UNIT 2 INTRANET AUTHORING AND MANAGEMENT TOOLS

Structure **Page Nos.**

2.0 INTRODUCTION

The success behind the Intranet or Internet is the authoring and management tools. They provide opportunities for higher productivity and give tremendous manageability. It is needless to mention that good powerful tools improve the management of tasks as well as make the processes fast and organised.

An activity as simple as Web page designing could be many times more complex and tedious than preparing similar output using a general word processor. Many software developers have extended the features of general application software used in day-to-day activities by adding up a number of features. Many have properly analysed the requirements of the developers and tried to give a proper organised shape to them.

With the advancement of object oriented technologies and software engineering concepts, software developers are seeing all application software as tools for achieving higher goals. Earlier this was not the concept and every piece of software developed was considered a masterpiece in itself. But as time passed, it was found that with the adoption of advanced concepts such as OO techniques and OO based software engineering, it had become possible to visualise and realise essential features required in different software (thereby making them complete).

There were days when designing and management of just 10 Web pages for a corporate was viewed as a major project and a task such as changing the reference to a Web page in all Web pages could consume almost half a day. Whereas these days the life of designers and developers has become very easy due to the sophisticated and elegant tools. More than 20000 pages can be handled with a few mouse clicks and tasks such as changing Web page reference can be as easy as a kid's play.

The impact of the tools has been so strong on the computing line that a number of new employment opportunities have evolved in no time. There has been a great demand for graphic designers, animators, publishers, creative artists, information or content specialists, and many more. Needless to mention, due to this impact, an era of "dotcom" companies came for about a decade before the dotcom culture burst. The use is still functioning due to certain major players in the industry such as companies running search engines, newspapers, massive portals, etc.

2.1 OBJECTIVES

This Unit contains information on various authoring as well as management tools available in the market for Intranet. These are the tools that help in improving the look and feel of the information to be hosted on the Intranet and can be used for the Internet also. Tools with lots of features are available which can improve the productivity of professionals.

After going through this Unit, you will be able to:

- know about different web page editors;
- understand the functioning of web editors;
- understand the meaning and the functioning of general service tool;
- understand the internet management;
- understand the web servers, and
- understand the Database connectivity issues.

The details of each tool have been given wherever possible. However, it is expected that as an exercise, the students should endeavour to identify various features that should be provided by the developer in the given categories of tools. This is very important in view of standardisation of the tools as well as study of tools in academic interest.

2.2 INTRANET AUTHORING TOOLS

With the active involvement of major developers such as Microsoft, Netscape, Macromedia, Adobe, Trellix, Sun, etc., there are a number of tools ranging from small applications such as image animation up to powerful email response handling applications available to everyone. Most of them are even free on the Web and those available commercially can be obtained at reasonable low cost.

2.2.1 Editors

Just about 5 years ago, the Web page developers used a standard text editor or basic word processor, such as Notepad, to create HTML file. This involved very laborious activities such as coding everything by hand and then saving the HTML pages as text files. Then finally there was the job of testing the output offline using browsers like the Netscape or Internet Explorer. Not many tools were available for carrying out petty activities like animation, placement or presentation of material, elegant user interface, etc.

It is essential to know almost all the HTML tags and take care of every tag and parameter of the HTML syntax. This need has led to the development of appropriate tools to take care of relevant activities. These tools are being updated very quickly to suit to the requirements of various newly added features, integration with other tools as well as to allow cross-platform functionality.

Today, there is no need to remember all the HTML tags and their parameters. Interestingly, there are a number of versions and variations of HTML available. This makes it much more complicated to remember the features and variations.

All that is needed is to obtain the tool, install it, practice a little and then straightaway start working on it. Many better and convenient ways are now available with the availability of the following software tools for Web authoring:

- Adobe PageMill
- Microsoft FrontPage
- Netscape Web Tools

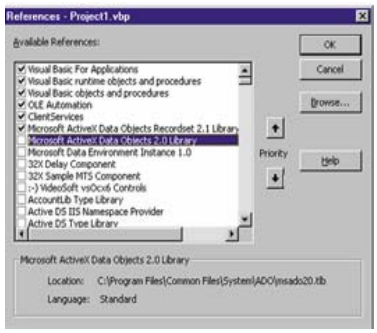
- Macromedia Dreamweaver Ultradev
- Trellix Authoring Tool
- Chili! ASP (Active Server Pages from Sun for UNIX)
- Claris Homepage
- GlobalX CORE System
- Revise
- SmartTable (converts spreadsheets into Java applets)
- Web Wizards (create and edit MS Office documents through a Web browser).

While the above tools are very popular, this is not the end. Though a number of other editors are also available, it is important to note about these tools that they offer greater flexibility and manageability and are highly creative.

All efforts have been made to bring out most of the features that are both essential as well as desirable for all editor tools to offer.

Features editor tools should provide for –

1. **Autocoding:** The tool should provide for automatic coding in the background when the developer assembles the objects on the Web page, thereby relieving the developer of remembering the HTML code. When the editor itself inserts the basic framework of actual code on which the developer can add the required features, it becomes quite obvious that the time and efforts of developers get reduced by many times. Moreover, the chances of committing errors also get reduced substantially.
2. **Modifying the code:** The developer should be free to change or modify a portion of the code or change certain setting through HTML coding, but the corresponding output has to be properly affected by the editor.
3. **Object library:** There are many editors that are more than just editors as they perform the tasks of debugger as well as code generator by use of concepts like the object libraries. Such software tools are considered intelligent and are highly reliable. They also guide the developer on-line during any syntax mistakes.
4. **WYSIWYG kind of output:** The software tool should generate output exactly as designed and laid out by the developers. If the developer designs the page in a particular format, it is essential for the editor to provide coding in a manner to generate the same output.
5. **Compatibility with other server architectures:** The editor should support a powerful Web server such as Apache, iPlanet or Zeus Web servers.
6. **Compatibility with other platforms:** The editors should produce output acceptable to all platforms such as Unix, Solaris, Windows, Linux, HP-UX, AIX, Sun Cobalt, etc.
7. **Less memory usage:** The tools should not consume all the memory space and swap area. Enormous amount of memory for storing images, texts, links and other parameters are needed.
8. **Preview of the output:** This feature proves to be of great use to the developers since the need to switch over to other browsers to the effect of every small change would consume memory space, time and efforts. Almost all editors are providing this feature.
9. **ActiveX Data Object Support:** New properties and methods to provide a tighter integration with the editor tools should be provided. Popular Web authoring tools (e.g., Macromedia's Dreamweaver UltraDev, Adobe GoLive!) give this support.



