

# Web Systems

## Lecture 1

### An Overview of Web Systems

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## 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.

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## 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

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## 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)

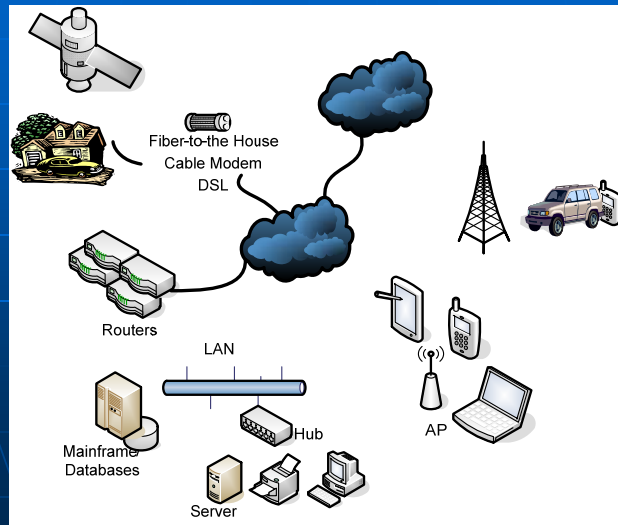


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## Web Systems – need to utilize

- 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



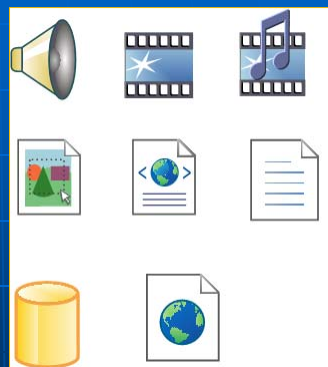
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## Web Systems – share and deliver

### ■ Data and Information Resources and Services:

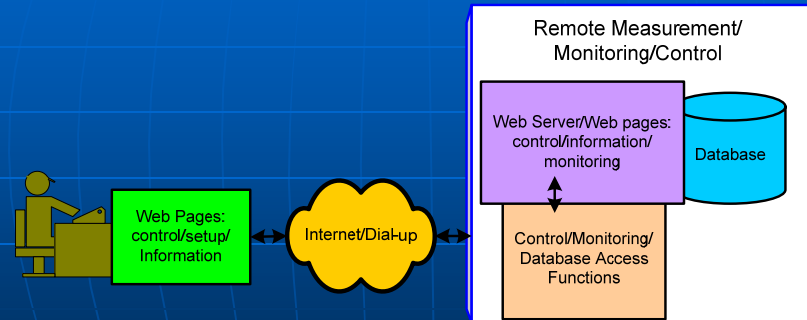
- Voice
- Multimedia
- Video
- Medical record
- Images
- Web pages
- Document
- etc



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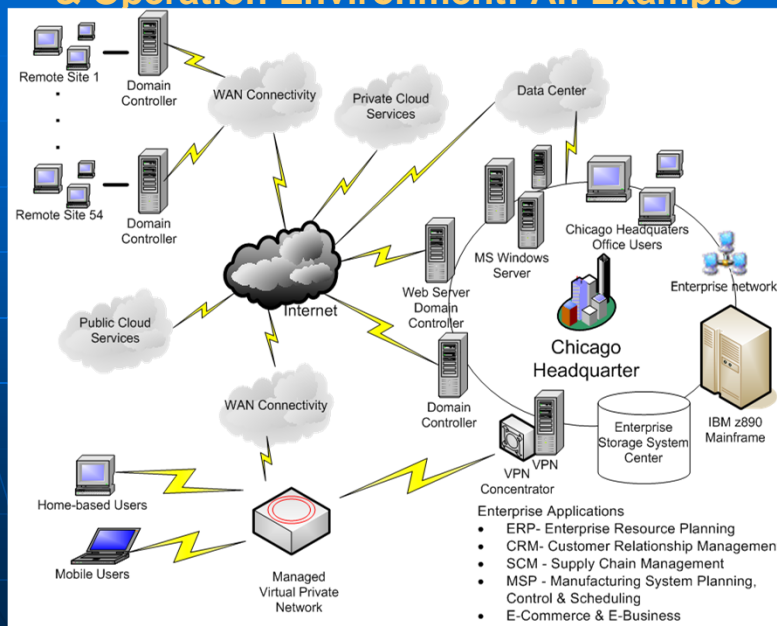
## Remote Measurement/Monitoring/Control – Web Enabled



