Web Engineering

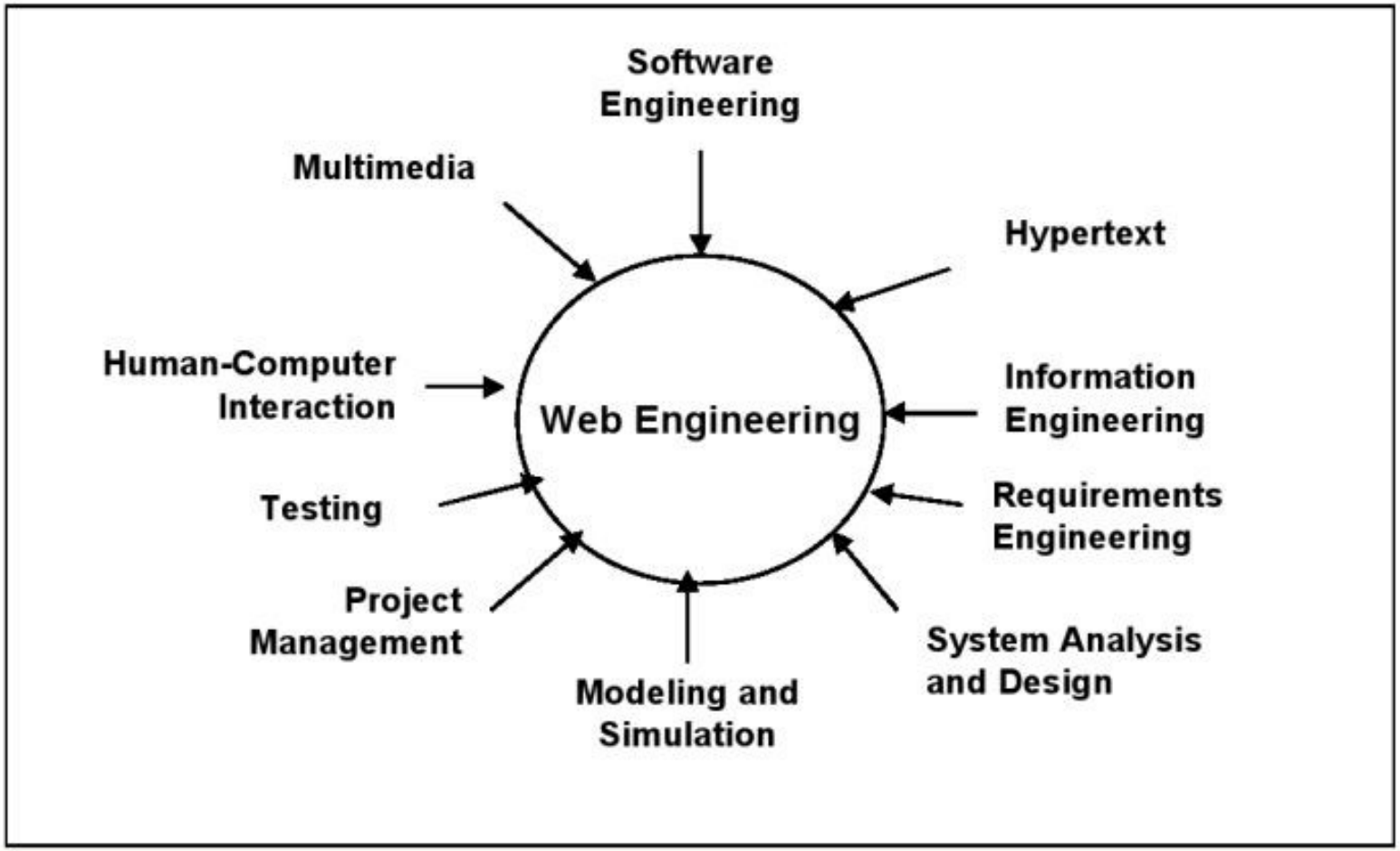
CSE 414

Web Engineering

Web Engineering is study of processes, concepts , methods and techniques used to create high quality web applications..

Web Engineering is the application of systematic and computable approaches to cost effective requirements analysis, design, implementation, testing, operation, and maintenance of high-quality Web applications.