ActiveX Data Object Support

10. **Java support:** The editor tool should provide for support for use of Java technologies such as JavaScript, Java Beans, Applets, etc.

11. **Acceptability of variants:** Though this aspect purely depends on the changing market trends, it is desirable that the editor should be able to accept coding specific to variants of the HTML such as DHTML, XML, SGML, VRML, WML, etc. and be capable of generating output in these formats whenever felt necessary.

Site Map

12. **Site map:** A proper view or estimate of how the Web site is organised and how massive it is makes the Web site more attractive. Editors should provide a broad view of the Web in the form of an GIF or JPG image whereas some even provide this as a Web page.

13. **Simple and elegant user interface:** The use of various objects such as colours, background, textures, buttons, banners, etc. makes the Web pages look more beautiful. The editors should support such things and the product would be readily accepted if it contains features related to the handling of graphical representations nearer to photo-realistic nature.

14. **Compatibility to popular word processing, spreadsheet and presentation software:** It has become common now-a-days that most features of a Web page editor are integrated directly into the word processors since the features of both are not much different. In addition to this, it should also be possible to publish the work done using spreadsheet or presentation software on to the Web site as well as use the existing pages to load and accordingly process using these software.

15. **Clipart support:** Most editors come with a huge gallery of clipart and some even provide a collection of sounds, music and multimedia clips. Though, this is optional, it is desirable to provide one such library to enable the developers to use ready available objects.

16. **Audio support:** The editors should provide for playback of audio files of various formats.

17. **Multimedia capabilities:** The editors should also give the option of playing multimedia files so that the Web site gives a much better look and feel.

18. **Extension of support to various file formats:** As it is known that there are hundreds of file formats available, the editors must give the support of a majority of the file formats. There are different sets of formats for images, audio, video, multimedia, text, support files, fonts, compressed files and many more.

19. **Powerful search and replace facility:** The editors should be smart enough to locate a particular word or phrase in the entire Web site on the click of the mouse button.

20. **Managing different peripheral devices:** Devices such as Web camera, scanner, light pen, etc., can be handled directly through the editor for better flexibility.

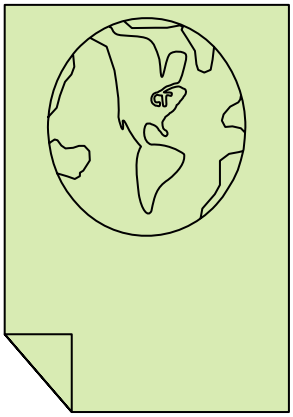
2.2.2 Supporting applications for services like FTP, Telnet, etc.

There are a number of tasks identified for hosting applications on the Web. After the designing tasks are over, the next important activity would be to host on the server, and to carry out this task it is essential that the developer is aware of the developments in this line. There is a huge range of software available for communication and file transfers between the developers' computers and the Web servers.

This issue could be as simple as clicking the mouse to transfer thousands of files and it could be as difficult as using a set of programs to execute and test the developed

software. It may also be possible that the developer may have to use Character User Interface (CUI) many times.

The developer must also know what are all the possible activities that can be performed and what objective would be achieved by use of a particular service. In addition, it must also be known what additional features would be covered under that particular service and what software are available to carry out this task easily.



Take for instance, a service like file transfer. It is possible to carry this out using software designed for Unix, DOS, Windows and other platforms. They are offered to work through different user interfaces such as CUI, GUI, etc. Those offered through the GUI technology are much popular and provide the easiest way to transfer files across the Intranet and the Internet connecting to an FTP site in seconds, even if the user is a beginner. Whether publishing a Web page, downloading the images, software and music or transferring high-capacity files between branch offices, such software provides the flexibility users need to make the tasks more enjoyable and productive.

It may be noted that there are a variety of tasks such as FTP, Telnet, Gopher, etc. that the users want to use without knowing much about the software tool they would be using and the underlying technologies. Users as well as the developers would like to look out for better user interface while hiding the supporting details and technologies.

The actual details of the protocol services would be dealt with in the next Unit, but for now it is sufficient to remember that telnet clients are part of the larger category of terminal based applications such as FTP, Gopher, etc., and are programs designed to allow one computer to emulate another type of computer. It gives a feel as if the user is actually working as a part of a big network group situated geographically distant from his place and that too may be on a separate platform. Some of the popular software for telnet are as follows:

- NetTerm - One of the best telnet clients available-features remote host file editing
- HyperTerminal - A must-have free upgrade for the standard Windows HyperTerminal client
- CRT - Combined Rlogin and Telnet-one of the best terminal apps on the ‘net
- SecureCRT - CRT with SSH2 (Secure Shell) support and RSA authentication
- CommNet - One of the better telnet clients available-features Zmodem support
- QVT/Term - The standalone terminal client found in the QVT/Net Internet suite
- Anzio Lite - A solid terminal emulator with extensive connectivity options
- EWAN - A good Emulator Without A good Name
- Kermit - Kermit and a whole lot more for Windows 95/98/NT/2000 users.

