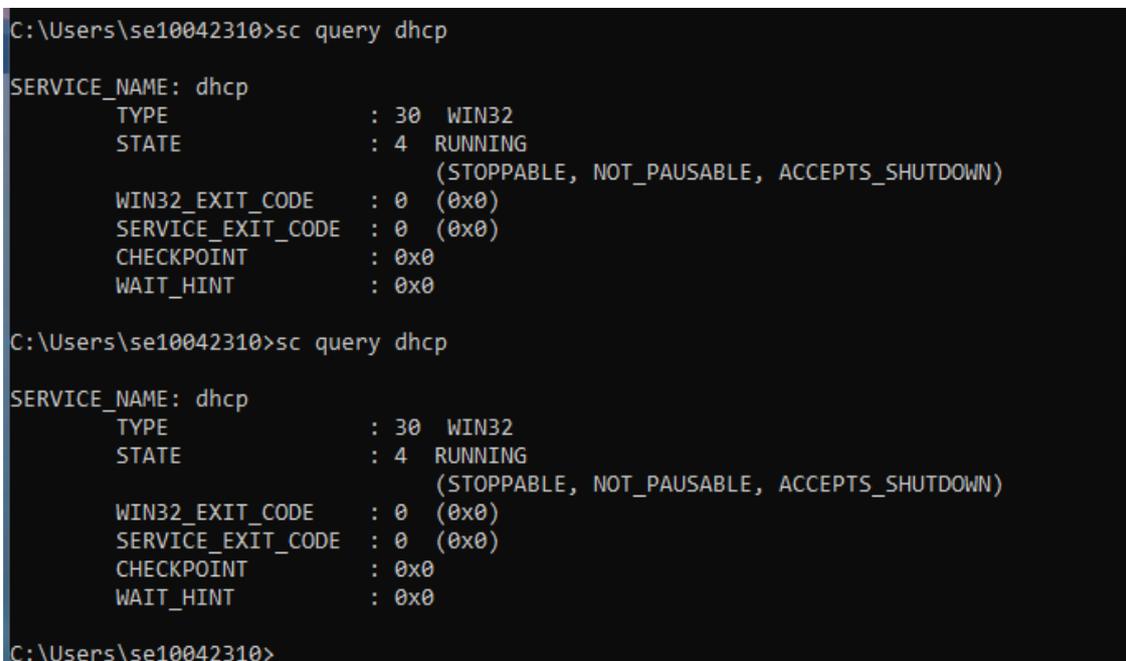
9. To view the status of services from the command line, you can use the sc command.

10. Type **sc query** and press Enter to view the status of all running services.



```
Command Prompt
SERVICE_EXIT_CODE : 0 (0x0)
CHECKPOINT         : 0x0
WAIT_HINT         : 0x0
SERVICE_NAME: PimIndexMaintenanceSvc_2fbb748
DISPLAY_NAME: Contact Data_2fbb748
TYPE              : e0 USER_SHARE_PROCESS_INSTANCE
STATE             : 4 RUNNING
                  (STOPPABLE, NOT_PAUSABLE, ACCEPTS_PRESHUTDOWN)
WIN32_EXIT_CODE   : 0 (0x0)
SERVICE_EXIT_CODE : 0 (0x0)
CHECKPOINT        : 0x0
WAIT_HINT        : 0x0
SERVICE_NAME: UnistoreSvc_2fbb748
DISPLAY_NAME: User Data Storage_2fbb748
TYPE              : e0 USER_SHARE_PROCESS_INSTANCE
STATE             : 4 RUNNING
                  (STOPPABLE, NOT_PAUSABLE, ACCEPTS_PRESHUTDOWN)
WIN32_EXIT_CODE   : 0 (0x0)
SERVICE_EXIT_CODE : 0 (0x0)
CHECKPOINT        : 0x0
WAIT_HINT        : 0x0
SERVICE_NAME: UserDataSvc_2fbb748
DISPLAY_NAME: User Data Access_2fbb748
TYPE              : e0 USER_SHARE_PROCESS_INSTANCE
STATE             : 4 RUNNING
                  (STOPPABLE, NOT_PAUSABLE, ACCEPTS_PRESHUTDOWN)
WIN32_EXIT_CODE   : 0 (0x0)
SERVICE_EXIT_CODE : 0 (0x0)
CHECKPOINT        : 0x0
WAIT_HINT        : 0x0
SERVICE_NAME: WpnUserService_2fbb748
DISPLAY_NAME: Windows Push Notifications User Service_2fbb748
TYPE              : f0 ERROR
STATE             : 4 RUNNING
                  (STOPPABLE, NOT_PAUSABLE, ACCEPTS_PRESHUTDOWN)
WIN32_EXIT_CODE   : 0 (0x0)
SERVICE_EXIT_CODE : 0 (0x0)
CHECKPOINT        : 0x0
WAIT_HINT        : 0x0
C:\Users\se10042310>
```

11. To view the status of DHCP, type **sc query dhcp** and press Enter



```
C:\Users\se10042310>sc query dhcp
SERVICE_NAME: dhcp
TYPE              : 30 WIN32
STATE             : 4 RUNNING
                  (STOPPABLE, NOT_PAUSABLE, ACCEPTS_SHUTDOWN)
WIN32_EXIT_CODE   : 0 (0x0)
SERVICE_EXIT_CODE : 0 (0x0)
CHECKPOINT        : 0x0
WAIT_HINT        : 0x0
C:\Users\se10042310>sc query dhcp
SERVICE_NAME: dhcp
TYPE              : 30 WIN32
STATE             : 4 RUNNING
                  (STOPPABLE, NOT_PAUSABLE, ACCEPTS_SHUTDOWN)
WIN32_EXIT_CODE   : 0 (0x0)
SERVICE_EXIT_CODE : 0 (0x0)
CHECKPOINT        : 0x0
WAIT_HINT        : 0x0
C:\Users\se10042310>
```

12. Sometimes restarting a service is necessary. A computer restart does this, but you can also do it in the Services control panel or from the command line.

13. Type **sc stop dhcp** and press Enter.

```
C:\Users\se10042310>sc stop dhcp
[SC] OpenService FAILED 5:
Access is denied.
```

14. Note you cannot again actually stop the DHCP service on a university lab PC as you do not have admin rights.
15. However, on a PC where you have admin rights, the status of DHCP is displayed as STOP—PENDING. (If you see the message "A stop control has been sent to a service that other running services are dependent on," try the `sc stop dhcp` command again until it's successful.)