

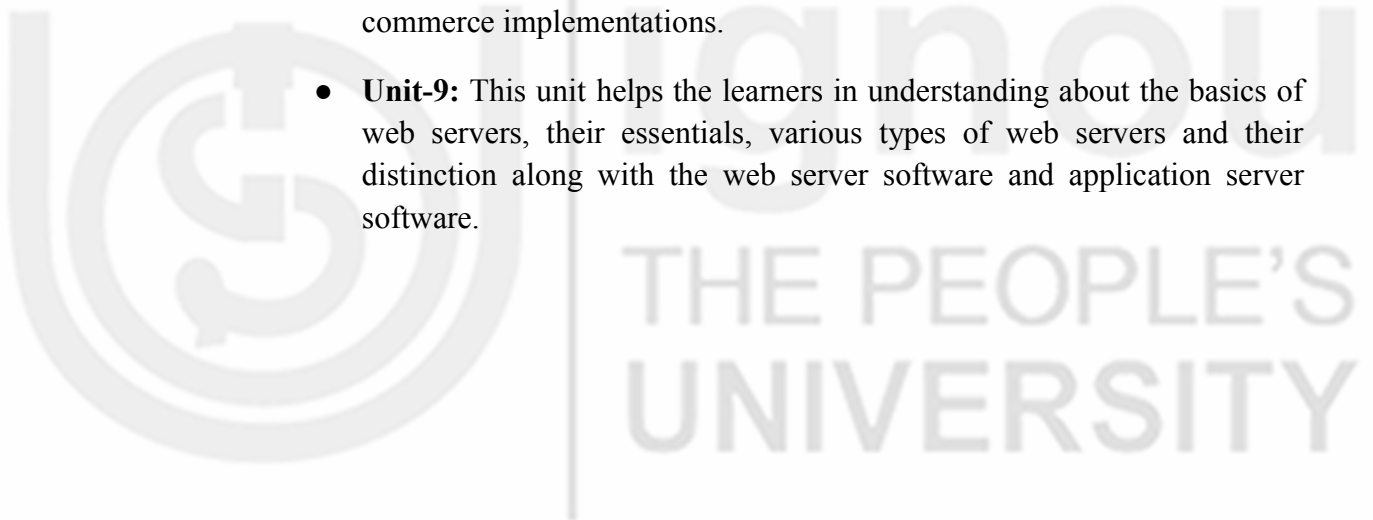
BLOCK 3
WEBSITE DEVELOPMENT AND
HOSTING

THE PEOPLE'S
UNIVERSITY

BLOCK 3 WEBSITE DEVELOPMENT AND HOSTING

This is the third block of the course “E-Commerce”. This block is structured to cover the various phases of website development process, web server hardware, web server software and E-commerce software. The block on the theme “Website Development and Hosting” comprises of three units, the detail of which is mentioned below:

- **Unit7:** This unit gives the basic introduction about website development. The unit covers the various aspects related to the websites such as their various types, evolution and usages in everyday life along with the website’s developments process focusing on the various phases of development and briefly stating the various inputs and output of each phase/step. The later part of the unit states various ingredients required for website development as well the various types of website hosting.
- **Unit-8:** This unit discusses the various e-commerce software for mid-sized, large sized and mid to large sized companies. Apart from that the unit also explains various e-commerce initiatives, strategies for developing e-commerce websites as well as the management of e-commerce implementations.
- **Unit-9:** This unit helps the learners in understanding about the basics of web servers, their essentials, various types of web servers and their distinction along with the web server software and application server software.



UNIT 7 WEBSITE DEVELOPMENT

Structure

- 7.0 Objectives
- 7.1 Introduction
- 7.2 Meaning of Website
- 7.3 Evolution of Website
 - 7.3.1 Rapid growth and expansion of WWW and the browsers
- 7.4 Website Usage
- 7.5 HTTP & HTTPS Protocols
 - 7.5.1 HTTP
 - 7.5.2 HTTPS
 - 7.5.3 Difference between HTTP and HTTPS
- 7.6 Types of Website
- 7.7 Development of Website
- 7.8 Ingredients Required for Website Development
- 7.9 Website Hosting
 - 7.9.1 Types of Website Hosting
 - 7.9.2 Website Hosting Alternatives
- 7.10 Let Us Sum Up
- 7.11 Keywords
- 7.12 Terminal Questions

7.0 OBJECTIVES

After studying this unit, you should be able to:

