
GLIMPSES OF WEB APPLICATION FOR DIGITAL LIBRARIES: THEORETICAL APPROACH*

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Abstract

This paper considers planning and designing of web technology and major reconstruction of existing web system with phenomenal description because in the present digital environment within a remarkable short time the Internet has evolved from an academic curiosity to mass medium, where web has been heralded as the basis of economic salvation for developing nations, as a new scholarly communication system and even as an alternative to television. This paper describes the essential mechanism for web and its services, architecture and utility in digital environment.

1. Introduction

During the last decade there have been endless and dramatic technological changes in all three major areas of information technology such as computing, communication and content. Now there is an advent of personal computers, world wide packet networks, optical disk, and other mass storage media, interactive video technology, image technology, digitizing and scanning technology, computer graphic technology and the growth in both size and number of massive public and private database-in bibliographic, numeric and multimedia format. The study shows that world is going digital and there is no turning back. It is also observed that with the exponential growth, the old informal way of running the internet no longer works. In January 1992, the Internet Society was set up to promote the use of Internet, and perhaps eventually to take over managing it where traditionally the Internet had four main applications as follows:-

- (1) **Email-** Which is available on virtually every kind of computer these days, where the ability to compose, send and receive electronic mail has been around since the early days of ARPANET.
- (2) **News-** Newsgroups are specialized forums in which users with a common interest can exchange messages. Thousands of newsgroups exist on technical and non-technical topics including computers, science, recreations and politics.
- (3) **Remote login-** Here the user using Telnet, Rlogin or other programs, users anywhere on the Internet can log into any other machine on which they have an account.
- (4) **File transfer –** Using FTP helps to copy files from the machine on the Internet to another vast number of articles, databases, and other information are available this way.

But until 1990s the Internet was largely populated by academic, government and industrial researchers. By the application of the WWW (World Wide Web) changed all that and brought millions of new, non-academic users to the net. This application invented by CERN physicist Tim Berners-Lee did not change any of the underlying facilities but made them easier to use. Together with mosaic viewer, written at the National Centre for Supercomputer Application, the WWW made it possible for a site to set up a number of pages of information containing text, picture, sound and even video with embedded links to other pages. The greatest merit of the web is the simplicity that it lends to the information and communication facilities on the Internet. Web is more than just a convenient graphical user interface to the Internet. It is

a universal medium for exchanging data, information, communication and conducting business. It provides services that can be accessed from any computer connected to the Internet. Organizations and individuals can provide information and services to an international audience by setting up web sites on the Internet. A good web site must make the best use of infrastructure on the web to design such site, the library professionals must understand the web medium

2. Genesis of WWW

Tim Berners-Lee invented the World Wide Web or WWW as we know it today in 1989, deploying a working system by 1990. Berners-Lee was the first to invent the browser, and it was simply called World Wide Web since it was the only way to see the web. Tim later rechristened this browser 'Nexus' to distinguish between the program and the abstract information space 'www' which was typed in the Uniform Resource Locator (URL). World-Wide-Web was written in objective – C and it would let users browse 'http' 'news', 'ftp' and local 'file' spaces. A consortium called World Wide Web came into existence (W3C). W3C is the consortium that has taken one responsibility for evolving the various protocols and standards associated with the web.

Scope of the paper

The development of the Internet and the World Wide Web is bringing unprecedented changes to the library environment. Library, information work is generally deals with large quantities of information, regardless of whether information sources are in printed or electronic formats, space is always in key issues. Bypassing of traditional information suppliers and reference sources is a consequence of progressive migration to the web. Commercial publishers, for their part, are coming to recognize the importance of digital publishing, and are struggling to develop a business framework for online enterprise. The generic attraction of the web are low entry cost, re-purposing direct customer access, lower distribution cost, indirect sales channels, pre-segmented markets, lower-advertising costs, lower transaction costs, lower exist costs, secondary markets. In consumer perspective there is a shift from push to pull, greater choice, transparency, disintermediation, price drivers, convenience, customer feedback, impersonality.

Objectives of the Study

A comprehensive assessment of information regarding web facilities in Orissa state and others states were made as a subject of study where the following problems are identified and necessary steps are identified for web application in all types of libraries.