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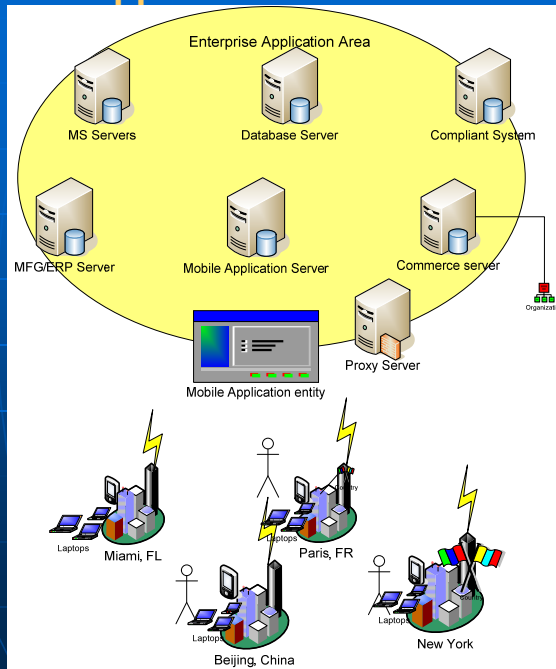
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## Internet- and Web-enabled Enterprise IT Services & Operation Environment: An Example



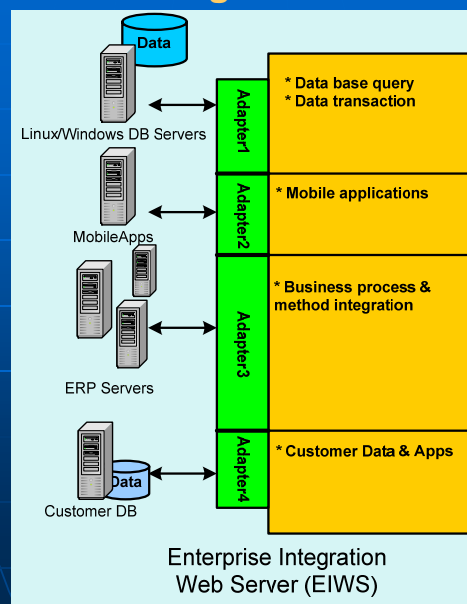
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## Enterprise Applications and Data Integration



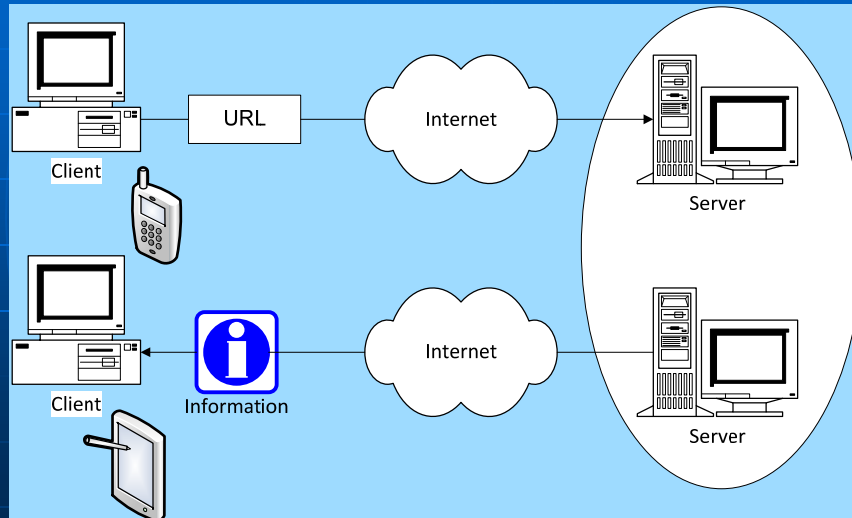
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## Web Servers for Enterprise Applications and Data Integration



