Web Systems

Lecture 1

An Overview of Web Systems

Paul I-Hai Lin, Professor of Electrical and Computer Engineering Technology
School of Polytechnic
College of Engineering, Technology, and Computer Science
Purdue University Fort Wayne

http://www.etcs.pfw.edu/~lin

Web Systems

- A study of essential knowledge and skills that an effective web administrator must know. Introduction to fundamental topics of web technologies, web-based systems, and web page design. Topics covered include Internet applications, web site development and publishing, information architecture, client and server-side programming, multimedia technologies and publishing, vulnerabilities, and web site implementation and maintenance.

Web Systems

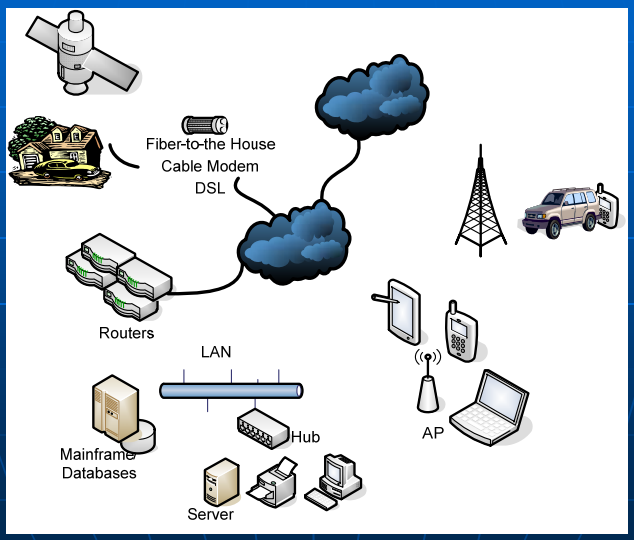
- Web Systems utilize
  - Computer Systems
  - Communications and Networking Technology
  - The Internet Technology & Services
  - Web Clients, Web Sites & Servers
    - Web sites, Web pages, contents, apps, services
  - Cloud Data Centers and Storage Systems
- Web Enabled, Assisted Applications
  - Online E-Commerce & E-Business
  - Web Content Sharing
  - Web Services
  - Enterprise Computer System & App Integration
  - Enterprise Data Integration
  - etc

Web Systems – need to utilize

- Computer Systems
  - Main Frames (IBM z14)
  - Networked Computers in Data centers
  - Server computers
  - Workstation computers
  - Desktops/Laptops
  - Embedded computers
  - Mobile Devices (smart phones, tablet, iPad, etc)

Web Systems – need to utilize

- **Networking & Communication Systems**



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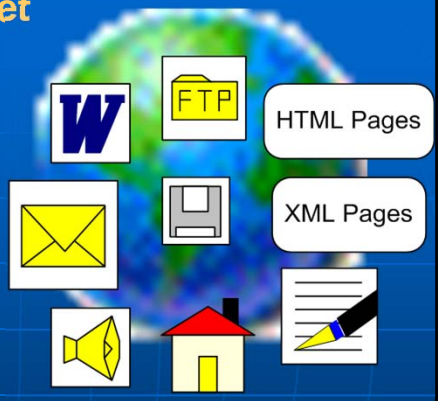
Web Systems – use Internet infrastructure

Internet, https://en.wikipedia.org/wiki/Internet

- The **Internet** is the global system of interconnected computer networks that use the Internet protocol suite (TCP/IP) to link devices worldwide. It is a *network of networks* that consists of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies. The Internet carries an extensive range of information resources and services, such as the inter-linked hypertext documents and applications of the World Wide Web (WWW), electronic mail, telephony, and file sharing.

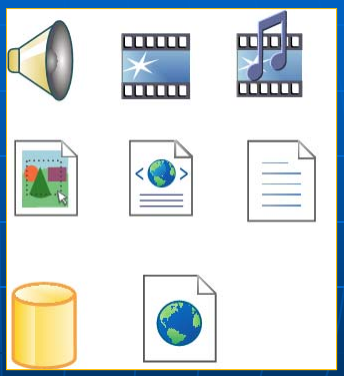
Internet

- **Interconnected Global Computer Networks**
  - **Networks of networks**
  - **A collection of LANs, WiFi, and WANs systems and network enabled devices and/or computers from private, public, government, and business networks**
  - **TCP/IP Protocols and Applications**
  - **Carry and support an extensive range of information resources and services**

