

Module 2 - Lecture 11

Application Architecture & Introduction to Networking





The PC revolution



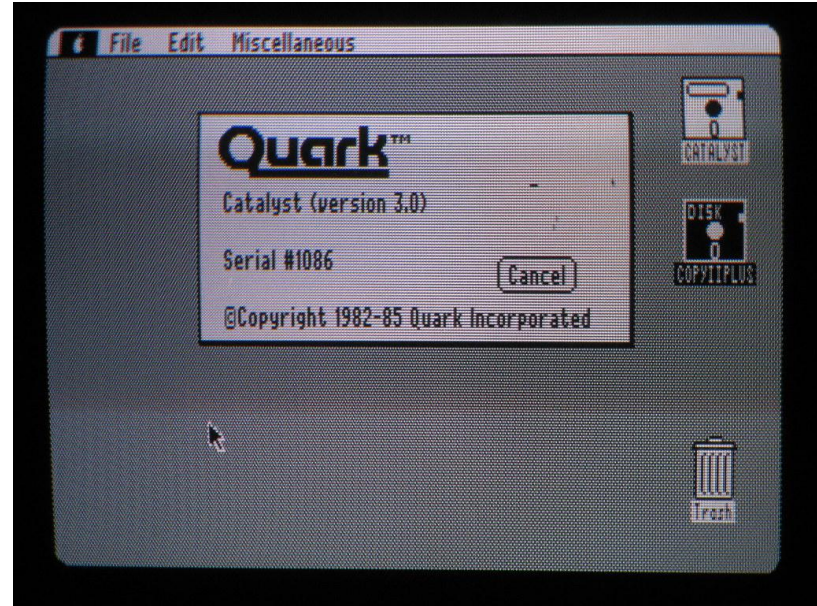
1940s



1970s



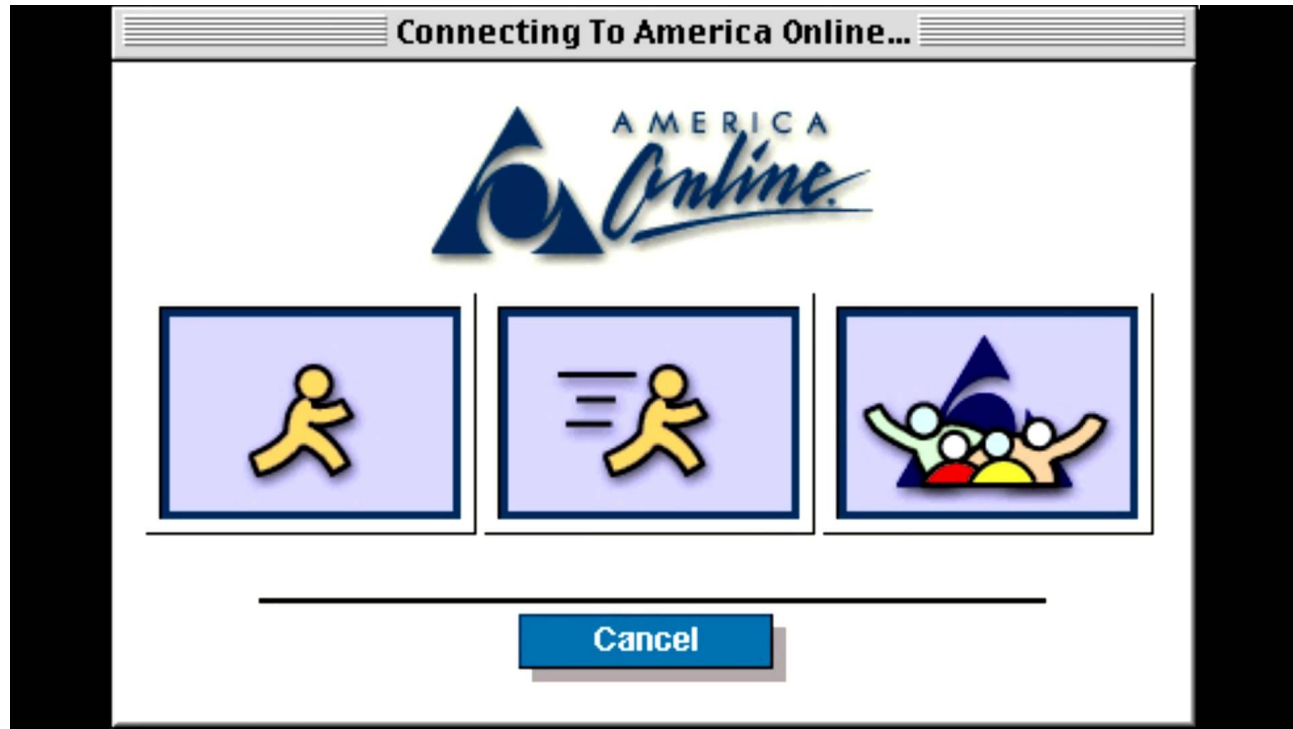
The GUI revolution



1980s



The Internet revolution



1990s



Web Browser evolution



NCSA Mosaic - 1993



Opera - 1996



maxthon



Netscape Navigator - 1994



Chrome - 2008



Internet Explorer - 1995



Safari - 2003



Tencent Traveler



Firebird (1998) > Firefox - 2004



AOL Browser



TheWorld

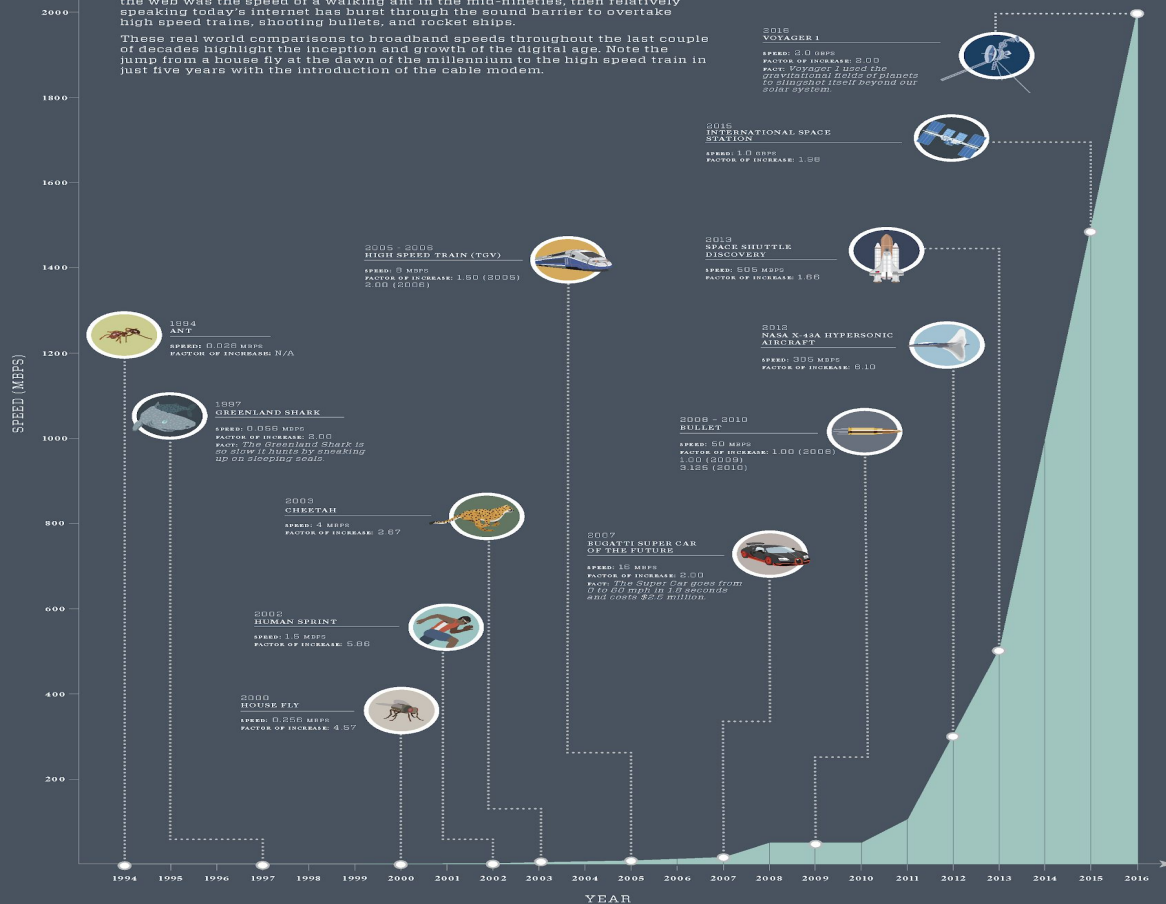


FROM TRAFFIC JAMS TO OUTER SPACE

A LOOK AT THE RISE OF BROADBAND SPEEDS

According to data from the Nielsen Norman Group and Comcast, internet speeds have been on the rise at an incredible pace ever since its inception. If the web was the speed of a walking ant in the mid-nineties, then relatively speaking today's internet has burst through the sound barrier to overtake high speed trains, shooting bullets, and rocket ships.

These real world comparisons to broadband speeds throughout the last couple of decades highlight the inception and growth of the digital age. Note the jump from a house fly at the dawn of the millennium to the high speed train in just five years with the introduction of the cable modem.