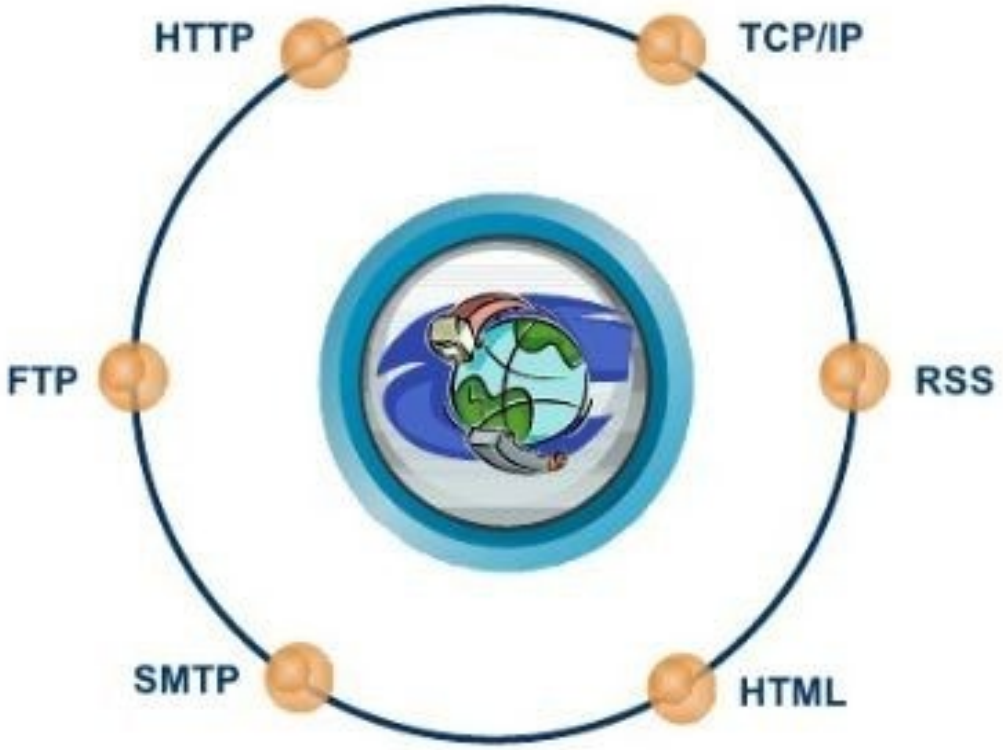
Web Engineering



Web ≠ Internet

- Internet : a physical network connecting millions of computers using the same protocols for sharing/transmitting information (TCP/IP)
- Web : a collection of interlinked multimedia documents that are stored on the Internet and accessed using a common protocol (HTTP) [reed]
- Key distinction: Internet is hardware; Web is software

Web Services



What is RSS?

- RSS stands for **R**eally **S**imple **S**yndication
- RSS allows you to syndicate your site content
- RSS defines an easy way to share and view headlines and content
- RSS files can be automatically updated
- RSS allows personalized views for different sites
- RSS is written in XML

Protocols and Ports

Protocol	TCP/UDP	Port Number	Description
File Transfer Protocol (FTP) (RFC 959)	TCP	20/21	FTP is one of the most commonly used file transfer protocols on the Internet and within private networks. An FTP server can easily be set up with little networking knowledge and provides the ability to easily relocate files from one system to another. FTP control is handled on TCP port 21 and its data transfer can use TCP port 20 as well as dynamic ports depending on the specific configuration.
Secure Shell (SSH) (RFC 4250-4256)	TCP	22	SSH is the primary method used to manage network devices securely at the command level. It is typically used as a secure alternative to Telnet which does not support secure connections.
Telnet (RFC 854)	TCP	23	Telnet is the primary method used to manage network devices at the command level. Unlike SSH which provides a secure connection, Telnet does not, it simply provides a basic unsecured connection. Many lower level network devices support Telnet and not SSH as it required some additional processing. Caution should be used when connecting to a device using Telnet over a public network as the login credentials will be transmitted in the clear.

Protocols and Ports

Simple Mail Transfer Protocol (SMTP) (RFC 5321)	TCP	25	SMTP is used for two primary functions, it is used to transfer mail (email) from source to destination between mail servers and it is used by end users to send email to a mail system.
Domain Name System (DNS) (RFC 1034-1035)	TCP/UDP	53	The DNS is used widely on the public internet and on private networks to translate domain names into IP addresses, typically for network routing. DNS is hieratical with main root servers that contain databases that list the managers of high level Top Level Domains (TLD) (such as .com). These different TLD managers then contain information for the second level domains that are typically used by individual users (for example, cisco.com). A DNS server can also be set up within a private network to private naming services between the hosts of the internal network without being part of the global system.
Dynamic Host Configuration Protocol (DHCP) (RFC 2131)	UDP	67/68	DHCP is used on networks that do not use static IP address assignment (almost all of them). A DHCP server can be set up by an administrator or engineer with a poll of addresses that are available for assignment. When a client device is turned on it can request an IP address from the local DHCP server, if there is an available address in the pool it can be assigned to the device. This assignment