The features considered essential and relate to most of the services that the supporting software tools should provide are given as follows:

Features common to all

1. **Simple Drag ‘n’ Drop based Instructions:** The tools developed in recent times offer this feature and it is here to stay. One should look for this service if easy transfer of files, less command based interface, etc. are desired.
2. **Extensive host type support:** The software should offer full support for various host types that the user can choose from, which may include VMS, MVS, NT, OS2, AS400, Novell, Chameleon, and VM/ESA.

3. **Quick connect URL:** Some software have icons and simple text entry boxes for easy connectivity so that FTP URLs, usernames and passwords, etc., can be entered and directly connected into the server just like a browser.

4. **Macro record/playback scripting:** Automation has never been so easy with software offering recording of macro scripts. Clicking the record button, performing the tasks required and then storing the performed actions as a "macro" can record a group of activities or commands. These macros can be used time and again so that the entire group of actions need not be repeated again and again.

5. **Dial-up networking support:** The ISP should be automatically dialed as soon as attempt is made to connect to a remote site and still further the ISP should also be automatically reconnected if the connection with ISP is lost due to certain reasons.

6. **Right-click shell integration:** Should allow performing a range of activities by just right-clicking anywhere and selecting from the choices given. The intention is that the users have to know little about the complexities of the program and it gives the minimum input to the process. If required, it should also lead to the shell execution of the platform.

7. **Record sessions log:** The details of the logging should preferably be recorded at some place to a file so that the details can be updated daily, weekly or monthly.

8. **Force upper/lower/preserve file case:** Most software can be forced to transact with files in lower, upper or preserved case.

9. **Auto-renaming of file extensions:** Though most of the platforms do not support this, it is desirable that the users should be relieved of the job of knowing the file extensions and types. Renaming of a file extension should be done automatically during upload or download or any other process.

10. **Change file attributes (such as chmod) :** Bringing up a GUI for easy manipulation of file attributes would be highly useful for every user.

11. **Wildcard macro support:** Transacting activities through macro scripts that are masked with wildcards.

12. **URL parsing/pasting:** The laborious task of parsing URLs should be automatic whereas pasting/copying URLs from the clipboard to the software for automatic connection to a site could be a boon to the users.

13. **Support for relevant international standard:** It is essential that the software should function based on the established international standard in order to provide proper compatibility to all other platforms, formats and architectures.

14. **Book-marking of remote directories and sites:** Ability to store the addresses of sites and location of directories of remote sites should be essential so that the user does not have to remember hundreds of sites for information. Once selected, the software should automatically lead the user to a specified directory when connected through FTP or telnet or otherwise.

Exclusive for FTP service

15. **Simple Drag 'n' Drop file transfers:** The tools developed in recent times offer this feature and it will be here to stay. One should look for this service if easy transfer of files is desired. Note that it is an essential feature for all the FTP software.

16. **Transfer queue and file transfer scheduling:** Selection of multiple files from various folders or directories as well as sites, and queuing them for transferring

later should be possible. Queued transactions should be open being edited, saved, and scheduled for later recurring file transfers.

17. **Caching of directories on remote servers:** During an FTP session, one of the most time consuming tasks is updating the directory display after almost every process. This could be simplified by means of proper caching or storing and processing at the user's end.

18. **Resume upload and download:** If the files could not be downloaded due to any reason, the software should be smart enough to resume downloading or uploading immediately once the connectivity has been established. This could save tremendous effort and precious time.

19. **File finder feature:** When it is required to search a massive site for simple information, the software should be capable of searching the site for files using multiple search engines or similar strategy.

20. **Site to site transfers:** Sometimes it becomes essential to transfer files from remote server to another remote server very quickly. During such a situation, the software should be intelligent enough to keep minimal processing at its end and ensure success.

21. **Directory Comparison:** Local and remote directory contents can be compared based on case, name, date, or size. Files that are different from each other can be highlighted and selected for directory wide changes.

22. **Directory upload and download:** Some software allows the user to upload and download entire directory tree structures to and from the remote server.

Exclusive for security

23. **Site security:** The software should allow the developer or user to protect the entire site using a combination of username and password pairs or any other security method. Whenever required, it should be able to generate reports about the type of user logged into and other details such as the user's address, platform used, date and time of logging, files or information requested, etc.

24. **Extensive firewall support:** It is the responsibility of the software to handle proper firewall security to keep the site secure. It is desirable that the depth of firewall implementation should be considerable. The software should be easily configurable and manageable.

Exclusive for Telnet

25. **File filters:** The file filters allows the users to specify the type of files in the local window. In short, the software should ensure that the commands are easily provided through single interface that provides excellent manageability.

For example, if the user specifies that only .doc files are needed to be displayed, then other unwanted types are suppressed allowing easy operation on those files.

2.2.3 Graphical tools for creating graphics and animation

There are a variety of tools available on the Web such as Adobe Photoshop, Corel Draw, GIF Animator, etc., to name a few for performing various tasks related to Web authoring. The tools could be used for a large range of tasks such as –

- Animating, enhancing the images
- Modifying images, text, contents
- Converting file formats
- Touching and finishing images
- Dealing with audio/sound
- Dealing with multimedia effects
- Graphically representing text

- Mapping images and text
- Compression and decompression
- Designing better user interface
- Preparing allied objects for use in the presentation
- Enhancing the content presentation.

While some tools offer a combination of these activities, most tools offer them separately. These tools in integrated form can prove to be wonderful and the applications could be as prestigious as graphic rendering for movies such as Star Wars, Jurassic Park, Matrix, etc.

Cyberspace is as powerful as the print medium. Just as presentation is key mantra in the print medium, so also is it in the cyber media. Most of these tools help in enhancing the ultimate design and finally the look and feel of the Web pages. With the advent of GUI based tools, the productivity as well as the beauty of presentation have grown manifold, but even then it may take some more time to bring in a proper synchronisation in the cyber media and the print medium.