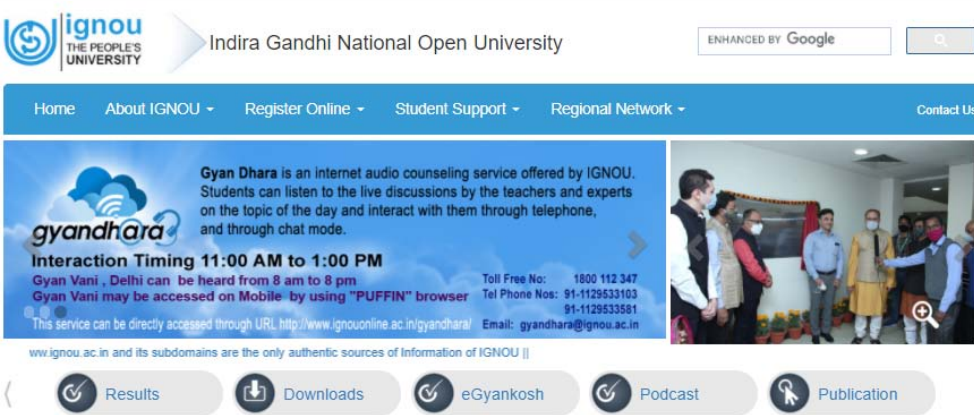
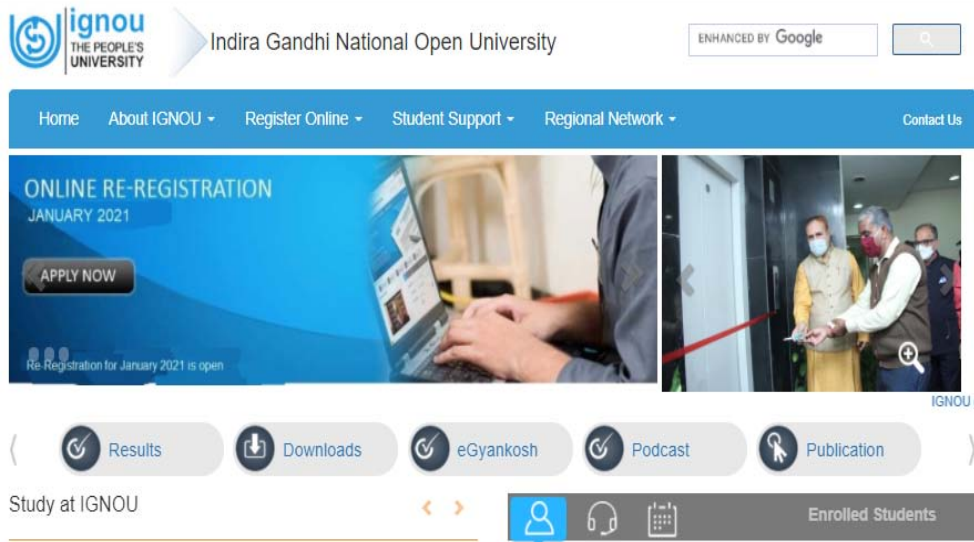
- understand the origination of websites;
- describe website usages;
- explain HTTP and HTTPs Protocols;
- explain the various types of websites;
- describe the process of development of websites over time;
- explain the various ingredients required for website development; and
- explain the concept and various types of web hosting;

7.1 INTRODUCTION

Websites are typically dedicated to a particular topic or purpose, such as news, education, commerce, entertainment, or social networking. Hyper linking between web pages guides the navigation of the site, which often starts with a home page. Users can access websites on a range of devices, including desktops, laptops, tablets, and smart phones. The software application used on these devices is called a web browser. Web development is the building and maintenance of websites. It is basically the work happening behind the scenes to make a website look great, work fast and perform well with a seamless user experience. Website development is done by the web developers by using a variety of coding languages which depends on the type of tasks they are performing and the platforms on which they are working. This unit explains the meaning, origination, usages of websites along with the process and ingredients required for website development.

7.2 MEANING OF WEBSITE

A website is a compilation of web pages and associated content that is acknowledged by a general domain name and published on at least one web server. A website (also known as web site) is a collection of web pages and related content that is identified by a common domain name and published on at least one web server. Notable examples are wikipedia.org, google.com, amazon.com and www.ignou.ac.in. The software application used on these devices is called a web browser. Basically, for a layman a website is a set of data and information about a particular subject which is available on the Internet. Websites can be used in various ways for a number of purposes such as a personal website for someone's own business or profession, a corporate website for a company, a government website for any government organization or any other organizational website, etc. Websites can be the work of an individual, a business or other organization, and are typically dedicated to a particular topic or purpose. Any website can contain a hyperlink to any other website, so the distinction between individual sites, as perceived by the user, can be blurred. For an example below is a snapshot of IGNOU University portal.