- Shortage of information professionals skilled in using information technology including web,
- Lack of in-serving training facilities for librarians in computing and telecommunication,
- Insufficient attention to the needs of users as well as information professional especially those of industry,
- Lack of attractiveness of the information science programme for the students,
- Infrequent revision of existing curricula,
- Shortage of qualified teachers and personnel for designing web page, and
- Paucity of financial resources for both teaching institutions and students.

So this study has highlighted the above mentioned problems and its solution on web application through web.

Requisite Infrastructure: In order to use Internet, the library professional must use the following criteria

- (i) Client and servers
- (ii) Web document
- (iii) URLs
- (iv) Websites
- (v) Web browser
- (vi) Domain Name System (DNS)

3. Client-server model

In the server-client model, communication generally takes the form of a request message from the client to the server asking for some work to be done. The server then does the work and sends back the reply. Usually, there are many clients using a small number of servers. A world wide set of interconnected servers forms the basis for web. In client server architecture, a server provides information and services to numerous clients, and a client uses the services of multiple servers. A client who requires the services of a particular server need not have a direct physical link with the server. The client can contact the server through other intermediate servers on the Internet. The WWW is a collection of numerous web servers, or servers connected through the Internet. These servers provide information and services on the Internet. Users can access these servers through computers connected to the Internet. These computers are called clients of clients.

This approach is the system which stores the database is called server. The server system acts as a data depository. The client system typically on the users desktop runs the application using data from the server. The result is a close matching of each partner's capabilities to its role in the overall system. Many librarians in digital library environment are familiar with small LAN version of client/server: using a print server to share a colour laser printer among several clients PCs or using a file server to eliminate the need for each PC to have its own copy of all application programmes. The libraries must remember that using LAN does not necessarily indicate client/server computing. The server here called file server could be used essentially as a large, shared disk drive. It sends or downloads file on request to the individual user system on the network.

In client-server approach where the client does most of the works, relying on the server only to supply it with raw data, are referred to as fat client approaches. In other direction, a client system that does little more than provide a user interface to result provided by the server is often called a thin client.

In this model the client sends message to the server requesting service of some kind. The server responds with messages containing the desired information or takes the appropriate action. The message containing the client request is encapsulated inside a network packet and transmitted over a physical connection to the server. Conceptually a logical connection also exists between the client and server through the use of respective network addresses. The model of client-server is as follows:-

Echo Server

- Client: Hello there 123
- Server: Hello there 123

Time Server

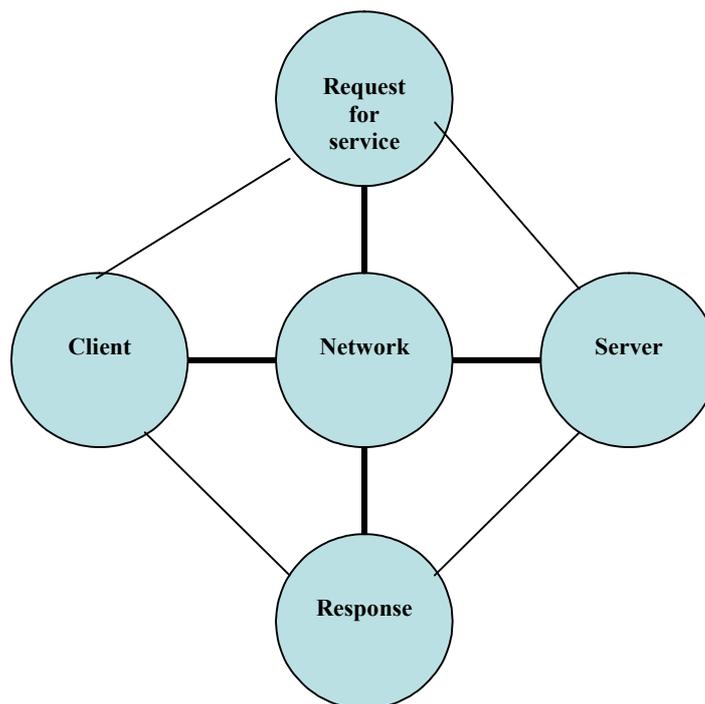
- Client: What time is it?
- Server: 12:08:00 A.M.