Technology and its tools start functioning initially from education. With due acknowledgement to the Institute offering a course on use of graphic tools and technology, the following methodology of learning has been given (note the extent of tasks that can be accomplished using these tools).

Through the study of technology applications foundations, including technology-related terms, concepts, and data input strategies, students learn to make informed decisions about technologies and their applications. The efficient acquisition of information includes the identification of task requirements; the plan for using search strategies; and the use of technology to access, analyse, and evaluate the acquired information. By using technology as a tool that supports the work of individuals and groups in solving problems, students will select the technology appropriate for the task, synthesise knowledge, create a solution, and evaluate the results. Students communicate information in different formats and to diverse audiences. A variety of technologies will be used.

The student demonstrates knowledge and appropriate use of hardware components, software programs, and their connections. The student is expected to:

a) demonstrate knowledge and appropriate use of operating systems, software applications, and communication and networking components;

b) compare, contrast, and appropriately use the various input, processing, output, and primary/secondary storage devices;

c) make decisions regarding the selection, acquisition, and use of software taking under consideration its quality, appropriateness, effectiveness, and efficiency;

d) delineate and make necessary adjustments regarding compatibility issues including, but not limited to, digital file formats and cross platform connectivity;

e) use the vocabulary as it relates to digital graphics and animation software;

f) distinguish between and correctly use process colour (RGB and CYMK), spot colour, and black/white;

g) identify colour mixing theories and apply these theories to the creation of new colours in the digital format;

h) compare, contrast, and integrate the basic sound editing principles including the addition of effects and manipulation of wave forms;

i) distinguish between and use the components of animation software programs including cast, score, stage, and the animation control panel;

j) select and connect task-appropriate peripherals such as a printer, CD-ROM, digital camera, scanner, or graphics tablet; and

k) distinguish and use the different animation techniques of path and cell animation.

The student evaluates the acquired electronic information and is expected to evaluate the fundamental concepts of a graphic design including composition and lighting;

The student uses appropriate computer-based productivity tools to create and modify solutions to problems. The student is expected to:

- combine graphics, images, and sound for foundation or enrichment projects;
- integrate the productivity tools including, but not limited to, word processor, database, spreadsheet, telecommunications, draw, paint, and utility programs into the digital graphics;
- use perspective including backgrounds, light, shades/shadows, and scale to capture a focal point and create depth;
- use the basic principles of proportion, balance, variety, emphasis, harmony, symmetry, and Unity in type, colour, size, line thickness, shape, and space;
- use repetition of colour, shape, texture, spatial relationships, line thickness, and size to develop organisation and strengthen the Unity of a product;
- create three-dimensional effects using foreground, middle distance, and background images;
- apply a variety of colour schemes to digital designs including monochromatic, analogous, complementary, primary/secondary triads, cool/warm colours, and split complements;
- use the basic concepts of colour and design theory to work in a bitmapped mode, creating backgrounds, characters, and other case members as needed for the animation;
- use the appropriate scripting language to create an animation or movie;
- read, use, and develop technical documentation;
- edit files using appropriate digital editing tools and established design principles including consistency, repetition, alignment, proximity, ratio of text to white space, image file size, colour muse, font size, type, and style, and
- use a variety of techniques to edit, manipulate, and change sound.

2.3 INTRANET MANAGEMENT TOOLS

Tools other than the ones used for intranet authoring fall under the category of Intranet Management. They include tools ranging from simple solutions to massive deployment tools.

Groupware can be considered as one good solution for Intranet Management but there are other tools also which help in accomplishing this task. Databases, application servers and other software tools for controlling the operations such as tools for discussion forum, emailing, chatting, etc. come under this category.

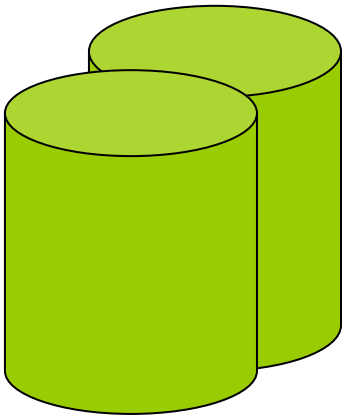
These tools are sophisticated and require higher expertise to tackle.

2.3.1 Databases – basic, ODBC, distributed

It has been said that every software that finds proper application must be supported with a database to store the source in the form of raw data. In view of this every

programming language has been redesigned to provide connectivity to every other database product available in the market. Embedded coding for use of records has been introduced to operate upon the data through programming languages.

The scope of databases is growing everyday. Today, there are hierarchical, relational, network, object-oriented and federated databases available in the market, but Very Large Databases (VLDBs) are yet to make entry. Databases could be installed at one place or can be distributed based on the nature of application. The field of the database world cannot wait any longer for introduction of knowledge bases.



Database

All programming languages either have proper drivers in-built to connect to the databases or need driver software to do so, if the feature has not been provided by the developer.

While purchasing the database or programming language software, do not forget to notice a separate CD-ROM or floppy diskette in the package consisting of the required database connectivity driver. It is essential that all the databases should support one another with respect to the method of storage, retrieval, and many other aspects. Even if they differ at every stage, it is most important that all the databases provide a method of connecting and converting between different formats or else there is a tremendous risk of non-connectivity and isolation from the rest of the information world. In addition, there will be huge unnecessary expenditure for installation, maintenance and conversion.

Databases – basic

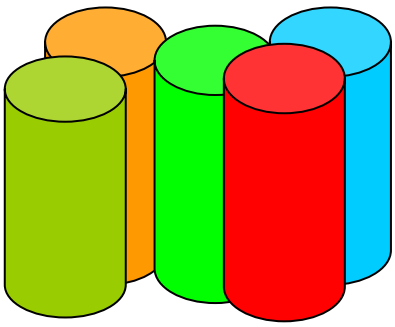
Almost all the programming languages support databases. Most popular databases are the Oracle, Sybase, DB2, etc. for massive implementations whereas Microsoft Access, SQL Server, etc., are highly popular for standalone personal computers.