Source: www.ignou.ac.in

Fig 7.1: Website of IGNOU

The above snapshot depicts that IGNOU is an abbreviation of Indira Gandhi National Open University which is a National Resource Centre for Open and Distance Learning (ODL), with international recognition and presence. It aims to provide seamless access to sustainable and learner-centric quality education, skill up gradation and training to all using innovative technologies. The University is committed to quality teaching, research, training and extension activities, and acts as a national resource centre for expertise and infrastructure in the ODL system. Emphasis is now being laid on developing interactive multimedia and online learning, and adding value to the traditional distance education delivery mode with modern technology-enabled education within the framework of integrated distance and online learning.

7.3 ORIGINATION OF WEBSITE

The development of the World Wide Web (WWW) began in 1989 by Tim Berners-Lee and his colleagues at CERN, an International scientific organization based in Geneva, Switzerland. They created a protocol, Hypertext Transfer Protocol (HTTP), which standardized communication

between servers and clients. Their text-based Web browser was made available for general release in January 1992. CERN announced that the World Wide Web would be free to use by anyone. Before the introduction of the Hypertext Transfer Protocol (HTTP), other protocols such as File Transfer Protocol and the Gopher Protocol were used to retrieve individual files from a server. We will discuss the HTTP and HTTPs in more elaborative manner in later section









Fig 7.2: World Wide Web (WWW)

7.3.1 Rapid Growth and Expansion of WWW with Browsers

The WWW gained rapid acceptance with the creation of a Web browser called Mosaic, which was developed in the United States by Marc Andreessen and others and was released in September 1993. Mosaic allowed people using the Web to use the same sort of “point-and-click” graphical manipulations that was possible in personal computers also. In April 1994, Andreessen co founded Netscape Communications Corporation, whose Netscape Navigator became the dominant Web browser soon after its release in December 1994. By the mid-1990s the World Wide Web had millions of active users.

Table 7.1: Various Software Support Internet Applications

Year of Origin	Internet Application	Logo & Parent Company	Product Mandate
1994	The company's first product was the web browser, called <i>Mosaic Netscape 0.9</i> , released on October 13, 1994. Within four months of its release, it had already taken three-quarters of the browser market	 Netscape Communications Corporation	Netscape web browser was once dominant but lost to Internet Explorer and other competitors in the so-called first browser war, with its market share falling from more than 90 percent in the mid-1990s. Netscape advertised that "the web is for everyone" and stated one of its goals was to "level the playing field" among operating systems by providing a consistent web browsing experience across them.

<p>1995 1996</p>	<p>Internet Explorer (IE), in 1995 as an add-on to the Windows 95 operating system. IE soon became the most popular Web browser</p>	 <p>Microsoft Corporation</p>	<p>Internet Explorer is a series of graphical web browsers developed by Microsoft and included in the Microsoft Windows line of operating systems, starting since 1995. It was first released as part of the add-on package Plus! for Windows 95 that year. IE was integrated into the Windows operating system in 1996 and came “bundled” ready-to-use within the operating system of personal computers.</p>
<p>2002</p>	<p>Mozilla Firefox, or simply Firefox, is a free and open-source web browser developed by the Mozilla Foundation and its subsidiary, the Mozilla Corporation. Firefox uses the Gecko layout engine to render web pages, which implements current and anticipated web standards</p>	 <p>Mozilla Organization.</p>	<p>Firefox Browser for Android is automatically private and incredibly fast.</p>
<p>2003 2005 2007</p>	<p>Apple’s Safari is the default browser on Macintosh personal computers and later on iPhones (2007) and iPads (2010) Safari 2.0 was the first browser with a privacy mode.</p>	 <p>Apple.</p>	<p>Safari is a graphical web browser developed by Apple, based on the WebKit engine. First released on desktop in 2003 with Mac OS X Panther, a mobile version has been bundled with iOS devices since the iPhone's introduction in 2007.</p>
<p>2008</p>	<p>Google launched Chrome, the first browser with isolated tabs, which meant that when one tab is crashed, other tabs and the whole browser would still function</p>	 <p>Alphabet Inc.</p>	<p>By 2013 Chrome had become the dominant browser, surpassing IE and Firefox in popularity</p>
<p>2015</p>	<p>Microsoft discontinued Internet Explorer and replaced it with Edge.</p>	 <p>Microsoft</p>	<p>Microsoft Edge is a cross-platform web browser developed by Microsoft. It was first released for Windows 10 and Xbox One in 2015, then for Android and iOS in 2017, for macOS in 2019, and as a preview for Linux in October 2020. Edge includes integration with Cortana and has extensions hosted on the Microsoft Store.</p>

Source: Google

For more details about web browsers refer to the unit-3 of BCOS-183: Computer Application in Business which is a 3rd semester course of B.Com (G). In the early 21st century, smart phones became more computer-like, and more-advanced services, such as Internet access, became possible. Web usage on Smartphone steadily increased, and in 2016 it accounted for more than half of Web browsing.