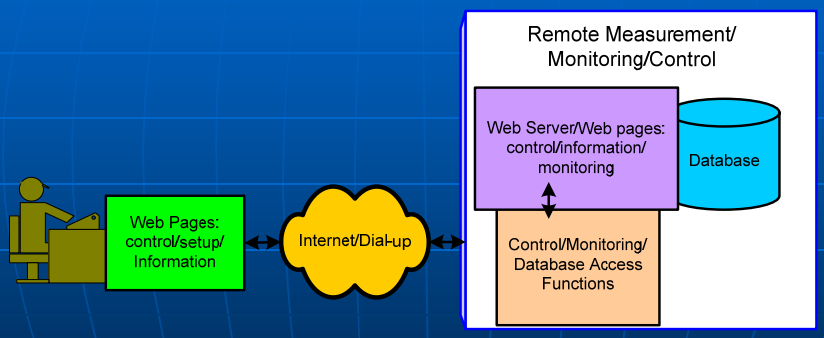


Web Systems – share and deliver

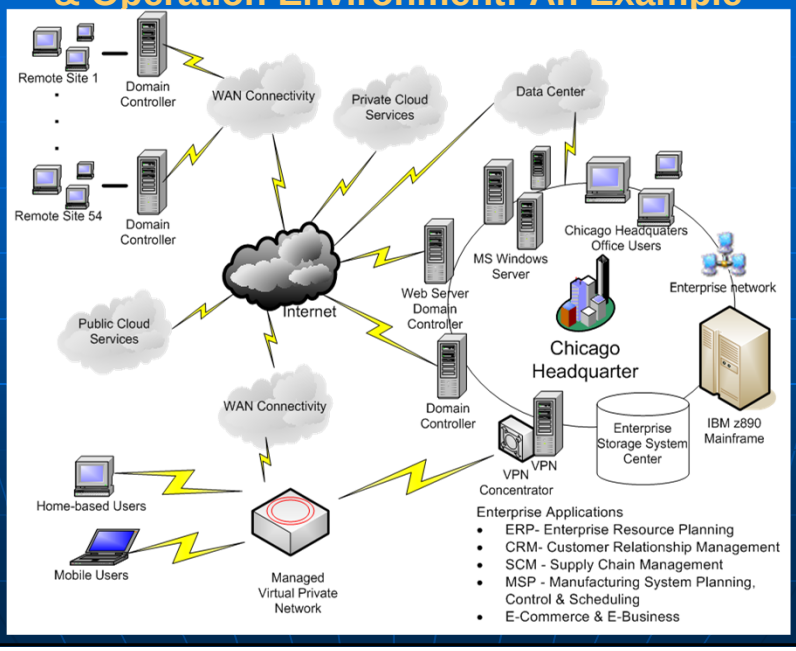
- Data and Information Resources and Services:
  - Voice
  - Multimedia
  - Video
  - Medical record
  - Images
  - Web pages
  - Document
  - etc



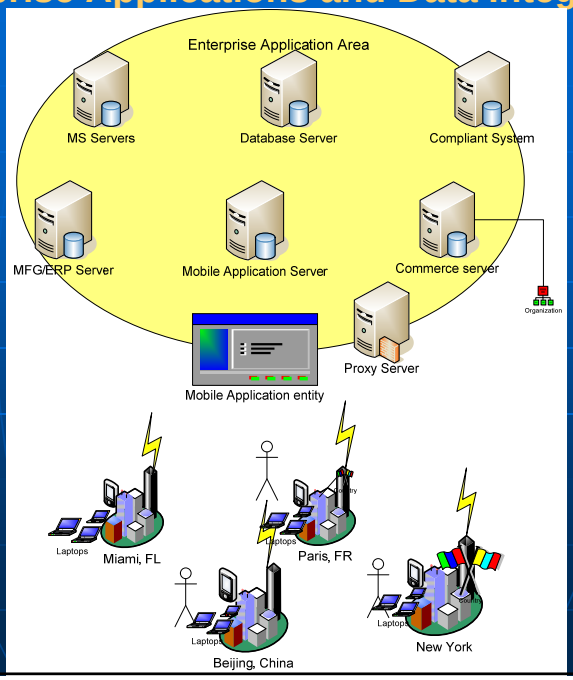
Remote Measurement/Monitoring/Control – Web Enabled



Internet- and Web-enabled Enterprise IT Services & Operation Environment: An Example



