NSS

Intro to the “Web” of Web Design

A Brief History of the Internet
or
Why the internet is like it is...

Back in the day of yore… long long ago… (1950's and 1960's).

Connections between devices were made through direct means. Copper lines were connected and those connections allow direct electrical current to carry information.

Direct connections

Direct connections between devices has some advantages:

- It is simple to construct
- It is simple to administer/troubleshoot

But...

- It relies on a central location to change connections (and the military saw this as a problem)

The Military's Voice

Why did the problems of the military weigh heavily on the design? The internet was designed primarily as a piece of military technology.

And if military communication is passed through a single location it is easy to stop that comminication by destroying that location

Solving the problem

The system was then de-centralized, but this required a new way of addressing how data was passed.

This was done by **Abstracting the Physical connection from the Logical Layer**.

Packet switching was born.

Physical vs Logical

A physical location is where your server is located in reality.

- For example your server may live at 1234 main street

The logical description of a devices location comes in 2 forms

- IP address logical location in the network: comes in 2 forms
  - version 4 (IPv4) [168.192.0.1]
  - version 6 (IPv6) [2001:db8:85a3:8d3:1319:8a2e:370:7348]
- MAC address physical name of the network hardware [01-23-45-67-89-AB-CD-EF]

Packet switching

Packet switching is the idea that messages are split into tiny fragments and a set of instructions for where they are going is added to each fragment.

Then devices on the path help direct/redirect each fragment to get to the destination.

We have packets now what

We need a basic set of mechanisms for handling tasks we want done.

For example: Email

In order to use email, we need a way to compose an email, to transfer it, for the recipient to recognize it as email and to read it on the other side.

Protocols

A set of instructions for how to govern an affair.

For example:

- Email uses SMTP
- File transfer uses FTP or SFTP or FTPS
- Web pages use HTTP or HTTPS

Protocols (cont)

Protocols allow the computer to use the correct tools to interact with the correct files.

For example:

HTTP is the protocol used by your browser.

SFTP is used to transfer files files securely.

TCP is the protocol which handles IP addresses

Protocols (cont)

Think of protocols as the languages spoken by each application or service.

Domain Name Server/Services

How does a computer know how to find Google.com?

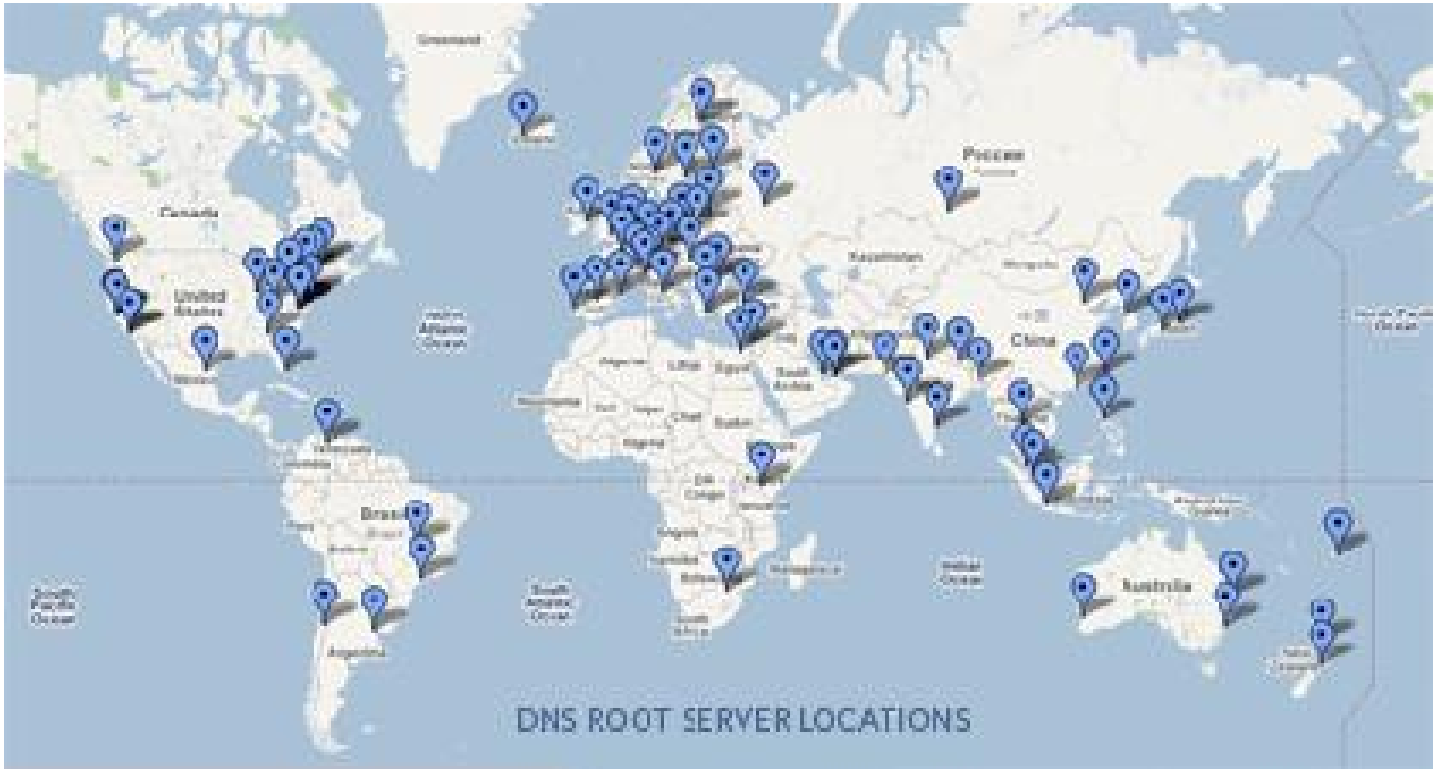
Computers have to translate google.com into the logical address for the servers.