Visual Basic or Visual C++ provides different ways to work with databases. The user can directly call database API functions from the DAO or ODBC Software Development Kits (SDKs). Or the user can choose to use the Microsoft Foundation Class Library (MFC), and let the MFC DAO classes and MFC ODBC classes simplify working with database API.

Remember that while using the DAO classes through any language, Microsoft Jet (.MDB) databases are used. It is also possible to use DAO to work with external databases, such as ODBC data sources. When not using the Jet databases, the user is free to work with ODBC API for complete data-source independence.

Databases – ODBC

Since it is essential that many Web based applications would connect to respective databases for querying and appropriately responding to users' requests, the driver software enable the applications to have connectivity to databases. There are different drivers for different platforms and databases. Of all of them, the ODBC drivers play the most important role since they are used to connect to any kind of databases. They provide significant performance improvements in data access and also help shorten deployment time.



Distributed Database

Open Database Connectivity (ODBC) is a widely accepted application programming interface (API) for database access. It is based on the Call-Level Interface (CLI) specifications from X/Open and ISO/IEC for database APIs and uses Structured Query Language (SQL) as its database access language.

ODBC drivers for the following databases must be available:

- Microsoft SQL Server
- Microsoft Access
- Microsoft FoxPro
- Microsoft Excel

- dBASE
- Paradox
- Oracle
- Unix based databases
- Text files.

In addition, most of the databases also accept spreadsheets as well as tables in word processors as input and offer easy and fast conversion to their internal representation. This feature of conversion from and to (called importing and exporting respectively) proves to be extremely useful and is slowly becoming an essential feature of databases. Some databases also offer a feature wherein the data stored in external format can be processed locally without disturbing the format of the actual database (called linking databases). It is most likely that the term convertibility would lose its importance in due course.

Databases – Distributed

Organisations select distributed databases for either or both of the following reasons:

- That there is a difficulty of communicating massive data and applications across the network on-line. In such a scenario, the organisation plans to implement distributed databases and connects them into an integrated network. For instance, look at the railways or airline ticketing which cannot be easily communicated over the expensive network lines for hours. Usually all processing is done at local level and are connected to the central server only when there is a need.
- That the organisation may like to keep the information centralised but applications remain distributed in order to attain greater reliability, availability, safety or performance, or all of the above.

The following could be some of the strong points for implementation of distributed databases:

- More fault-tolerance: Such databases can work even if one or more databases or systems fail to work. In such an event, other centres can keep communicating and updating themselves thereby ensuring continuity of work.
- More flexibility: Distributed databases are easy to work with and they offer extremely high flexibility through various aspects ranging from installation, interface to manageability.
- Easier to extend: It is possible to have more processing and storage capability by increasing the number of relevant components.
- Easier to upgrade: It is not necessary to dismantle and install a new system or upgrade all the components at a time. The concept is that whenever a single large computer system or database becomes obsolete, usually it has to be replaced resulting in a huge cost and disruption of all operations whereas in systems under distributed architecture, they may be upgraded in parts without major disruptions.

While there are a number of good things happening due to distributed databases, there is a few major problems too. They introduce several problems as given below that are normally not found in centralised systems.

- Distributed databases and their implementation are highly complex due to complex synchronisation between processes, systems and databases. They introduce lot of problems due to maintaining consistency of data.
- Generally speaking, since the central control and management is lost, it becomes difficult to change any part of the database or structure or any other aspect of data.

Keeping the above information in view, the planning for implementation of distributed systems or databases should be carefully dealt with.

Databases – Object Oriented Models

These days a number of programming languages as well as object oriented tools have come up due to rapid development in IT discipline. Consequently, databases also have taken the shape of object oriented database management systems or "OODBMS", which function purely on object orientation. They also offer connectivity to a broad category of other tools and programming languages to manipulate with objects. The concepts of data and schema have become old, but OODBMS, with strong capabilities of managing objects, are yet to hit the market.

Just as people deal with the entities/objects around them, the object-oriented models also attempt to implement the concepts of objects on the computer. The concepts, ideas, processes, or data, or combinations of these, are grouped together into one capsule-like entity called an object. An object supports a number of interfaces with which it communicates with other objects. It is much easier to operate with objects as compared to day-to-day issues since they provide much better manageability and organisation.

Objects provide an effective way of encapsulating things so that they can be used in other parts of the model. The interface describes exactly how to use the object. In a true object model everything is an object. However, going too far down this road enables one to describe anything recursively and thus ending up explaining nothing. The object concept is used to build up a model of a distributed system, the model will then show what types of object interaction will be needed to support.

The re-usability of objects, and refinement through inheritance, makes systems more open, since they can support diversity, but permit comprehension of diverse systems into one.

2.3.2 Web Servers

Web servers allow serving information about the organisation, its services and products over the Intranet or Internet. At the most fundamental level, it uses the Hyper Text Markup Language (HTML) for presentation of the content.
The job of Web servers does not end there; they accept requests from browsers like Netscape and Internet Explorer generated by users at the client end and then return the appropriate HTML documents.

With the advancement of technology, thousands of new features are being added day in and day out. A combination of many server-side computing techniques and technologies can be used to enhance the power of the server beyond its ordinary capabilities; which may include implementation of CGI scripts, server-side includes, SSL security, and Active Server Pages (ASPs).