Enterprise Applications and Data Integration



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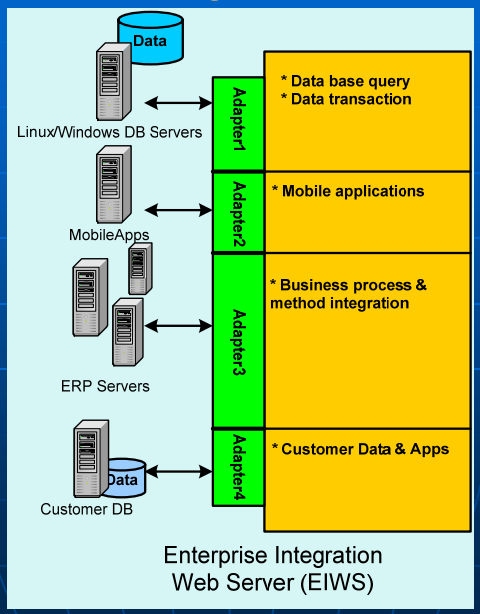
Web Servers for Enterprise Applications and Data Integration



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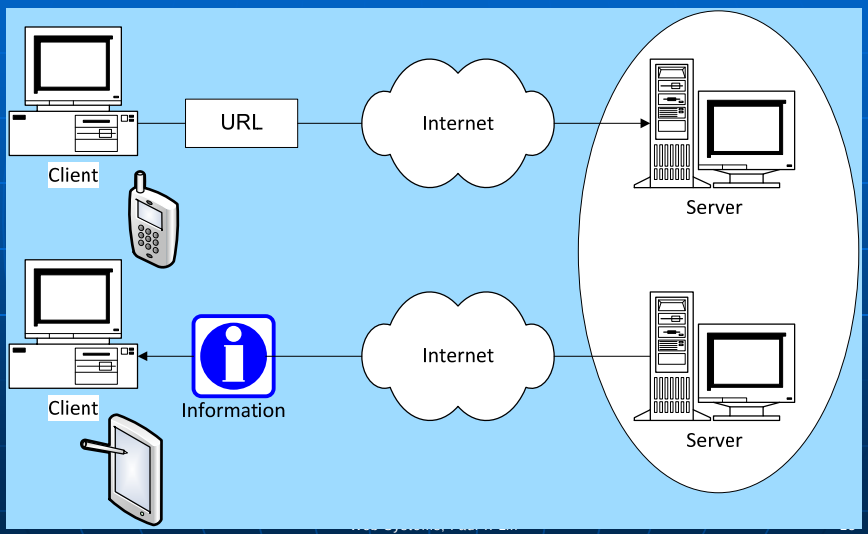
Web Browser/Web Server Interaction