7.4 WEBSITE USAGES

The proliferation of mobile phones has given birth to new categories of web users and expanded the target audience for the businesses, and this all has become possible with the easy access to the internet. Despite the availability of mobile apps, mobile friendly responsive web is gaining popularity and is preferred among the audience. A website provides a quick and easy way of communicating information between buyers and sellers. Websites are useful not only for the customers but also for buyers in many ways. Websites can be tailored according to the hosts requirements. A website can provide much information such as opening hours, contact information, images of location or products and also the AI enabled contact forms to facilitate enquiries from potential customers or to obtain feedback from existing ones. Various usages of websites are explained in detail below:

1. **Online Presence 24/7:** Website enables customers to contact the service provider anytime, anywhere. Even outside of business hours, website continues to find and secure new customers. 24/7 presence offers the user convenience as the information needed by them can be accessed in their comfortable zones be it either their own home or workplace with no added pressure to buy.
2. **Information Exchange:** Through a website a seller can provide as much information as he wants and requires for the customers. Websites provide the easiest way of information exchange between the buyer and sellers, which really helps the businesses to engage the customer and sell in an effective and cost-efficient way.
3. **Credibility:** Having an online presence is imperative on the part of any sort of business these days. It makes them get ahead of their competitors in one way or another. Most of the reputed businesses have their presence in virtual places, which helps in building reputation and improved credibility of the businesses in the eyes of customers. A website can be used for answering all what's and why's of potential customers. Moreover, having a good quality, easy-to-use website makes them believe that they will get the same positive experience in all areas of the business.
4. **Market Expansion:** Online presence helps in the expansion of the target market, as it can be accessible to anyone all over the world. Anyone, from any country, can easily find the company and as such becomes a potential customer. Online presence actually helps the companies to increase their market share and capitalize by a great extent which otherwise is not possible.
5. **Consumer Insights:** These days various customers analytic tools such as artificial intelligence, big data help in identifying typical customers, their preferences, demand and behavior towards certain products. The diverse

range of data available also offers hands to the businesses to better understand their potential customers and thus offer them products as per their needs.

6. **Advertising:** Tools like Google Ad Words or advertising on Facebook gives the power to reach customers with much more accuracy and reliability than with traditional offline advertising methods. SEO and online advertising are a great way to help build up awareness and increasing traffic in no time.
7. **Competitors Online:** If any business player do not have a website it is highly likely that their competitors will have. This can lead to missing out on gaining new customers and opportunities to be at the forefront. It is crucial that no opportunity is missed and every prospect is gained by competition. Therefore, to stay ahead of the competition and have a greater market presence it is required by every business to have online presence.
8. **Customer Service Online:** Websites provide an easier and effective way to handle customer service. AI enabled chat boxes can address all the queries immediately which also helps the companies to save the costs of customer representatives. Timely responses to the customer queries help in improving their relationships with the service provider.
9. **Growth Opportunity:** Websites, in general, are great ways to provide a place that potential investors can be referred to. It shows what the company is about, what it has achieved and what it can achieve in the future. Thus, having a website incredibly provides various growth opportunities.

7.5 HTTP & HTTPS PROTOCOL

Every URL link that begins with HTTP uses a basic type of “hypertext transfer protocol”. Which was developed in early 1990’s by Tim Berners-Lee. This network protocol enables web browsers and servers to communicate through the exchange of data. Hyper Text Transfer Protocol Secure (HTTPS) is the secure version of HTTP, the protocol over which data is sent between your browser and the website that you are connected to. The 'S' at the end of HTTPS stands for 'Secure'. It means all communications between browser and the website are encrypted. For more details we will study both the terms separately:

7.5.1 HTTP

HTTP is a protocol which allows the fetching of resources, such as HTML documents. It is the foundation of any data exchange on the Web and it is a client-server protocol, which means requests are initiated by the recipient, usually the Web browser. A complete document is reconstructed from the

different sub-documents fetched, for instance text, layout description, images, videos, scripts, and more. It is an application-level protocol for distributed, collaborative, hypermedia information systems.