Protocols and Ports

Trivial File Transfer Protocol (TFTP) (RFC 1350)	UDP	69	TFTP offers a method of file transfer without the session establishment requirements that FTP uses. Because TFTP uses UDP instead of TCP it has no way of ensuring the file has been properly transferred, the end device must be able to check the file to ensure proper transfer. TFTP is typically used by devices to upgrade software and firmware; this includes Cisco and other network vendors' equipment.
Hypertext Transfer Protocol (HTTP) (RFC 2616)	TCP	80	HTTP is one of the most commonly used protocols on most networks. HTTP is the main protocol that is used by web browsers and is thus used by any client that uses files located on these servers.
Post Office Protocol (POP) version 3 (RFC 1939)	TCP	110	POP version 3 is one of the two main protocols used to retrieve mail from a server. POP was designed to be very simple by allowing a client to retrieve the complete contents of a server mailbox and then deleting the contents from the server.
Network Time Protocol (NTP) (RFC 5905)	UDP	123	One of the most overlooked protocols is NTP. NTP is used to synchronize the devices on the Internet. Even most modern operating systems support NTP as a basis for keeping an accurate clock. The use of NTP is vital on networking systems as it provides an ability to easily

Types of Website

Static

Dynamic

CMS
[Mix]

Contextual Info.

Stored Info.

A Complete
Automation

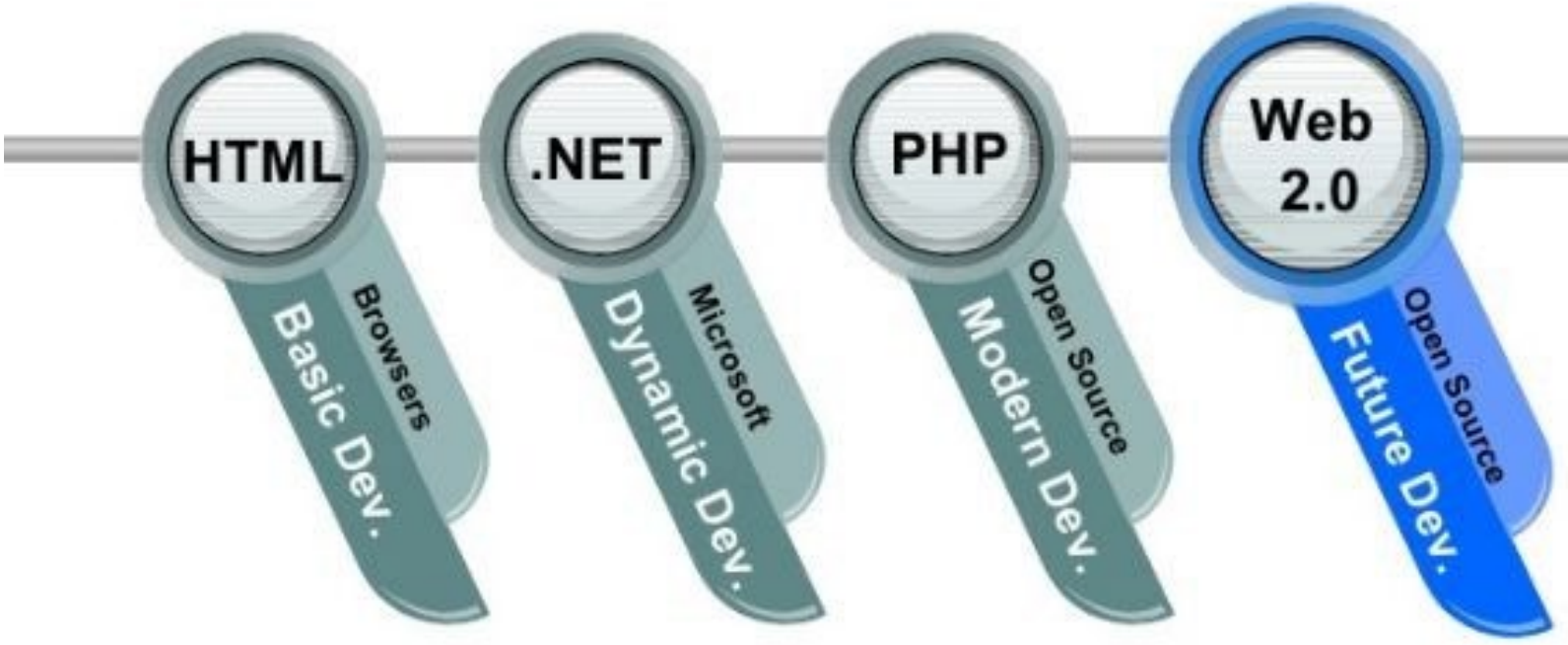
Difference between static and dynamic websites