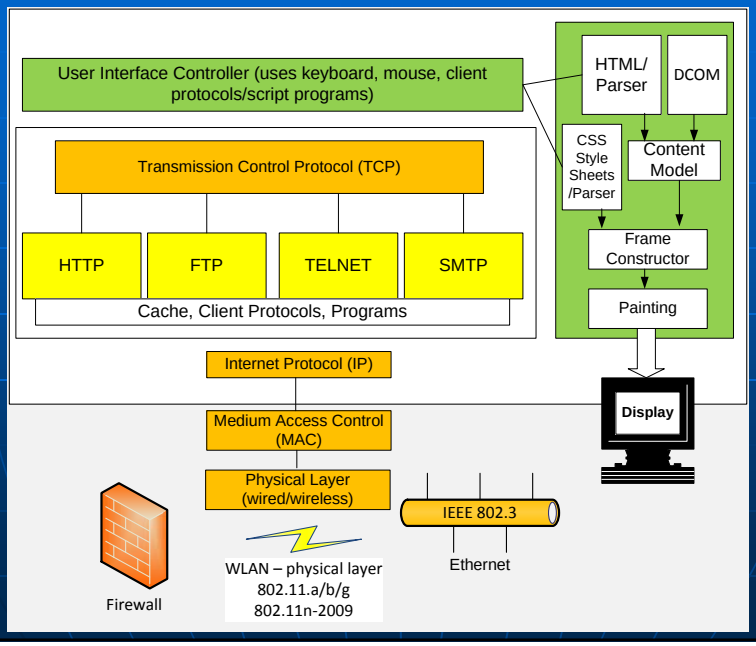


Web Clients

- Browser Statistics,
  https://www.w3schools.com/Browsers/default.asp

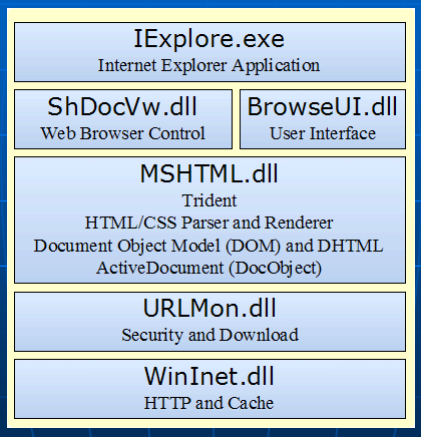
2018	Chrome	Edge/IE	Firefox	Safari	Opera
July	80.1 %	3.5 %	10.8 %	2.7 %	1.5 %
June	79.4 %	3.8 %	10.9 %	3.0 %	1.6 %
May	79.0 %	3.9 %	10.9 %	3.2 %	1.6 %
Apr	78.6 %	3.9 %	11.2 %	3.3 %	1.5 %
Mar	78.1 %	4.0 %	11.5 %	3.3 %	1.6 %
Feb	77.9 %	4.1 %	11.8 %	3.3 %	1.5 %
Jan	77.2 %	4.1 %	12.4 %	3.6 %	1.6 %

Web Browser Architecture



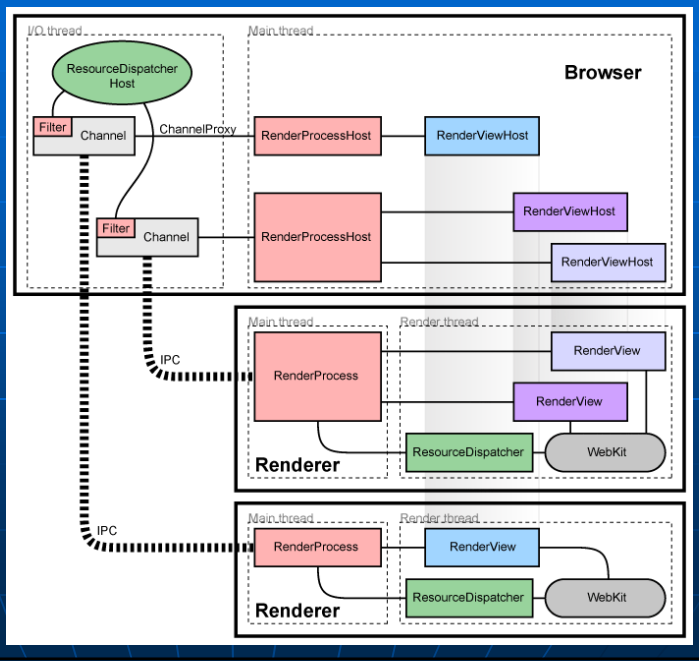
IE Web Browser Architecture

- https://msdn.microsoft.com/en-us/library/aa741312(v=vs.85).aspx [accessed 2017/8/22]



Chrome Browser Architecture

- The Chromium Project - Multiprocess Architecture, https://www.chromium.org/developers/design-documents/multi-process-architecture [accessed 2017/8/22]



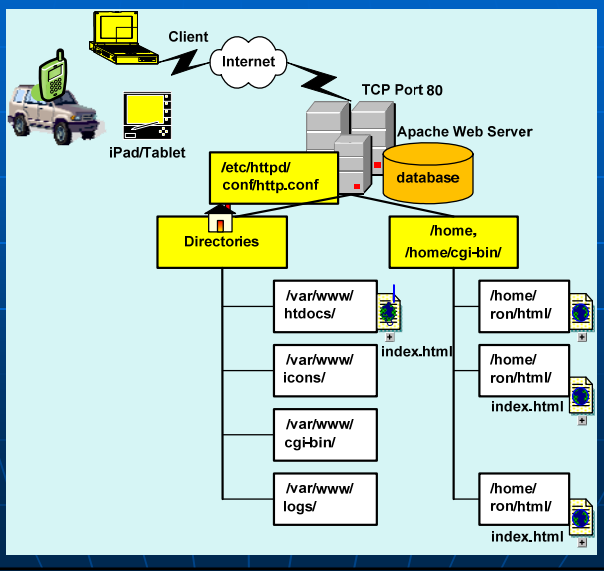
Web Servers/Web Sites

Netcraft Web Server Survey

- May 2017 Web server survey, https://news.netcraft.com/archives/2017/05/25/may-2017-web-server-survey.html
  - **Microsoft IIS – 49.1%**
  - **Apache - 20.95%**
  - **NGINX – 29.22%**
  - **Google – 1.05%**
- July 2018 Web server survey, https://news.netcraft.com/archives/2018/07/19/july-2018-web-server-survey.html
  - Apache - 41.13%
  - NGINX – 21.64%
  - Google - 8.18%
  - Microsoft – 6.62%

Web Servers (HTTP Server)

- HTTP (HyperText Transfer Protocol – Port 80)
- HTTPs (HyperText Transfer Protocols Secured – Port 443) protocols