4. Web server

Client: Send the web page <http://www.wasoftware.com/apps>

Server: OK (lots of messages follow as page is transferred) thus the client must know the IP address or domain name of the server to initiate communication.

Merits: (i) Client/server computing allows each part of an overall application to run in a hardware/software environment optimized for that part and that part alone, whether it demands a large database, high speed computing or high resolution colour graphics. This optimization tends to minimize the overall cost of the system. (ii) Potential cost saving in hardware are possible with this approach because many small computers costs less than one large computer and terminals to support the same user community. (iii) The modular nature of the system simplifies expansion. Clients can be added to the network or upgrade independently of the server(s). The server(s) can be upgraded without affecting the clients. Because of the client/server approach is increasingly popular, many software development tools are designed to run in a client/server environment. So any digital organization can often reduce development time and cost by using these.



Demerits: There are some complexities in client-server application which the library professional must be aware of. (i) The complexities of application, development and management are much greater in a client-server system than they are on a single computer. (ii) The tools to support system administration, security, resource accounting are not fully developed as those of large scale multi user computers though this situation is improving rapidly. (iii) It emphasizes the knowledge and skill to link the both client server and user server. (iv) Security becomes major concern whenever users access critical corporate

data over a network, system developers must be alert to the possibility of unwanted access as well. Security features also increase the overall cost in several ways such as the cost of the security software, the cost of people to install it and manage its use, the cost of additional hardware resource to run it. (v) Hardware saving tend to be higher because the client environment is more varied and more complex than terminal environment of a multi-user computer.

5. Client – Server Network Model

(ii) Web document: The information on the WWW is stored in web documents residing on servers. A web document or web page is an electronic document that stores a set of related information web pages and are generally written in Hyper Text Markup Language (HTML). As a result, web pages are also referred to as HTML documents. HTML stands for hypertext markup language. HTML is the core component of the information that composes a web page. The HTML source code for a web page has an overall syntax and structure that contains formatting commands understood by a web browser.

WWW pages are classified in to three categories: static, dynamic and active. The easiest to make are static and involve only HTML code. The page content is determined by what is contained in the HTML code. Dynamic WWW pages contain a combination of HTML code and a 'call' to a server using Common Gateway Interface (CGI) application. In this scenario, information supplied by the user into an HTML form is transferred back to a host computer for processing. The host computer then returns a dynamic customized WWW page. Active pages contain combination of HTML code and applets. Therefore the WWW page is not completely specified during the HTML coding process. Instead, using a Java applet, it is specified while being displayed by the WWW browser.

Hypermedia is used to refer to media elements such as graphics and video on a web page. Hypermedia is an extension of hypertext.

Hypertext is a feature of world wide web and it lets web page designers provide shortcuts when one wants to move to another web page or another web site. More importantly it saves time. So without hypertext one has to type the full web address of every location one has to visit. A hypertext can be displayed in different colour from the rest of the text and usually it's also underlined.

To create hypertext, web designer use Hypertext Markup Language (HTML) which is a set of mark up codes that are in a text file. Each individual markup code is called a tag, and it exits within brackets (< >). Tags tell the web browser how to display a web page's words and images for the user.

Hypertext can also link a document to other resources on the web. A resource can be a web page, graphic, sound files or any other source of information connected to the web. There links are accompanied using hyperlinks.

A hyperlink consists of an anchor and a target. The anchor is the visible part of the hyperlink on a web page. The anchor is generally formed from one or more words of text or an image. Usually hyperlinks display in a colour to distinguish them from the rest of the hypertext on the page. By using a pointer on a hyperlink the pointer changes to a hand icon, signifying a link to another resource. So, the user can move to the target by clicking on the hyperlink. A webpage can contain multiple hyperlinks that link to multiple resources.

A link can also direct the user to a different location on the same web page. This link acts a book mark to jump to a specific location on the same document. For example- many lengthy web pages include a link at the bottom with an anchor, such as 'move to top'. The target of such link is a book mark to the top of the page. When a user clicks on this link, the web page scrolls to display the top portion of the page.