7.5.2 HTTPs

Hypertext Transfer Protocol Secure is an extension of the Hypertext Transfer Protocol. It is used for secure communication over a computer network, and is widely used on the Internet. In HTTPS, the communication protocol is encrypted using Transport Layer Security or, formerly, Secure Sockets Layer.

7.5.3 Difference between HTTP and HTTPs

HTTP is a protocol using which hypertext is relocated over the Web. Due to its ease, HTTP has been the most commonly used protocol for data transfer over the Web but the data (i.e. hypertext) exchanged using HTTP is not as secure as we would like it to subsist. In precise, by using both the HTTP/HTTPS the information of a particular website is exchanged between Web Server and Web Browser. But what’s difference between these two is extra ‘s’ present in HTTPS, Which that makes it secure! The below mentioned table would meticulously provide concise difference between HTTP and HTTPS.

Table 7.3: Difference between HTTP and HTTPs

Basis	HTTP	HTTPs
Definition	It stands for Hyper Text Transfer Protocol	It stands for Hyper Text Transfer Protocol Secure
Encryption	It does not encrypt the text	It encrypt the text so that no one can access it
Usage of SSL	They don’t require Secure Socket Layer at Transport layer	They use Secure Socket Layer to encrypt the code
Type	It is a default protocol	It is not a default protocol
Beginning	URL begins with http://	URL begins with https://
Security	It is an unsecure protocol	It is a safe transfer protocol
Validation	It does not require any validation	It requires validation like domain verification
Address bar	It has simple address bar	It has green colored address bar that shows it is secure
Hacking	It can be easily hacked	It cannot be hacked easily

7.6 TYPES OF WEBSITES

As we know that Web hosting is a service that allows organizations and individuals to post a website or web page onto the Internet. Websites are hosted, or stored, on special computers called servers. When Internet users desire to sight the website, all they need to do is to type the website address

or domain name in the browser. The choice of the type of websites depends on the requirement of the seller. Websites can mainly be categorized into four broad categories namely authority website, lead generation website, sales website and utility website explained in detail later. By knowing, what kind of website is needed before making any design or marketing decision, one can save oneself from a world of hurt and waste money and that also helps in attracting the audience they want.

1. **Authority Website:** An authority website is a trusted, reliable source of information. The authority website serves as an online presence for the business. This is the place potential customers can go to see what the company has done and how to get in contact with someone about services and leads are generated offline. People visiting the website already know about the company and reach there to gather more information. Here the website serves as an online placeholder, giving more legitimacy to the business in the eyes of customers. For example: Healthambition.com is a great Authority site in the health sector which has dozens of review articles that compares different products and makes it easy for viewers to buy the recommended products from the affiliate links as shown in the Fig. 7.3 below:

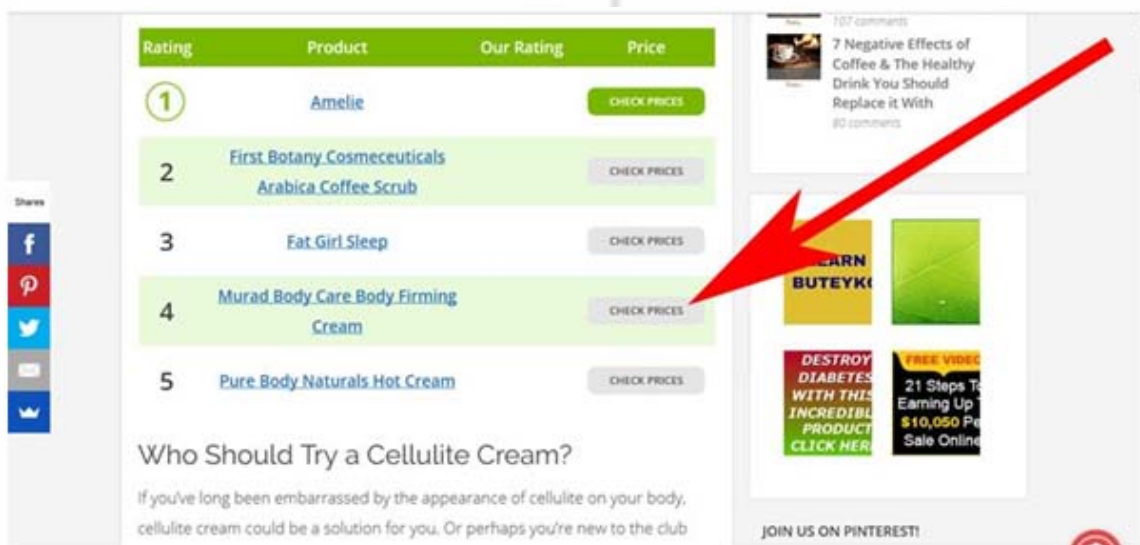


Fig 7.3: Example of Authority Websites

2. **Lead-Generation Website:** As its name suggests, this site is focused on generating leads through its online presence. SEO and targeted marketing strategies play a huge role in bringing in new customers. Sales, however, still occurs offline. These websites are found online by people who have buyer's intent. This means that the prospective customer is basically ready to spend their money and they just need to be convinced that the business is the perfect place to do this spending. For example, Live Chat is online customer service software with online chat, help desk software, and web analytics capabilities which can be used as a tool for lead generation.