Software Delivery Evolution

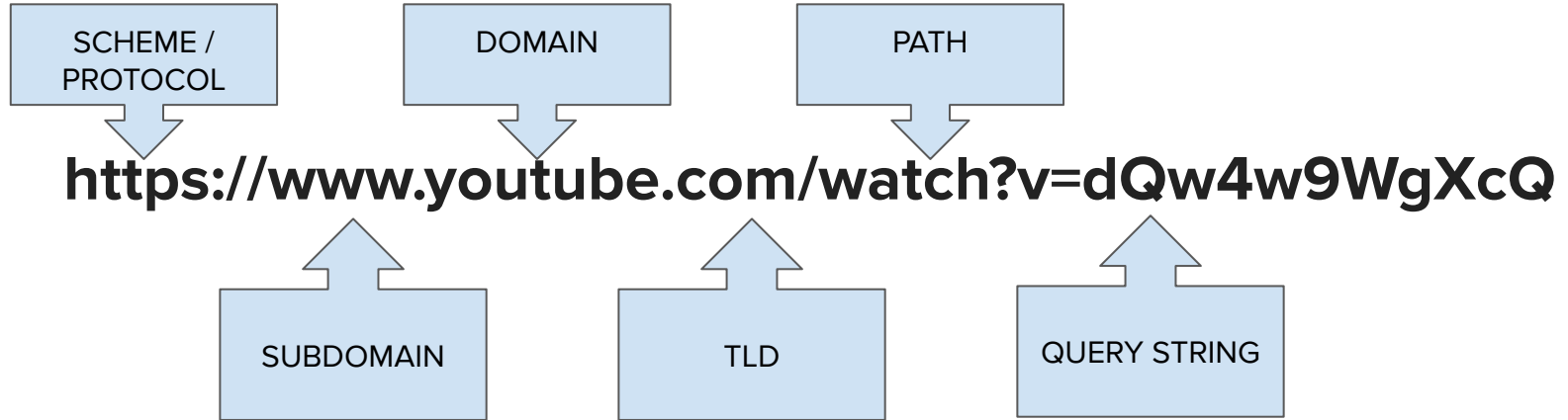
From Floppy Disks to App Stores



An Internet Primer



Uniform Resource Locator

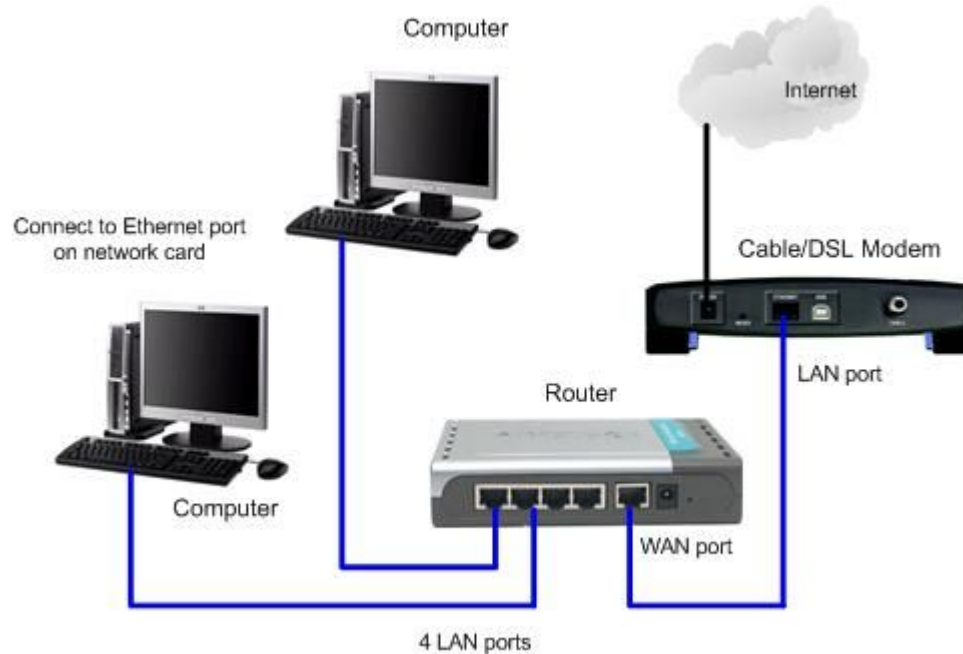


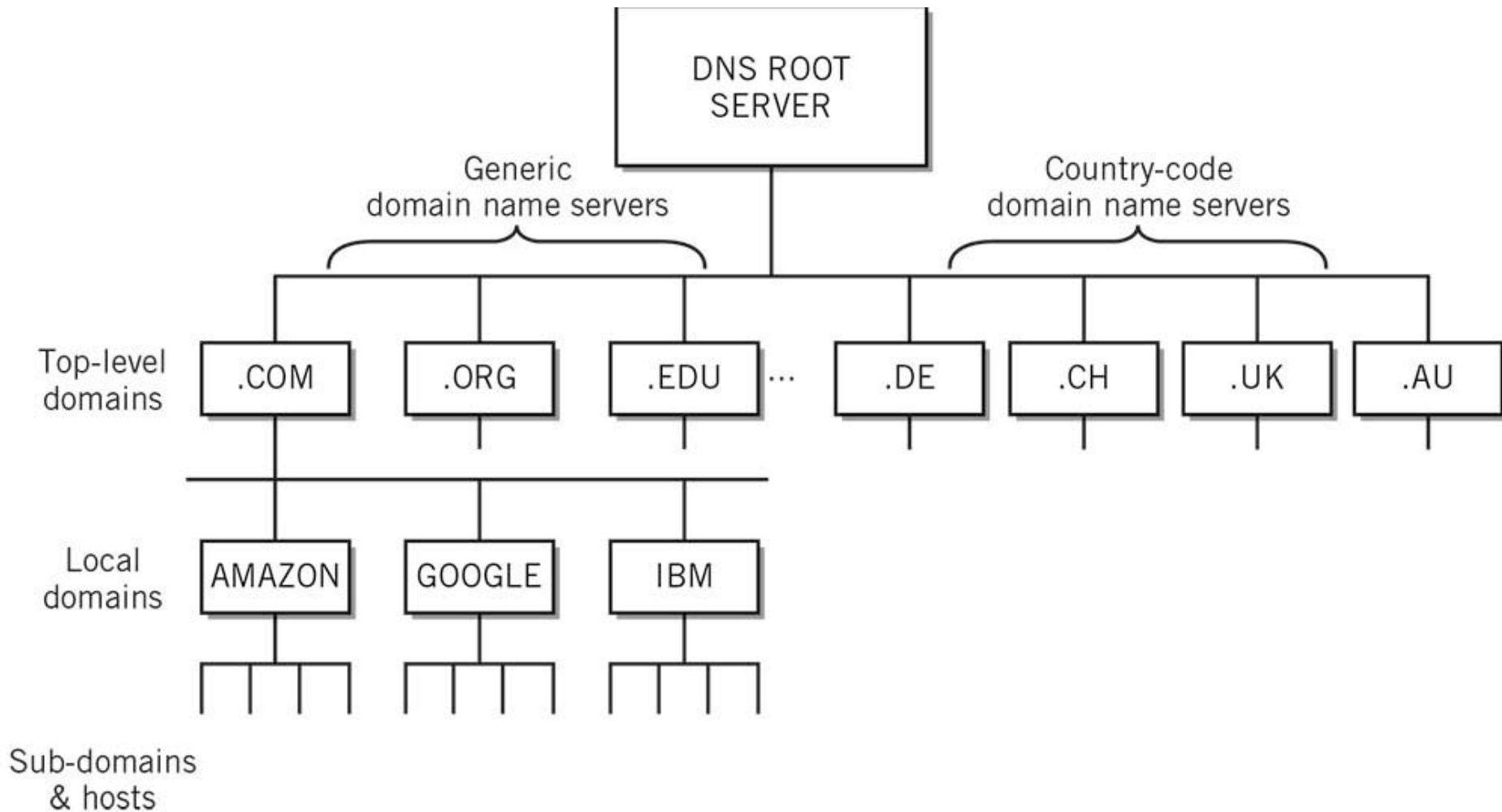
Internet Protocol (IP) Address

- The phone number of the Internet.
- IPv4 ranges from 0.0.0.0 to 255.255.255.255
 - Four 8 bit numbers for a total of 32 bits.
 - How many IPv4 addresses are there?
- IPv6 ranges from 0.0.0.0.0.0.0.0 to FFFF.FFFF.FFFF.FFFF.FFFF.FFFF.FFFF.FFFF
 - Eight 16 bit numbers for a total of 128 bits.
 - How many IPv6 addresses are there?



Routing and NAT





Domain Name System

- The phone book of the Internet
- Translates a hostname to an IP Address
 - Accomplished by a decentralized group of name servers.