Hyperlinks are one of many ways the web accomplishes its key objectives, inter connection of resources. Millions of resources are spread across the WWW today, and they are increasing by the day. To locate the resource they need out of this vast reserve, hyperlinks use Uniform Resource Locators (URLs).

6. Uniform Resource Locators (URLs)

One important convention on the web is a standardized method of locating information. This standard is called Uniform Resource Locator but usually it is more commonly known as URL.

Features: URL is a string of text and it has three components

- The protocol required for the type of data on the web site, followed by a colon and two forward slashes (://).
- The registered name of the web site.
- The path to the file that contains the data.

Example: If one reader wants to read articles about performing tasks in Microsoft Windows XP professional, one has to the following URL, which is `WWW.microsoft.com/windowsup/pro/using/howto/default.asp`. WOW breaking this URL into its components we find, `http://` means the webpage one is heading for using the HTTP protocols; it contains hypertext document.

- `www.microsoft.com` is the registered name of the website, and the “www” means the site is on the world wide web and the domain type is “com”.
- `/windowsxp/pro/using/how to/default.asp` is the path to the document (the specific web page)
- Windows-based computer uses a backward slash (\) to separate the parts of a path, the backward slash started with DOS and is inherited by windows.
- The web (actually, the entire Internet) uses a forward slash (/) to separate the parts of a path, the forward slash is a Unix convention, and the Internet has its origin in Unix (In fact, the majority of Internet Servers run some form of Unix/Linux).
- The file name (the name the creator assigned to the page).
- The extension (the type of file).
- On a Site’s homepage the filename is frequently “default” or “index”. Not all web sites use filenames for the home page, and it can be seen only the name of the site in the address bar.

The file name for any page except a home page is the name of that page’s file. For example, if one user started at the windows XP home page and clicked the link to the article on enabling Internet firewall connection in windows XP, the URL for that article is: `http://www.microsoft.com/windowsxp/pro/using/howto/networking/icf.asp`. Here,

- `asp`, stands for Active Server Pages, which is commonly used on servers running Microsoft windows, but ASP technology is now available for Unix/Linux servers.
- `html` stands for Hypertext Language.
- `htm` is a short term of `.html`, and was required years ago when naming conventions had to follow the rule that a file extension could not exceed three characters.
- `shtm` means the pages is an `.html` page, but includes a script that performs an action.

Thus considering the following URL <http://www.pqr.com/states/default.htm>/<http://> refers to hypertext transfer protocol. A protocol defines the method used to retrieve the desired file.

- www.pqr.com is the internet address of the server that contains the file, [www](http://) is the service and [pqr.com](http://www.pqr.com) is the domain name.
- [states/default.html](http://www.pqr.com/states/default.html) is the path of the server.

A web site consist of a number of web pages, containing related information, each with its own URL.

(iv) Websites: A websites is a set of interconnected web pages displaying related information on a specific subject. A websites can be designed and maintained as a source of distributing information, or it may be used to conduct business. Each individual groups and organization can have websites. The home page is a starting point on the web sites. The homepage gives the user an overviews of the contents of the site. A homepage generally contains the links to the rest of the pages on the site. Website forums are opened when we have an interest or want to learn more about a particular subject, try a web site forum. Forums like newsgroups, except they're sponsored by, and accessible from a web site. Some web sites use "discussions" or "message boards" instead of "forums".

Many forums requires to login before we post a message, although we can read message without creating a login name and password. The forums policy about login is displayed when we enter the forum web page.

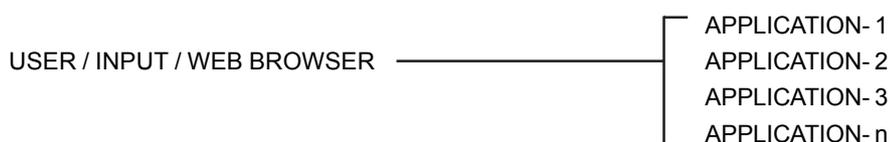
Following are a number of service, reference and technology based-sites that may be of interest.