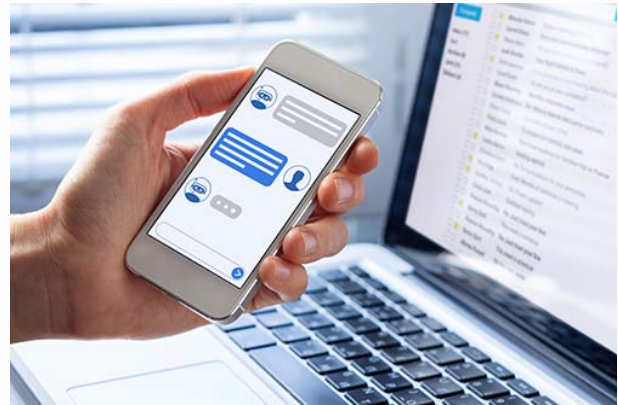


Fig 7.4: Examples of Lead-Generation Websites

3. **Sales Website:** These are the sites that sell products or services through e-commerce. If a site has a cart function, then it falls into the sales website category. This site is especially popular, as both leads and sales are all done completely online. A company’s website can still fall into the sales category if that business utilizes online scheduling and payment, but provides the service in-person. For example, Amazon.com, flipkart.com, myntra.com are the sales websites, here customers can buy products and services online as per their needs.



Fig 7.5: Examples of Sales Websites

4. **Utility Website:** A utility website functions more like a tool than a standard website. These are the companies whose business and website are one and the same. Air BNB and Facebook are examples of utility websites. They don’t necessarily generate leads or sales online. They just exist in the online space and are accessible to anyone that chooses to use them.

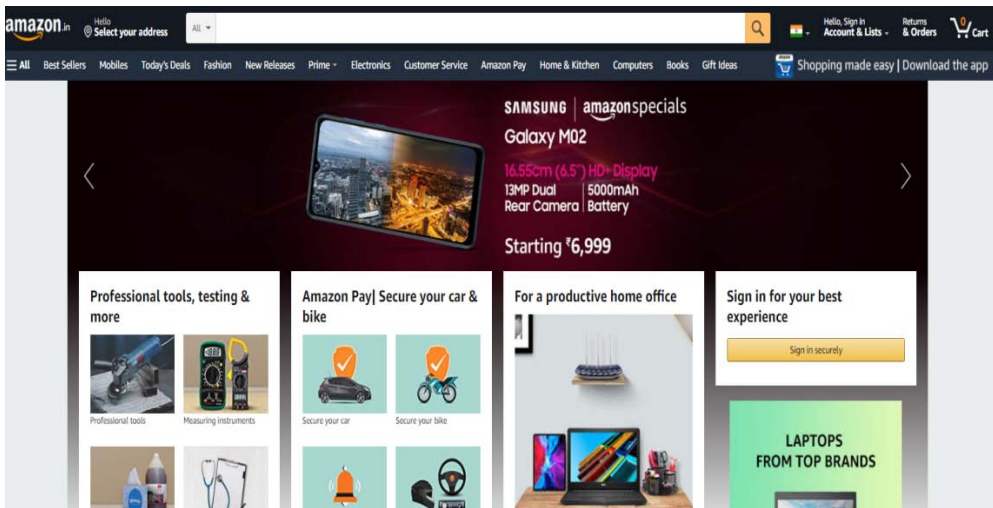
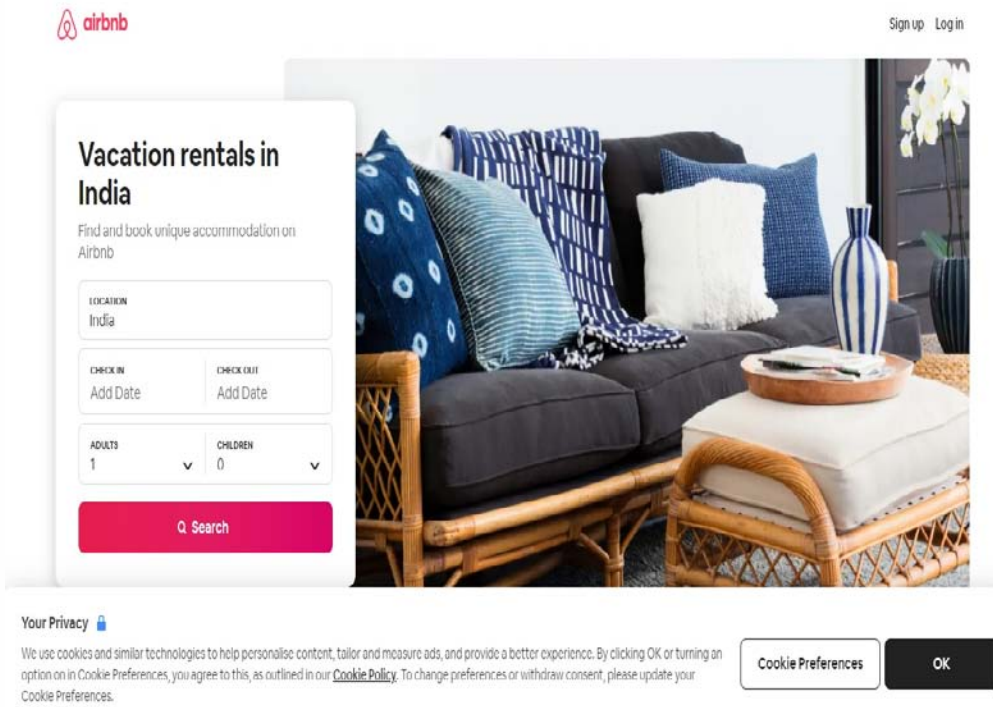


