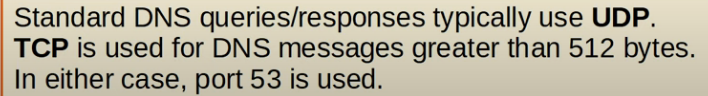
# **38. DNS (Domain Name System)**

## **The Purpose of DNS**

* DNS is used to **resolve** human-readable domain names (e.g., google.com) into IP addresses.
* Machines such as PCs do not use names; they use **IP addresses** (IPv4/IPv6).
* Domain names are easier for humans to remember than IP addresses.
  + Example: What is the IP address of youtube.com?
* When you type youtube.com into a web browser, your device queries a **DNS server** for its corresponding IP address.
* The DNS server(s) your device uses can be manually configured or learned via **DHCP**.



## **Basic Functions of DNS**

### **Viewing Local IP Configuration**

#### **Command: ipconfig /all**

Displays the local IP configuration on the current device.

### **Querying a DNS Entry**

#### **Command: nslookup**

Retrieves IP information for a given domain name.

### **Capturing DNS Queries**

#### **Tool: Wireshark**

Wireshark can be used to analyze network traffic, including DNS queries and responses.

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### **Viewing DNS Cache**

#### **Command: ipconfig /displaydns**

Displays the DNS resolver cache.

#### **Command: ipconfig /flushdns**

Clears the DNS resolver cache.

### **Hosts File**

* **Windows Hosts File Location:** C:\Windows\System32\drivers\etc\hosts
* The **hosts file** can be used to manually map domain names to IP addresses.

## **Configuring DNS in Cisco IOS**

* For hosts in a network to use DNS, **you do not need to configure DNS on routers**.
  + Routers simply forward DNS queries like any other network packets.
* However, a **Cisco router** can be configured as a **DNS server**, though this is rare.
  + If an internal DNS server is needed, it is usually a **Windows** or **Linux** server.
* A **Cisco router** can also be configured as a **DNS client**.

### **Cisco IOS Commands**

#### **Configuring a Router as a DNS Server**

R1(config)#ip dns server

R1(config)#ip host <hostname> <ip address>

#### **Viewing Hostname Mappings**

R1(config)#show hosts

#### **Configuring a Router as a DNS Client**

R1(config)#ip name-server <DNS\_IP\_Address>

R1(config)#ip domain lookup

## **Command Review**

| **Command** | **Function** |
| --- | --- |
| ipconfig /all | Show local IP configuration |
| nslookup | Query DNS for domain IP resolution |
| ipconfig /displaydns | Show DNS cache |
| ipconfig /flushdns | Clear DNS cache |
| ip dns server | Enable DNS server on a Cisco router |
| ip host <hostname> <ip address> | Manually define hostname-to-IP mapping |
| show hosts | Display hostname mappings |
| ip name-server <DNS\_IP\_Address> | Set DNS server for the router |
| ip domain lookup | Enable DNS resolution on the router |