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## Web Browser/Web Server Interaction

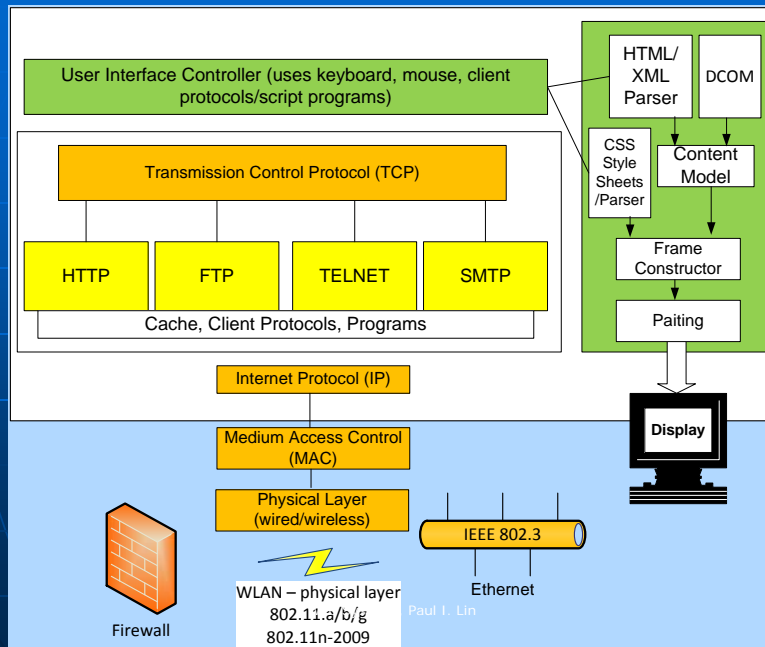


## Web Clients

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

2017	<u>Chrome</u>	<u>IE/Edge</u>	<u>Firefox</u>	<u>Safari</u>	<u>Opera</u>
July	76.7 %	4.2 %	13.3 %	3.0 %	1.2 %
June	76.3 %	4.6 %	13.3 %	3.3 %	1.2 %
May	75.8 %	4.6 %	13.6 %	3.4 %	1.1 %
Apr	75.7 %	4.6 %	13.6 %	3.7 %	1.1 %
Mar	75.1 %	4.8 %	14.1 %	3.6 %	1.0 %
Feb	74.1 %	4.8 %	15.0 %	3.6 %	1.0 %
Jan	73.7 %	4.9 %	15.4 %	3.6 %	1.0 %

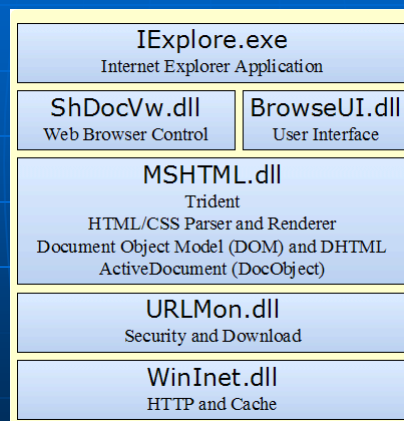
## Web Browser Architecture



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## IE Web Browser Architecture