Fig 7.6: Examples of Utility Websites

7.7 DEVELOPMENT OF WEBSITE

Website development is the effort involved in developing a website for the Internet or an intranet. Web development can vary from developing a simple single static page of plain text to complex Web-based Internet applications, electronic businesses, and social network services. Web development is the maintenance and development of a website, basically it is the effort that happens in the backdrop to make a website look enormous, work speedy and perform sound with flawless user knowledge. Website development is a comprehensive process which is carried by the Web developers by using a diversity of coding languages. Various steps of web development process are explained in detail below:

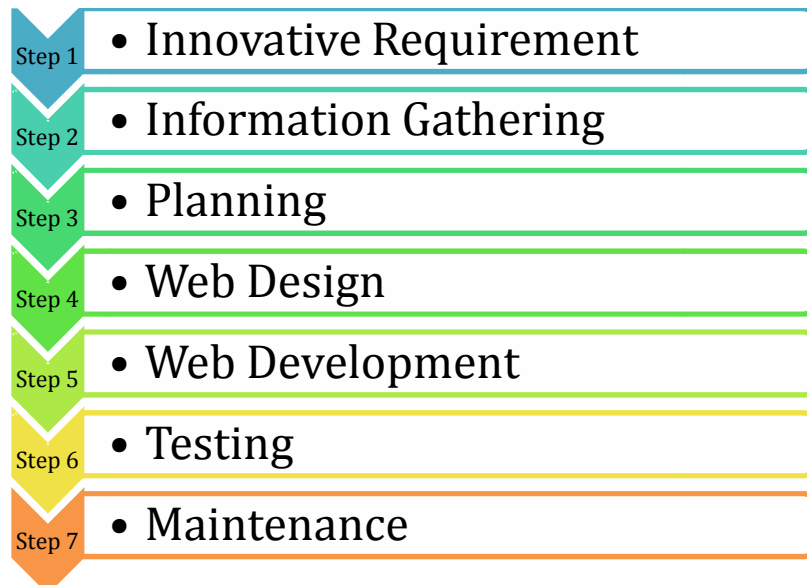


Fig 7.7: Steps of Website Development Process

Step-1: Innovative Requirement: Innovative requirement is the first and foremost requirement of the web development process. This is basically a discussion oriented step in which the client shares his ideas, needs and requirements with the web developers and on the basis of their demands the developers provide them innovative suggestions best suiting their requirements. Various inputs and outputs of innovative requirement are stated below:

Table 7.4: Various inputs and outputs of innovative requirement

Input	Output
<ul style="list-style-type: none"> ● Potential interview with the client, initial emails, proposals and supporting docs by the client, discussion notes. ● Recorded telephone conversations and Skype Chat ● Estimated Budget Portfolio Showcase 	<ul style="list-style-type: none"> ● Development process ● Estimated cost ● Team requirements (No of designers, developers, BA, QA, SEO etc.) ● Hardware-software requirements ● Report documents ● Final client approval for the project.