Note that the software are described separately as Web servers and application servers. There is a little difference between the two. While the Web servers perform functions encompassing those of application servers, other services like security, multithreading, communication, and many more. Some application servers available are as following:

- Allaire Cold Fusion
- Bluestone
- CreDO
- Cyberprise
- FastTrack
- Infoscape
- Intertop - I-Xpresso

- NetDynamics
- NetObject Fusion
- Netscape Application Server
- Netscape Enterprise
- NeXT WebObjects
- Persistence
- Perspecta (XML Based)
- Progress/Apptivity (Java Only)
- RadNet WebShare
- WebStar Pro

Primary Web Servers

The primary Web servers apply all that has been discussed just now (as above) as the most fundamental services. Products such as AOLserver, Apache, WNServer, IIS, PWS, etc. are very well known and are easily configurable and manageable.

Apache Server

In the first instance, all the servers offer similar services; however, all of them differ in terms of certain additional value added features, better manageability, etc.

There is absolutely no shortage of free Web servers in the market, especially those based on Unix. Apache is the most popular of all the available Web servers and it is a freeware. Apache is a Unix-based software package that rules on about 60 percent of the Web server market in the world as estimated by a survey.

The situation is different in the Web server world other than Unix based. There are few freeware available and it requires lot of searching to get one such server. It is a well-known fact that most Windows-based servers are either costly or integrated into the operating system thereby making the process more complicated.

As a professional, the purchaser must ensure that the Web servers provide support for two major standards, i.e., the HTTP 1.1 and CGI 1.1, both of which have become the most popular and widely used.

Most Web servers are based on the content of a file and consequently are purely based upon the file extension. For instance, if a file of HTML format has been named "html.txt", then it would be served as a text file only.

AOL server (America On Line Server)

AOL press and AOL server were formerly known as GNNPress and GNNServer (and much before they were popularly known as NaviPress and NaviServer) respectively. America Online combined or bundled the features of Web authoring tools and Web server into one.

AQL Server Sign On dialogue Box

The basis of AOL's complete Web development service is known as PrimeHost, which combines the fineness of the HTML editor and Web server. Joining the PrimeHost service, as a member will allow the user to have own domain name, a Web site space of 20 MBs or more, counter programs, SSL support, and CGI capabilities.

Using PrimeHost user accounts can be easily set up with appropriate and moderate inexpensive monthly rates. Also offered are membership categories such as an individual, commercial, or dedicated user. Using the AOLserver software, whenever any a page is saved through AOLpress, it gets automatically hosted on the site. This cuts out the time and efforts required for saving files locally, transferring them to the

remote server using FTP, and then making additional changes for maintenance thereafter.

In addition to seamless integration with the AOLpress client, the AOLserver offers the following services:

- Secure Sockets Layer (SSL) support (40-bit encryption)
- Multithreading and multi-homing capabilities with the ability to configure hundreds of virtual servers in a single process
- An integrated search engine
- Hierarchical access control (for restricting access to parts of the Web site)
- Built-in TCL scripting language capabilities (for quickly building custom Web applications)
- Internal image map support
- SQL database services
- A complete C API for writing custom functions, drivers, and applications
- Support for AOLserver Dynamic Pages (ADPs) which make it easier to create dynamic content
- An integrated nsftp module (a fully-functioning FTP server that uses the AOLserver's permission system)
- Support for server-parsed HTML
- HTML caching (allows pages to be served more efficiently)
- An nsvhost module for virtual hosting (non-SSL only)
- And many more.

AOLserver also offers native support for server-side that includes CGI, HTML-forms based configuration, remote site and page administration, custom error responses, page trailers, and more.

There are certain drawbacks of this server application as well. The most important of them is being its support only for the Windows NT platform. The server also ignored the famous 128-bit SSL security technology support responding to the export regulations of US.

Overall, it stands as a good solution for serving anything from personal home pages right up to corporate Web sites. The presence of the AOLpress and the PrimeHost Web-hosting service makes the duo-combination much better.

iServer

iServer was developed by Servertec, written entirely in Java for any Java-enabled operating system. It has the dual purpose of serving both Web pages as well as Java servlets. In other words, this is a special kind of product that offers the functionality of both a Web server as well as an application server.

As a Web server, iServer provides support as a simple multithreaded Web engine generating threads for multiserver type environment and managing them. The iServer offers the following features:

The server supports HTTP 1.1

Uses minimal resources as the basic installation takes up to only 85KB and the full package occupies space less than 125KB of memory.

Since it can manage Java servlets, it supports the more advanced protocols like IIOP and CORBA as well as fundamental protocols like ODBC, JDBC, SSI and CGI.
It is a unique combination of BASIC and Java, permitting users to create BASIC-like scripts for Java environment. It also supports TCL and Perl.

The administration is done very easily through Web while detailed log files help tracking usage levels and problems with the site.

As an application server, iServer has some attractive features, as given below:

- Load balancing (which allows management of incoming requests to a cluster in the most efficient manner and could include redirection to a less busy server).
- Fault tolerance.
- Database-connection pooling.
- Since it can run on a server with Java, it can be easily installed on the smallest PC based machine to the largest mainframe computer.

These features are usually found in enterprise-level application servers but not in Web servers and hence offer flexibility for a scaleable Web-server installation. However, there are some downsides in iServer:

- There is no provisioning for any other third-party authentication.
- Users, access rights, resources, and access control lists must be set up manually, i.e., it is not possible to import any user lists even from a Windows database or from the outside.
- Separate Perl support is not available (one could implement through CGI).
- No support provided for the Microsoft FrontPage extensions.

WN Web Server

WN is a free Web server that runs on a number of variants of UNIX platforms. It provides support for both the major standards, HTTP 1.1 and CGI 1.1.

In the WN server, the method of operation is unique and easy. The server is not based on file extensions but a separate database, called “index” is maintained in which the filename, extension, type, security information, etc., are entered. All requests or references are checked with the entries in the index. A file is loaded only when there is a reference and permission for execution or service. The WN does not serve files unless specifically instructed by the index.

