**CTF Challenge: DNS in Detail**

**DNS in Detail: The Phonebook of the Internet**

The Domain Name System (DNS) is a fundamental component of the internet, acting as a giant phone book that translates human-readable domain names (like google.com) into numerical IP addresses (like 142.250.184.196) that computers use to locate and communicate with each other. Without DNS, navigating the internet would be incredibly cumbersome as we'd need to memorize long strings of numbers to access websites.

Here's a deeper dive into the inner workings of DNS:

**DNS Components:**

* **Domain Names:** Hierarchical names that represent website addresses in a user-friendly format. They consist of subdomains separated by dots (e.g., [www.google.com](https://www.google.com), mail.yahoo.com). The rightmost part of the domain name is called the Top-Level Domain (TLD) (e.g., .com, .org, .net).
* **IP Addresses:** Unique numerical labels assigned to devices connected to the internet. They consist of four sets of numbers between 0 and 255 separated by periods (e.g., 192.168.1.1).
* **DNS Servers:** Specialized computers distributed worldwide that store and manage DNS records. These records map domain names to their corresponding IP addresses.

**DNS Lookup Process:**

1. **Request Initiation:** When you enter a domain name in your web browser, your computer contacts its local DNS resolver (often provided by your internet service provider).
2. **Recursive Resolution:** The local resolver doesn't necessarily have the answer readily available. It acts like a middleman, querying a series of DNS servers in a hierarchical manner:
   * **Root Name Servers:** These servers point to the top-level domain (TLD) nameservers.
   * **TLD Nameservers:** These servers point to the authoritative nameservers for the specific domain name.
   * **Authoritative Nameservers:** These servers hold the actual DNS records for the domain name and provide the corresponding IP address to the local resolver.
3. **Response and Resolution:** The local resolver receives the IP address from the authoritative nameserver and caches it for future use. It then returns the IP address to your computer.
4. **Webpage Display:** Your computer uses the IP address to connect to the web server hosting the website, and the requested web page is displayed in your browser.

# **Capture the Flag (CTF) Challenges**

**Flag 1. DNS translates user-friendly domain names into what?**

Answer: IP

**Flag 2. What part of a domain name specifies the category (e.g., .com, .org)?** Answer: TLD

**Flag 3. In the DNS lookup process, the local resolver acts as a what?**

Answer: Resolver/Middleman

**Flag 4. Authoritative nameservers hold the actual DNS records and provide the corresponding what?**

Answer: Address

**Flag 5. A potential security risk of DNS is attackers redirecting users to fake websites through what?**

Answer: Spoofing