Static websites	Dynamic websites
Static websites contain fixed number of pages.	Dynamic websites can create webpage dynamically.
Theme of website and content of webpage are fixed.	Webpage design and content may change on run time.
Static websites load quickly on client browser because it has only some markup contents.	Dynamic sites take some time to load on client browser because it processes the request server side and create contents dynamically.
Static sites never use database connectivity.	Dynamic sites deal with database and generate the contents dynamically using database queries.
Static websites is highly secure than dynamic sites because it behaves as a half duplex approach so only one way communication is possible i.e. server to client.	Dynamic sites are less secure because it behaves as full duplex approach so both side communications is possible so user can change the server data.

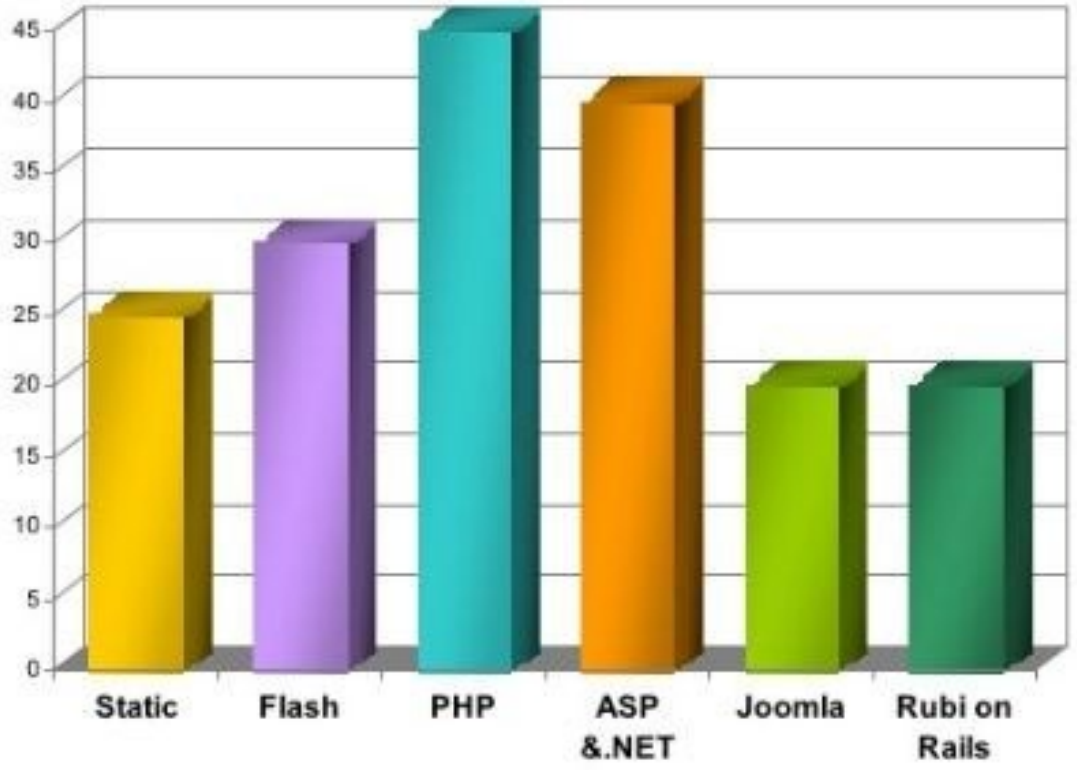
Difference between static and dynamic websites

Static site use for provide some information to the clients like an organization or institute website.	Dynamic website use where content changes frequently on run time. Like a E-commerce site, online examination, etc.
Static website directly run on browser and does not require other server application language. Static website can be created from HTML and CSS.	Dynamic website run the application on server and the output will display on webpage. So this is require server application language like PHP , Asp.NET, JSP etc.
Static sites are easy to develop and a bit experienced people can develop it.	Dynamic websites not easy to develop because require qualify developers to create it, manage it, test it and maintain security of application and database.
In static website if we want to change the page content then we have to upload that page on server many times.	Dynamic sites provide the facilities that it possible to change the page content using server application. And need not to upload the page on server.