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Internet Service Providers (ISPs)

Basic Services Provided

- DNS (Domain Name Resolution Service): translating domain name into an IP address.
- RADIUS: User Authentication Dial-In User Services, and accounting
- WWW: Basic web hosting and server functionality; FTP, etc
- Email: Providing POP3 (post office protocol), IMAP (Internet Message Access Protocol) and SMTP (Simple Mail Transfer Protocols) services

Internet Service Providers (ISPs)

ISP Connection Types

- **DSL (Digital Subscriber Line):** DSL modem, Router
- **Fiber:** Verizon FIOS, https://en.wikipedia.org/wiki/Verizon_Fios
- **Cable:** Cable Internet Access, https://en.wikipedia.org/wiki/Cable_Internet_access
- **Satellite:** The Best Satellite ISP in 2017, http://www.reviews.org/internet-service/best-satellite-internet-providers/
- **Wireless ISP:** http://www.wispa.org/
- **Cellular**
  - https://www.wireless.att.com/businesscenter/solutions/network/wwan.jsp

Internet Service Providers (ISPs)

Internet Providers in Fort Wayne, https://www.highspeedinternet.com/in/fort-wayne [accessed 2017/8/20]

- Verison DSL, Fiber
- Frontier FiOS – Fiber, DSL
- Xfinity (Comcast) - cable
- CenturyLink – DSL, Fiber
- HiughesNet - Satellite

Web Systems May use Data Centers

- Networked Computer Systems in Data Centers

Globaldots.com

Consulttech.us

Datacenters.com

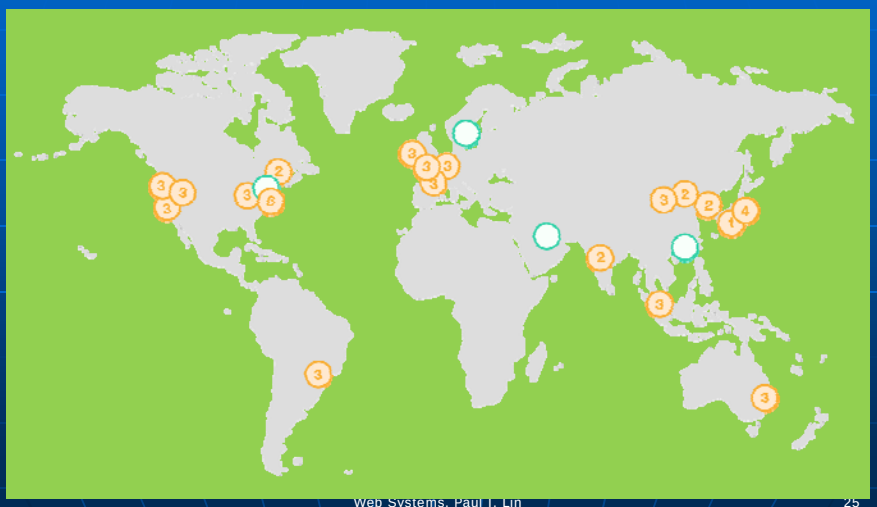
Stackoverflow.com

AWS Global Infrastructure (Amazon Web Services)

- AWS Global Infrastructure (Accessed 2018/8/23), https://aws.amazon.com/about-aws/global-infrastructure/
  - **The AWS Cloud operates 55 Availability Zones within 18 geographic Regions around the world, with announced plans for 12 more Availability Zones and 54more Regions in Bahrain, Hong Kong SAR, Sweden, and a second AWS GovCloud Region in the US.**

AWS Global Infrastructure

- AWS Global Infrastructure, https://aws.amazon.com/about-aws/global-infrastructure/



AWS Global Infrastructure

- Azure Regions (54 regions worldwide, 140 countries), https://azure.microsoft.com/en-us/regions/ [accessed 2018/8/21]

Hot Topics in Web Systems and Technologies

HotWeb 2017, Oct. 14, 5th ACM/IEEE Workshop, San Jose, CA, https://hotweb2017.github.io/cfp.html

- Web of Things (Internet of Things)
- Applications
- Caching and replication,
- Crowdsourcing Systems and Social Media
- Data mining and analytics
- Ecommerce and monetization
- Infrastructure (Datacenters, Content Networks and Cloud Computing)

Hot Topics in Web Systems and Technologies

- Internet Telephony
- Measurement studies of deployed systems
- Mobility and pervasive Web
- Multimedia content distribution
- Security and privacy
- Social networks and graph analysis
- Searching and Information Retrieval, and
- Web/Database integration.

Summary