【CN】Day18

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【Ch2】Application Layer

2.4.3 DNS Records and Messages

The DNS servers that together implement the DNS distributed database store resource records(RRs).

A resource record is a four-tuple that contains the following fields:

```
(Name, Value, Type, TTL)
```

`TTL` is the time to live of the resource record; it determines when a resource should be removed from a cache. The meaning of Name and Value depend on Type:

- If `Type=A`, then Name is a hostname and Value is the IP address for the hostname.

  Thus, a Type A record provides the standard hostname-to-IP address mapping.

  For example, (`relay1.bar.foo.com, 145.37.93.126, A`) is a Type A Record

- If `Type=NS`, the Name is a domain (such as `foo.com`) and Value is the hostname of an authoritative DNS server that knows how to obtain the IP addresses for hosts in the domain.

  This record is used to route DNS queries further along in the query chain.

- If `Type=CNAME`, then `Value` is a canonical hostname for the alias hostname Name. This record can provide querying hosts the canonical name for a hostname
- If `Type=MA=X`, then Value is the canonical name of a mail server that has an alias hostname Name.

If a DNS server is authoritative, the DNS server will contain a Type A record for the hostname.

If a server is not authoritative, then the server will contain a Type NS record for the domain that includes the hostname; it will also contain a Type A record that provides the IP address of the DNS server in the Value field of the NS record.

Suppose we are starting a company called networkutopia.com. The first thing we need to do is to register the domain name networkutopia.com at a registrar.

A registrar is a commercial entity that verifies the uniqueness of the domain name.

When we register, we also need to provide the registrar with the names and IP addresses of our primary and secondary authoritative DNS servers.

Suppose the names and IP addresses are dns1.networkutopia.com, dns2.networkutopia.com, 212.2.212.1, and 212.212.212.2.

For each of these two DNS servers, the registrar would make sure that a Type NS and a Type A record are entered into the TDL com servers.

```
(networkutopia.com, dns1.networkutopia.com, NS)
(dns1.networkutopia.com, 212.212.212.1, A)
```