Web Designing Technologies



Worth of a Web Designer



Web Technologies

Technologies for Web-Based Systems

- Web Standards
  - HTTP, HTML, XML, CSS, etc
- Programming Languages:
  - PHP, Javascript, Perl, Java, C#, etc
- Component Frameworks:
  - J2EE: Servlets, JSP, EJB
  - .NET: ASP.NET
- Web Frameworks:
  - PHP: Symfony, Mojavi, CakePHP, Prado, etc
  - Java: Struts, Spring, Tapestry, Turbine, Webworks, etc
- Security:
  - Firewalls, Cryptography, Authentication

Attribute of Web Application

Network intensive

- By its nature, a WebApp is network intensive. It resides on a network and must serve the needs of a diverse community of clients.
- WebApp may reside on the Internet (thereby enabling open worldwide communication).
- Alternatively, an application may be placed on an intranet (implementing communication across an organization) or
- An Extranet (internetwork communication).

Internet

1.Internet is wide network of computers and is open for all.

2. Internet itself contains a large number of intranets.

3.The number of users who use internet is Unlimited.

4. The Visitors traffic is unlimited.

5.Internet contains different source of information and is available for all.

Intranet

1.Intranet is also a network of computers designed for a specific group of users.

2. Intranet can be accessed from Internet but with restrictions.

3. The number of users is limited.

4. The traffic allowed is also limited.

5.Intranet contains only specific group information.

Attribute of Web Application

Content driven

- the primary function of a WebApp is to use hypermedia to present text, graphics, audio, and video content to the end user.

Attribute of Web Application

Continuous evolution

- conventional application software that evolves over a series of planned, chronologically spaced releases,
- Web applications evolve continuously. It is not unusual for some WebApps (specifically, their content) to be updated on an hourly schedule.
- Continual care and feeding allows a Web site to grow (in robustness and importance).

Attribute of Web Application

Immediacy

- Web-based applications have an immediacy that is not found in any other type of software.
- That is, the time to market for a complete web site can be a matter of a few days or weeks.
- Developers must use methods for planning, analysis, design, implementation, and testing
- That have been adapted to the compressed time schedules required for WebApp development.

Attribute of Web Application

Security

- Because WebApps are available via network access, it is difficult, if not impossible, to limit the population of end-users who may access the application.
- In order to protect sensitive content and provide secure modes of data transmission
- strong security measures must be implemented throughout the infrastructure
- that supports a WebApp and within the application itself.

Attribute of Web Application

Aesthetics

- An undeniable part of the appeal of a WebApp is its look and feel.
- When an application has been designed to market or sell products or ideas
- aesthetics may have as much to do with success as technical design.

Characteristics of Web Application

- The Categories of Web Application are:

Informational

- Read-only content is provided with simple navigation and links.

Download

- A user downloads information from the appropriate server.

Characteristics of Web Application cont…

Interaction

- Communication among a community of users occurs via chatroom, instant messaging.

Customizable.

- The user customizes content to specific needs.

User Input

- Forms-based input is the primary mechanism for communicating need.

Characteristics of Web Application cont…

Transaction oriented.

- The user makes a request (e.g., places an order) that is fulfilled by the WebApp.
- The application provides a service to the user (e.g., assists the user in determining a mortgage payment).

Characteristics of Web Application cont…

Portal

- The application channels the user to other Web content or services outside the domain of the portal application.
- *Database access*. The user queries a large database and extracts information.
- *Data warehousing*. The user queries a collection of large databases and extracts information.

Quality Attribute

Web application quality

Usability

Usability defines how well the application meets the requirements of the user and consumer by being intuitive, easy to localize and globalize, providing good access for disabled users, and resulting in a good overall user experience.

- Global site understandability
- On-line feedback and help features
- Interface and aesthetic features
- Special features

Quality Attribute cont.....

Functionality

- Searching and retrieving capability
- Navigation and browsing features
- Application domain-related features

Reliability

- Correct link processing
- Error recovery
- User input validation and recovery

Quality Attribute cont….

Efficiency

- Response time performance
- Page generation speed
- Graphics generation speed

Quality Attribute cont.....

Maintainability

- Ease of correction
- Adaptability

Extensibility

- is a system design principle where the implementation takes into consideration future growth.
- It is a systemic measure of the ability to extend a system and the level of effort required to implement the extension.
- Extensions can be through the addition of new functionality or through modification of existing functionality

The inventor of WWW

Sir Tim Berners-Lee