- www.prenhall.com – Engineering and technology textbooks
- www.yahoo.com – Search engine
- www.internic.net – Internet authority
- www.intel.com –Intel Corporation
- www.microsoft.com – Microsoft Corporation
- www.netscape.com – Netscape Corporation

(v) Web browsers: The web browser is used to navigate the Internet by selecting links on any www pages or by specifying a uniform resource locator or URL to point to a specific page of information. There are many different www browsers. The two most popular are Microsoft Internet Explorer and Netscape Navigator. Both of these browsers are available free over the Internet and contain familiar pull-down menus and graphical tool bars to access the most commonly used functions such as forward, backward, stop, print and reload. Practically, individuals who design web page must take into account the different requirements of each browser so that the page looks acceptable in respective browsers.

From the user's point of view, the web consists of a vast, world wide collection of documents usually just called pages for short. Each page may contain links (pointer) to other related pages anywhere in the world. Users can follow a link (e.g. by clicking on it) which then takes them to the page pointed to. This process can be repeated indefinitely, possibly traversing hundreds of linked pages. While doing so pages that point to other pages are said to use hypertext, and when pages are viewed with a program is called browser, of which Mosaic and Netscape are two popular ones. The browser helps to fetch the page requested, interpret the text and formatting command that it contains and displays the page, properly formatted on the screen.

A web browser is the user interface of the web. It is an application that enables a user to locate and view resources on the web. A web browser takes URLs as input from the user and displays the resource pointed by the URL. The user can also click on a hyperlink to instruct the browser to retrieve a resource.



Interaction between a client and web application of Microsoft Internet explorer and Netscape navigator are browsers used to view text as well as graphic that appear in web pages. Another browser, lynx can only display textual information

(vi) Domain name system: The domain name system (DNS) categorizes the millions of applications on the web according to their field of activity. The field of activity of a web application is referred to as its domain. This naming system assigns a suffix to name of an application to represent the domain of the application. The name and suffix of a web application are separated by a dot (.).

The most common names on the web are of the form, PQR.com in which PQR is the name of the application and the suffix.com indicates that the application belong to the commercial domain.

Domain	Suffix
Education institution	.edu
Commercial Organization	.com
Government Organization	.gov
Professional society/non profit-organization	.org
Military establishment	.mil
International Organization	.int
Network Organization	.net

There are a wide varieties of web sites exist, each set up for a specific purpose by an individual or organizations. Most common categories are-

- (a) E-commerce websites
- (b) Corporate websites
- (c) Portals
- (d) Personal homepage

(a) E-commerce websites: An e-commerce site can be a commercial organization, educational institution, government organization or even an individual providing a product or service on the web. An important characteristic of e-commerce web sites is interactivity. Depending on the parties involved in the interaction, e-commerce can be classified into four models. These are:

- Business to business model
- Business to consumer model
- Consumer to consumer model
- Consumer to business model

Business to Business model : Business to business model includes trading goods such as business subscriptions, professional services, manufacturing and wholesale dealings.

Hypothetical model : In a hypothetical, example: ABC Company sells parts of automobiles and PQR company assembles these parts and then sells the automobile to customers. When PQR company come across the website of ABC at that time decides to purchase automobile parts from ABC. To do this PQR place an order on the ABC's website. As soon as the order is confirmed, the payment procedure settled. Finally, ABC sends an acknowledgement of payment to PQR and delivers goods as per the shipment details decided between two organizations. Thus this model

- can efficiently maintain the movement of the supply chain and the manufacturing and procuring processes.
- can automate corporate process to deliver the right products and services quickly and cost effectively

Business to consumer model: This model involves transactions between business organization and consumer. In the field of librarianship it is applied between publisher and the librarian. The publisher is treated as business organization who sells product and provides service to the librarian as consumer through Internet. This model also includes services such as online banking, travel services and health information.

Hypothetical model : Considering a hypothetical model in which transaction is conducted between a publisher and librarian (consumer), suppose publisher X displays all its books already published and range of products on their web site. The detailed information of all their products is displayed. A librarian reads detailed information about the book, availability and discounts when the librarian decides to buy the book he places an order for the books on the website. To place an order librarian needs to specify the library's budget information and account number on web. This information is again validated by X publisher and stored in their database. On verification of the information, the order is processed.