DNS

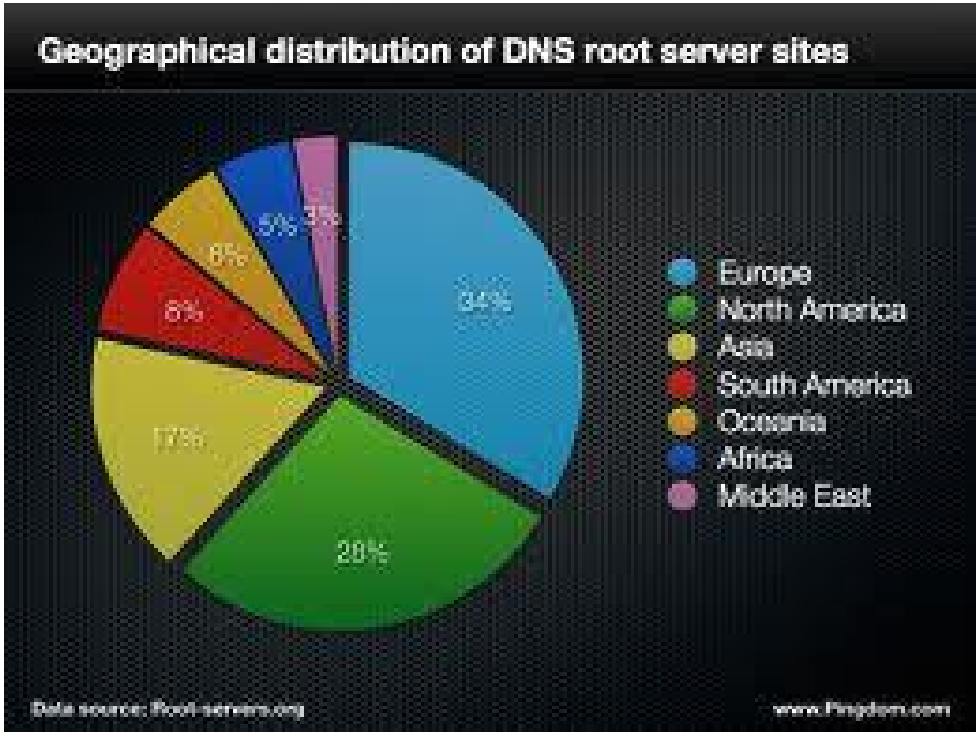
Conversion of Uniform Resource Locator (URL) address into an IP address is done by looking the URL up in a repository. These are located all over the world.

There are 13 main groups of servers

DNS Root server locations



DNS Breakdown



URL (in brief)

A URL follows a specific pattern.

scheme://domain:port/path?query_string#fragment_id

Example: https://docs.google.com/presentation/d/1MLb4gee-jCnW_Iz4Qrb_dTeoMr8-aPA55eg7wC8F6FU/edit#slide=id.g2b5924c39_07 (which is the URL for this presentation).

Server

A system entity that provides a service in response to requests from other system entities called clients.

Operating systems

Window

OSx

Linux

Mobile (IOS, Android, Windows Mobile)

Host

Any computer that has full two-way access to other computers on the Internet. Or a computer with a web server that serves the pages for one or more Web sites.

Web servers

Are remote resources which host web content (Using HTTP or HTTPS protocols).

FTP server

An FTP server is a server which hosts file content through the FTP protocol.

TOR Server

Are remote resources which host content through the TOR protocol.

Client

A system entity that requests and uses a service provided by another system entity, called a "server." In some cases, the server may itself be a client of some other server.

Browsers

Browsers are Applications, which allow the viewing of remote web content (HTML, JS, etc) on local machine.

FTP Clients

Are Applications which allow interaction with remote FTP content.

Can my server do more than one thing?

What if you want to host both HTTP and FTP content on the same device? You would need a way to be sure the correct content type went with the correct request. FTP with FTP requests and HTTP with HTTP requests. This means we would need a mechanism to split this up within the server.

To do this we need an additional layer of addressing. We call these Ports.

Port

Ports are an application specific communication endpoint on a computer.

Example well known protocols and associated ports:

HTTP 80	FTP 20 & 21	DNS 53
HTTPS 443	SMTP 25	SQL 118

Common Web Server

IIS: Windows Server's Web Server

Apache: Open Source, Free, most common Web Server

JRun: Adobe web server (JAVA)

!Web Servers

These are NOT Web Servers:

- PHP
- ColdFusion
- Python
- Ruby
- ASP
- HTML

Databases

Is an application, which houses a collection of organized data.

Databases can do 2 things, read data & write data.

Database Languages

Query languages:

- SQL (Structured Query Language)
- LDAP (Directory Services Language)

Common Databases

MySQL: Free, open source, most common

MSSQL: Microsoft SQL Server

PostGREs: Free open source

User

A person, organization entity, or automated process that accesses a system, whether authorized to do so or not.

Trust

Trust determine which permissions and what actions other systems or users can perform on remote machines.

Architecture

The logical and physical organization of a network.

Common ones include:

- Client-Server
- Peer-to-Peer

Questions?