Obviously, the database called index makes the process of searching the Website very easy. This is in line with the basic objective of WN to create an easy-to-search Website. It becomes possible for the end users to search for desired data in many different ways and in different portions of the files.

The most important and notable point is that security is implemented by the process of minimisation rather than by authorisation. The concept is as clear as the fact that malicious users cannot see it, they would not know what to hack.

WN was one of the original Web servers developed in this line. It is not just one of the nicest Web servers available, it also combines the features of stability with decent security features.

Samba Server

Samba is an excellent Web server software and has taken a lead further by being functional, reliable, and free. Samba 5.0 is the latest version and provides the following features:

- It is functional, that means Samba not only works like the server but also works very well in a wide variety of applications. At any time, if it is found that the server does not work according to the desired pattern, the system administrator can program APIs using languages like C and C++.
- A Web-based step-by-step guidelines are available for configuration of Samba.

- It Supports ASP Web pages via the Samba Server CScript language so that the system administrators can create dynamic and database-driven Web pages.
- Samba uses the HTTPS protocol in both 40- and 128-bit versions. Also, the OpenSSL libraries are supported.
- Samba is reliable. When matched with a Windows-NT-based system, Samba's reliability can come very close to that of a Unix/Apache-based system, so long as the supporting, custom APIs are programmed properly.
- Samba can run as a Windows NT System Service by executing a file named ntserver.exe binary in the "bin" directory.
- Provides features similar to Unix daemons, i.e., the use of a system program without the need to log on to a machine and keep it connected.
- Provides a module called the Watcher Daemon that will try to restart the Web server and build up the system status automatically, and also arrange to send e-mail to the administrator if the server crashes.

It would be interesting to note that the basic Samba Production Server is available free. The professional version of Samba (that is priced at few thousand rupees) provides features such as DNS, mail, telnet, and proxy capabilities.

Microsoft's initiative

IIS Configuration

The Microsoft Corporation has taken a lead over other software developers due to the fact that it has provided the most popular operating systems and other applications. This has led to seamless interchange of information and proper standardised approach for all the users.

The wave of Microsoft products continued and had followed the pattern in Web servers as well. The most notable contribution of Microsoft has been the Internet Information Server (the latest being version 5.0) and the Personal Web Server (popularly known as PWS for the benefit of personal computer users).

Internet Information Server

Microsoft's IIS 5.0 is a great improvement over the existing versions of Web servers and is now bundled with the Windows 2000 Server operating system. This version contains many new features along with enhanced performance and reliability. Notable improvements include –

- Better and clearly documented security policies
- Support for the new WebDAV publishing standards
- Faster restarts of both Web and FTP services.
- Support of clustering, Microsoft has significantly improved the configuration and setup to enable multiple machines to share the load and deliver more reliable Web services.

Microsoft has also added a few new wizards to perform common tasks much easily. Three important wizards are:

- the Permissions Wizard (to synchronize and align Web and NTFS security settings),
- the Web Server Certificate Wizard (to obtain and install server certificates),
- the CTL Wizard (to create and modify certificate trust lists).

There is a strong support of a number of standards in IIS 5.0 including:

- Fortezza (a new U.S. government security standard).
- Transport Layer security using SSL 3.0.
- Digest Authentication (a method of hashing authentication information introduced in IE 5.0).

- Replacing NT LAN Manager authentication with the stronger Kerberos 5.0 authentication protocols used in Windows 2000.

The greatest improvement in IIS 5.0 is supposed to be the Web-based distributed authoring and versioning or in short WebDAV. It is a newly developed standard designed to make the construction of Intranets simpler. It also helps many simultaneous users to publish and host documents on a common Web server. A step ahead, this protocol allows the users to use the Web directories through Office 2000 and IE 5 tools running on Windows 98, NT and Windows 2000 as if they were shared over Windows file system.

The minimum specification required for running IIS is a 200 MHz Pentium based computer with 128 MB of RAM. Another product from Microsoft that acts as complementary to the IIS i.e., the Advanced Server that is meant for clustering purpose. Companies planning for running the Advanced Server clustering should double the RAM and CPU speed. A similar step is required even if it has been planned to run MS-SQL or Transaction services on the same machine as the Web server. It should be remembered that for setting up clusters through Windows 2000, it is essential to think of Advanced Server that works fine with IIS.

Personal Web Server

Microsoft's Personal Web Server (PWS) also functions on lines similar to the IIS. In other words, PWS is a lowered version of the IIS introduced and bundled along with the Server edition of Windows NT. Even though it has been designed for Windows 95 and Windows NT Workstation users, the PWS has made the greatest impact on the design, development and publishing of Web documents by bringing them to the personal computer range. It has proved to be a boon for small Web sites and Intranets.

While it is extremely easy to install and use PWS in terms of the clients, there are wizards that help the developers to quickly publish, share and administer the documents. The Explorer interface or the Personal Web Manager of the PWS can be used to share folders, start or stop the server services and do other similar tasks. The documents intended to be published on the Web site can be tested before hand for dead or invalid links, scripting errors and many other possible loopholes.

Once the site is ready to go live, you can either continue using PWS to serve your Web site or you can use Microsoft Front Page to copy the Web site developed on PWS over to IIS. PWS and IIS are packaged together as part of the freely downloadable Windows NT 4.0 Option Pack. Microsoft FrontPage is a commercial Web design client that must be purchased separately.

Certain advanced features such as the Index Server, Certificate Server, and Site Server Express found in IIS are not present in PWS. But PWS does support the famous Active Server Pages (ASP), script debugging, and many other important features. It offers the ability to develop Web applications using the Microsoft Transaction Server.

In general, it can be said that though large organisations may prefer other high-end Web servers such as the IIS, the PWS remains the best option for smaller companies and personal computer users.