In this model, e-commerce is more prone to the security threats because individual consumers provide their credit card and personal or organizational information on the site of business organization. In certain cases, consumers may harbour doubts about the security of their information and these doubts may deter them from using business to consumer model. Therefore business organization must provide robust security mechanism that can guarantee consumer security.

Consumer to consumer model: In this model, both the seller and the buyer must register with auction site, while seller need to pay a fixed fee to the online auction house to sell their products, the buyer can bid without paying any fee. The site brings the buyer and seller together to conduct deals.

Hypothetical model : On e-bay when a customer plans to sell his products to other customers on the web site of e-bay, he first needs to interact with e-bay, which in this case acts as a facilitator of the overall transaction. Then, the seller can host his product on www e bay.com purchases the product from the seller and then sells it to the buyer. In the way though the transaction is between two customers, an organization acts as an interface between the two organizations. E bay is not successful commercial sites on the web.

Consumer to business model: Here the transaction is conducted between a consumer and a business organization. In this case a consumer is the seller and the business organization is the buyer. Here the consumer decides the price of a particular product rather than the supplier. For example www.monster.com is a website on which a consumer can post his resume for the services he can offer.

Hypothetical model :Suppose Raj needs to buy an airline ticket for his journey from New York to New Jersey, where Raj needs to travel immediately. Therefore he searches a website for a ticket. On the web sites Raj quotes the highest price of any other bidder and gets the ticket.

e-governance: Some transactions involve government as one entity which are of five categories.

- **Government to Government** – This model involves transaction between two governments. For example- if the US government wants to buy agricultural products from Switzerland then the transactions involved are categories in this model,
- **Government to Consumer** – In this model the Government interacts with individual consumer. Here the Government can enforce laws pertaining to tax payment on individual consumers over the internet by using this model.
- **Consumer to Government** – In this model, an individual consumer interacts with Government where consumer can pay his income tax or house tax online.
- **Government to business** – It involves transaction between a government and business organization. For example for any huge construction like roads, bridge, flyover governments can requests for tenders from various contractors.
- **Business to Government** – Where the business house transact with Government over the Internet.

(b) Corporate Site: A corporate web site is a site that serves as the corporation's strategic interface on the web. A corporation sets up a corporate web site for the purpose of promoting its products and services. The presence of a corporation on the web also increases its reach. It has the following features:

- Corporate news
- Market information for investors and share holders
- Data for employers
- Information on products and services offered

(c) Portals: A Portal is a website that is designed to be a gateway to the rest of the web, instead of a site that represents a company or a particular interest group. MSN, Yahoo and AOL are all examples of portals. Their home pages are filled with links and utilities aimed at helping you get to a specific place on the web quickly. Most web portals have both search engines and a visible directory structure. One can use to speed up the search process. In addition, some search engines offer a method for using their directories to target one's search. So a portal is a web site that gathers bits and pieces of information from different sources and makes it available to users of the web. The objective of setting up a portal is to enable web users to search for any type of information from a single location, which is the home page of the portal.

In order to become the entry point to the web for users, portals usually try to provide a variety of common features and services to web users. Portals usually contain some or all of the following feature.

- A search engine that enables users to search the web for information
- An extensive list of sub-sites and links to other sources of information on the web
- News and weather information
- E-mail service
- Advertising that may be of interest to users

A popular portal on the web is www.man.com

(d) Personal Homepage: A personal web site, is reformed to as home page set up by an individual for the purpose sharing information with other web users. This information may relate to the individual or any other subject that the individual feels would be of interest to web users. The person setting up the web site may or may not be associated with larger organization.

7. Web Service in digital Library Environment

Web service uses Internet protocols and standards, such as XML and HTTP. Internet standards enable us to create a platform-independent infrastructure which can be used for the effective integration of application. Web services use the XML messaging technology to access or implement code written to provide the required functionality. So the web service provider application and the web service client application can be integrated to provide a complete business solution even if they are running on different platforms. Web services also referred as XML web services because they use XML for data exchange.

8. Architecture of web services

A web service is made up four layers- the data layer, the data access layer, the business layer and the listener layer. These layers work together to allow a web service client to interact with web service.