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



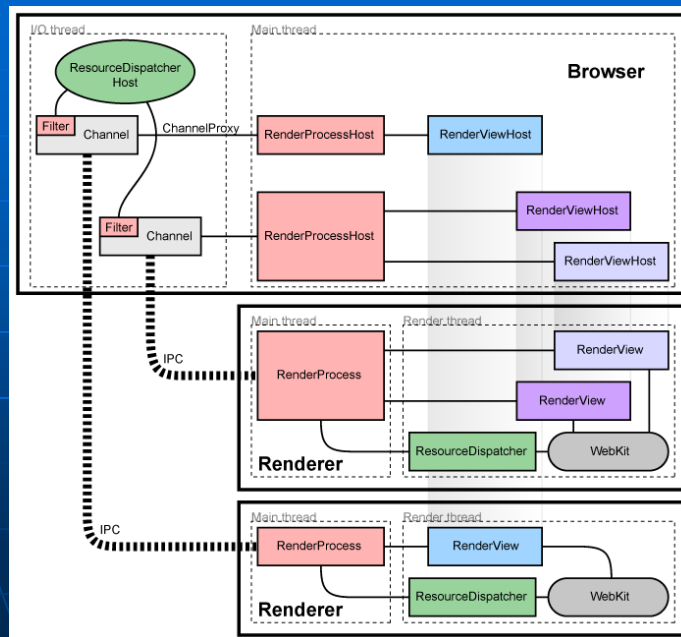
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## Chrome Browser Architecture

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



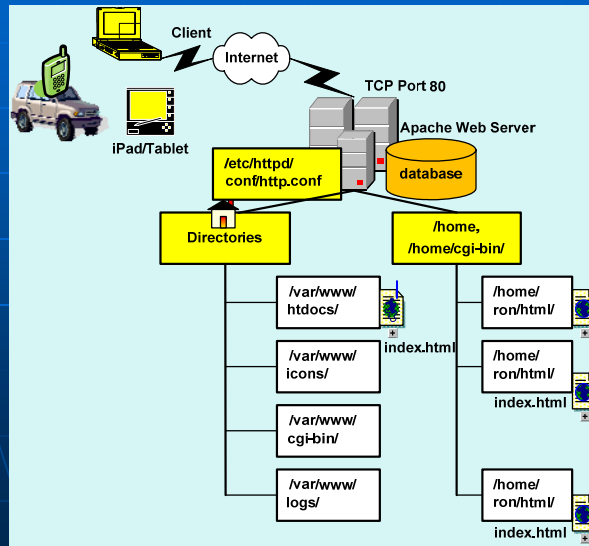
## Web Servers/Web Sites

### 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%

## 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](https://en.wikipedia.org/wiki/Verizon_Fios)
- Cable: Cable Internet Access, [https://en.wikipedia.org/wiki/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]

- Verizon DSL, Fiber
- Frontier FiOS – Fiber, DSL
- Xfinity (Comcast) - cable
- CenturyLink – DSL, Fiber
- HughesNet - Satellite

## Web Systems May use Data Centers

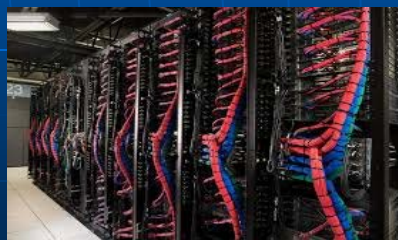
- Networked Computer Systems in Data Centers



Globaldots.com



Consulttech.us



Datacenters.com



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Stackoverflow.com

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## AWS Global Infrastructure (Amazon Web Services)

- AWS Global Infrastructure, <https://aws.amazon.com/about-aws/global-infrastructure/>
  - The AWS Cloud operates 44 Availability Zones within 16 geographic Regions around the world, with announced plans for 14 more Availability Zones and 5 more Regions in China, France, Hong Kong, Sweden, and a second AWS GovCloud Region in the US.



## Hot Topics in Web Systems and Technologies

HotWeb 2016, Oct. 24-25, 4<sup>th</sup> IEEE

Workshop,

<http://conferences.computer.org/hotweb2016/>

- Content delivery architectures
- Peer-to-Peer systems
- Support for mobile and wireless systems
- Web caching and replication
- Edge services and dynamic content delivery

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## Hot Topics in Web Systems and Technologies

- Multimedia content distribution
- Overlay networks
- Content placement and request routing
- Measurement studies of deployed systems
- Security and privacy
- Wide-area upload and content gathering
- Novel web-based applications
- Web/database integration
- Information retrieval and searching
- Electronic commerce

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## Hot Topics in Web Systems and Technologies

- Internet telephony
- Social computing
- Web of Things
- Mobile web
- Big web data

## Summary