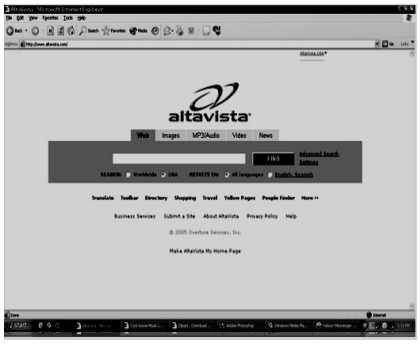
2.3.3 Other Tools

There are certain other tools available on the Web that can automatically check for various features of the submitted Web site and give a detailed report about missing and dead links, compatibility to Netscape and Internet Explorer, download speed, size of images, etc. Such tools can prove to be very useful for error detection and better updation of the Web pages. This kind of feature is also available in software like Macromedia Dreamweaver Ultradev.

In addition to all the tools available for Web authoring and management, there are a number of tools available separately in the market for carrying out the desired tasks in

a professional manner. A partial list of popular tools has been given below, categorised under various types of applications.

- Agents
  - UMBC Agent Web
  - MIT Software Agents Group
- Discovery Agents (Content)
  - Web Robots Database
  - AliWeb
  - Harvest
  - Kinetoscope Via Agent Developer (Java Based)
  - Merzcom
- Discovery Agents (Network)
  - Advent Network Management (Java Based)
  - Concord
  - Kaspia Network Device
  - Network General
- Push Agents
  - SkyTel Web Paging Service
- Search Agents
  - AltaVista
  - Autonomy (Pattern Matching based)
  - Excalibur RetrievalWare (Pattern Matching based)
  - Fulcrum
  - Livelink Pinstripe
  - Merzcom
  - NewSurfer.com (multi-lingual)
  - PicoSearch
  - Google
  - Semio (Pattern Matching based)
  - Google
  - Tacit
  - Ultraseek
  - Verity
  - Web Browser Intelligence (IBM)
  - WebSeeker
- Subscription Agents
  - BackWeb
  - DataChannel (XML Based)
  - Incisa
  - Majordomo
  - Marimba (Java Based)
  - NewsFlash
  - PointCast
  - Smart Delivery
  - Tibco (Rendezvous)



AltaVista Search Engine

Goggle Search Engine

- Tracking Agents
  - eClips (Wireless Services)
  - Karnak
  - NetMind
  - Tympani NetAttche Pro
  - Tympani NetAttache Server (Group Services)
  - WebSeeker
- Collaboration
  - Bantu (Web-based service)
- Calendaring - Scheduling
  - Amplitude Reserve
  - CrossWind
  - CyberScheduler
  - Netscape Calendar Server
- Discussion (audio-video)
  - CU-SeeMe
  - White Pine Reflector
  - netPodium (Java Based)
  - VXTREME video streaming
- Discussion (text)
  - ForeFront Roundtable
  - Forum
  - News Gateway
  - HyperMail
  - Internet TalkShow
  - Majordomo
  - Mastermind Forum Master
  - MIT Conferencing Gateway
  - Netscape Collabra Server
  - Xpound
- Document Sharing (create and edit MS Office documents through a Web browser)
  - DataChannel (XML Based)
  - Net-It Central
  - Transit Central
  - Tympani Atlas Server
  - Web Wizards
- Email Response Management
  - Brightware
  - eGain
  - Genius Server
  - MailQueue

☞ Check Your Progress 1

1) The Modeling Language that can be used in Virtual Reality Environments is _____.

   a) HTML b) VRML

   c) CGI d) Java

2) CommNet is one of the _____ clients available, featudres Zmodem support.

   a) FTP b) TCP

   c) telnet d) UDP

3) _____is a solid terminal emulator with extensive connectivity options.

   a) Bantu b) eclips

   c) Cross wind d) Anziolite

4) Distributed databases and their implementation are highly complex due to complex synchronization between _____

   a) Process, system & Database

   b) Tools, Technology & Standard

   c) Applications, protocol & System

   d) Client, Program & Server

5) ASP stands for

   a) Active Serve Pages

   b) Attractive Server Pages

   c) Active system pages

   d) Active server Programming.

2.4 SUMMARY

The adoption of higher concepts and systematic techniques such as object orientation and software engineering principles has also provided for proper interaction amidst tools. Even though, in physical sciences, the output of one tool cannot be considered as input to another; for instance, the output of vernier caliper cannot be taken as input to temperature controller, it has become possible for computer based tools to interact with one another.

There is a specific need to stress on the importance of such tools with respect to Intranet and Internet. As the technologies grew in number, so also the type of tools increased day-by-day. Today, there are hundreds of tools available right from the browser to request handling and much higher levels of request management and thread manipulation, covering a number of platforms such as DOS, Windows, Unix, Mac, Solaris, Linux, HP-UX, AIX, Sun Cobalt and what not.

It is the law of nature, by default, that whenever there is a variety of tasks, tools, objects, entities or otherwise available, the immediate next step is standardisation. This also follows standardisation of various Web authoring and management tools. The process of standardisation should not stop just by identification but also should extend to the minimum features they should contain and the functionality to perform. From the Figure, it should be clear that the technology, tools and standards work hand in hand to attain the objective.

2.5 SOLUTIONS/ANSWERS

Check Your Progress 1

1) (b) VRML
2) (c) Telnet
3) (d) Anzio Lite
4) (a) Processes, Systems and Databases
5) (a) Active Server Pages

2.6 FURTHER READINGS

1) *Professional Active Server Pages* by Brian Francis
2) *Building and Managing Virtual Private Network* by David Kosiur, John Wiley & Sons.
3) *Designing Microsoft ASP.Net Applications by* Douglas J. Reilly Microsoft Press

Reference Websites

1) http://www.citrix.com/
2) http://www.novell.com/
3) http://www.developer.com/
4) http://www.epicentric.com/