Layer	Description
Data layer	The data layer contains data that can be accessed by a web service. It includes a database or another data source that can be accessed by the web service to manage information.
Data access layer	The data access layer is an intermediate layer between the data layer and business layer. It is responsible for interacting with the data layer to retrieve data and make it available for the web service. The data access layer also updates the data source after a business transaction. Finally it maintains the integrity of data by validating changes that are made to the data with the business logic of the application.
Business layer	The business layers implement the business logic of the application and provide accessibility to the web service. To do this, the business layer is internally divided into two layers – the business logic layer and the business façade layer. The business façade layer is an interface that provides access to the services provided by the business logic layer.
Listener layer	The listener layer is the upper most layer in the web service architecture; it is also the closer to the client application. The listener layer listens for request that are made by web service clients and converts the requests to forms that can be delivered by the web service. The business façade layer processes the request and sends the result back to the listener layer. The listener layer then forwards the result to the web service client in the form of an XML message.

9. Web service technologies

Web service support Internet standards and technologies such as HTTP, and XML are as follows:

HTTP (Hyper Text Transmission Protocol): A common set of rules or protocols are necessary to facilitate the transfer of data over the network. In addition, HTTP provides a framework for displaying data on web page in a web browser. Data that is transferred using HTTP includes requests, responses, HTML pages or files and web application data.

XML: XML is a meta-markup language that is used to describe data in a structured format. A meta-markup language uses easy to understand description for data, which makes it possible for users to determine what data is stored in the XML document. XML is defined by W3C (World Wide Web Consortium) as a means to store, transport and display data. It is widely used to display data over the internet because it provides a standard format to present data across applications.

XML data is stored in XML documents that contain XML tags. In addition to the XML tags we can create customized tags to display data which contains elements, which in turn are associated with attributes. To understand the tags used in XML, we create an XML documents.

Step in creating an XML document:

Step – I – An XML document is composed of elements and attributes. Creating an XML document is a sample as writing data in a notepad file and saving the file with an extension of XML.

Step – II – After we create an XML document we can open it in Internet Explorer. Internet Explorer represents an XML document hierarchically, by grouping each element and its attributes.

Example

```
<New Data Set>
<URL> www.aspnet</URL>
<URL> www.asplliance.com</URL>
<URL> www.123aspx.com</URL>
<URL> www.aspfree.com</URL>
</New Data Set>
```

This data entry will declare like the urlist.xml file declares a tag named New Data Set containing an element called URL. The URL element stores five web addresses: namely www.asp.net, www.asplliance.com, www.123aspx.com, www.aspfree.com, and www.as[pbject.com

Importance of XML in web services: XML is a platform-independent format for porting data. Data in XML format can be accessed by any XML-enabled application. Because the data is easily accessible, web applications are able to communicate effectively with web services. Web service must be available to devices and web browsers running on any operating system. XML makes this possible by presenting the text from a web service in plain text that is easily understood by an devices. That is SOAP, WSDL and UDDI.

SOAP (Simple Object Access Protocol): When a request for a web service is made, the request is packaged as a SOAP package. It is protocol based on XML that is used to transfer data from a web service client application to a web service provider application and vice versa. The support for XML and HTTP makes SOAP a platform-independent transfer protocol. SOAP also supports transport protocols such as FTP (File Transfer Protocol) and SMTP (Simple Mail Transfer Protocol).

Steps: When a web service client communicates with a web service, it sends a request to the web service as a SOAP message, which includes the call to the web service. The result of the web service is sent as a SOAP message, which includes the call to the web service. The result of the web service is sent as a SOAP package in the form of an XML document. The following list presents the components of a SOAP package.

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- A SOAP package contains an envelop that encapsulates the data that is communicated from a web service client to a web service and vice versa.
 - When data is transferred over a network, a transport protocol is used. This protocol defines a set of rules to encode and decode data that is transferred over the network. It helps to maintain the integrity of data and allows smooth transfer of data over the network. This component is also mandatory.
 - SOAP package includes two optional components – a message pattern and the binding between SOAP and HTTP. Though SOAP is a protocol, it does not define any syntax for transfer of data. Rather it defines the mechanism of data transfer across multiple applications. SOAP does not require any hardware or software investment and can be accessed by any device which is basic Internet standards.