 - Right to left.
 - Start with the top-level domain (.com, .org, .edu)
 - Then the domain name (youtube, google)
 - Then any sub-domains (www)



Port numbers

- If IP addresses are the phone number, port numbers are the extension.
- Range from 0 - 65535
- Some are reserved for common activities
 - 21 - file transfer (FTP)
 - 25 - email (SMTP)
 - 80 - unencrypted web traffic (HTTP)
 - 443 - encrypted web traffic (HTTPS)



HyperText Transfer Protocol (HTTP)

- Request / Response
- A Request is made up of...
 - **Method** (GET, POST, PUT, DELETE, etc)
 - Headers
 - URL
 - **Parameters**
- A Response is made up of...
 - Headers
 - **Status code**
 - **Data**



HTTP Request Methods

- Verb. Describes what we want to do.
- POST **C**reate
- GET **R**etrieve
- PUT **U**ppdate
- DELETE **D**elele



HTTP Request Parameters

- Three forms, path variable, query string and request body.



HTTP Response Status Codes

- Describes the result.
- Convention based.
 - **1xx** **Informational**
 - **2xx** **Success** (200 OK)
 - **3xx** **Redirect** (301 Moved Permanently)
 - **4xx** **Client Error** (400 Bad Request, 401 Unauthorized, 403 Forbidden, 404 Not Found)
 - **5xx** **Server Error** (500 Internal Server Error)



HTTP Response Data

- HTML, JSON, XML, Image file (JPG, GIF)
- JSON is JavaScript Object Notation

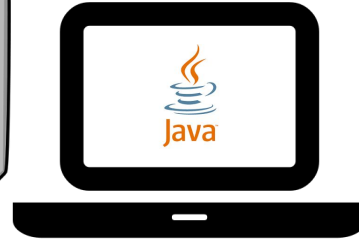
```
{  
  "Person": {  
    "First Name": "Walt",  
    "Last Name": "Impellicceiri"  
  }  
}
```



Web Application Architecture



CLIENT



WEB SERVER



DATABASE



QUESTIONS?