WSDL (Web Service Description Language): WSDL is similar to XML markup language which defines the data in a web service. It is used to generate a discover documents for a web service. A discovery documents is an XML file which contains information about the web service where the parameters are defined in a statement. A discovery document also specifies the mechanism used by the web service client application to communicate with the web service. This discovery documents has a .wsdl file extension and can be accessed using web service discovery tool.

UDDI (Universal Description Discovery and Integration): In order to make aware of web service, client's needs to register with a directory called UDDI directory. A UDDI directory is like yellow page that contains a list of all the web services created by a user across the network. To register the web service with UDDI directory, we can use UDDI as a mechanism to discover web service. A UDDI directory contains a pointer to the entire web services registered with the UDDI directory. In an XML file pointed by the directory, so in order to use web service the user has to create a search criterion for required web service in the UDDI directory, and the directory will return a list of matching web services. The user can then use the required web service.

Utility of web services: It has been estimated that the use of web is growing at a faster rate. Of course there are many outstanding technical issues, relating in particular to bandwidth and responsiveness, which affect perception of credibility and reliability. Within the web, information marketing can be business-to-business, business-to-consumer, or consumer-to-consumer. This plurality is a defining feature, and offers a mix of benefits for both producers and consumers. From the view of *Cronin and McKim*, (1996) web has merits of (i.) lower entry cost: virtual information markets are easy to penetrate (ii.) repurposing: a digitized product base can be configured in a variety of way to create secondary product lines. (iii) Direct customer service: web creates direct connection between producers and consumers without resource to distribution or sales network. (iv) Lower distribution cost: the separation of contents from storage medium eliminates several steps in traditional industry value chains. (v) Indirect sales channels: retailers can exploit the web to generates the referrals to conventional wholesale or retail outlets. (vi) Pre-segmented markets: web encourages self segmentation market. (vii) Lower advertising cost: web helps to advertise in a lower cost. (viii) Lower transaction costs: web provides certain categories of goods which cost are lower insignificantly. (ix) Lower exit cost: the consumer of low entry cost are low exit cost.

From the consumer perspective the virtual market changes traditional relationship between suppliers and buyers in a number of ways. That is (i) shift from push to pull: the web gives consumer voice and option of drilling down from product information, (ii) greater choice: web encourages translating of greater consumer choice, (iii) transparency: the web creates transparency by facilitating consumer to consumer information exchange. (iv) Disintermediation: the web has been described as the transaction of friction less capitalism. (v) Convenience: electronic shopping adds a new dimension to the concept of customer convenience, (vi) customers feedback: vendors will become highly sensitive to the voice of consumer (vii) impersonality: web allows to enjoy the sense of anonymity afforded by electronic shopping or trading.

Thus web models provides commercial transaction over the Internet which fall into three classes namely, those who seeks to merely to provide secure transportation of transaction of information for purchaser to merchant; those that attempts to facilitate the actual funds authorization and transaction settlement process; those that aim to reproduce the essential features of model in digital form.

9. Conclusion

The web function as a global common; a shared space which creates new forms of social interaction. In the 1980s there was a widespread development and use of LAN's, PC's and workstation. This allowed the Internet to flourish. By 1985, the Internet was refined and well – established as a technology and although it was still limited, mostly to researchers and developers, regular computer users started using it for daily activities. Experimentally, the world wide web often scholars something new: a tool that eliminates distance, erodes arbitrary boundaries between domains and facilitates associative learning. Although the web can be used as a document locator, its real strength may lie in the fact it supports query-free browsing and promote serendipity. The ability to forage for new ideas and insights in a hyper navigable and unbounded space is a singular aspect of the web. Today our world has entered to another new sphere that is network information sphere. The development of network concepts at various spheres such as local, national, regional, global had profound influence on seeking, accessing, and using information. Use of net through web technology has helped to access and exchange information, but without understanding of problems, issues and concern of web technology, one would not be able to fulfill owns information needs. To promote, network and information literacy adequate network opportunities should be provided to generate, apply web mechanism in digital library environment.

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