Step-2: Information Gathering: Information gathering stage is also known as discovery phase. In this phase, the designer portrays the client’s vision into the paper and is most important phase of website design & development process. In this step, it is important to understand the purpose of creating a website, target audience as well as the content they look for. These factors are very crucial to determine in the fundamental phase of website design. Various inputs and outputs of information gathering are stated below:

Table 7.5: Various inputs and outputs of information gathering

Input	Output
<ul style="list-style-type: none"> • Reports from clients and documentations from Business Analyst 	<ul style="list-style-type: none"> • Complete final project documentation with requirement specifications and individual work described to the designers as well as developers.

Step-3: Planning: Good website is the result of good planning. After the information gathering planning is important. Planning is nothing but prioritizing tasks for website completion. In this step, the sitemap of the website is developed in which menu, contents, navigational system etc. of the websites is developed. Various inputs and outputs of planning are stated below:

Table 7.6: Various inputs and outputs of planning

Input	Output
<ul style="list-style-type: none"> • Final project documentation 	<ul style="list-style-type: none"> • clickable prototype and sitemap containing all WebPages

Step-4: Web Design: Web design is the website that supports good look, feel and makes it different from others. This is the creative phase of website design. This is the phase where designers put their efforts to make the website look good and different from others. The designer needs to understand each and every aspect of the client's expectation and try to sketch it. In this step logo design, templates etc. are discovered. Various inputs and outputs of web design are stated below:

Table 7.7: Various inputs and outputs of web design

Input	Output
<ul style="list-style-type: none"> • Wireframes 	<ul style="list-style-type: none"> • Site design with layout templates and images

Step-5: Web Development: After designing, there is a development phase also known as 'implementing phase'. Now, this is the phase where the actual website starts its implementation. The development phase is also a very crucial phase for the website design. In this phase, all the information gathered from the initial phase is integrated like creating a database, logic & actual programming to name. Various inputs and outputs of web development are stated below:

Table 7.8: Various inputs and outputs of web development

Input	Output
<ul style="list-style-type: none"> • Website with forms and complete requirement specifications 	<ul style="list-style-type: none"> • Website with database driven functions, Coding docs

Tools: Dreamweaver CS6, Bootstrap, JQuery, AngularJS, CoIgnitor, PHP, CSS3, HTML5, Javascript

Step-6: Testing: After the Development phase, there is a Testing & Discovery Phase. The testing in this phase are done by Quality Assurance (QA), also responsible for preparing the test cases. The various types of website testing are. Content Testing, Functional Testing, Design Testing etc. Various inputs and outputs of testing are stated below:

Table 7.9: Various inputs and outputs of testing

Input	Output
<ul style="list-style-type: none"> The site, Requirement specifications, supporting documents, technical specifications, and technical documents. 	<ul style="list-style-type: none"> Complete website testing and error logs reports, frequent interaction with the developers and designers.

Tools: GTmatrix, Google Page speed tool, W3c Validation, Screaming Frog

Step-7: Maintenance: The last phase is Maintenance, in this stage, the maintenance of the website is done for a limited time period only. Maintenance means updating the contents & design of the website. The maintenance facility is provided for limited time by the company but if the user wants to extend the service, they are charged extra for it. Various inputs and outputs of maintenance are stated below:

Table 7.10: Various inputs and outputs of maintenance

Input	Output
<ul style="list-style-type: none"> Live Website, Analysis reports. 	<ul style="list-style-type: none"> Updated Website, Maintenance reports

Check Your Progress A:

- Name the various phases of website development.

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- How does a website help in market expansion?

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3. Distinguish between the sales websites and utility websites.
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4. What is the significance of websites in information exchange?
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7.8 INGREDIENTS REQUIRED FOR WEBSITE DEVELOPMENT

These days, the web is approximately unrecognizable from the early days of white pages with lists of blue links. Now, sites are premeditated with multifaceted layouts, exceptional fonts, and customized color schemes. For staying ahead of the competition, the interactivity of websites is a must and adding some of these types of capabilities requires a stronger programming language. Web design is actually how a site works and the feelings it invokes with its users. With this expanded perspective, below explained are ingredients that are critical for an optimal website:

1. **Clean navigation:** Navigation is the first thing people notice about the site. Top-notch navigation allows the users to move from page to page, and finding everything they want without wasting a fraction of a second. For example, in the figure 7.8, navigation is properly given through which the visitors can easily locate what they are looking for.
2. **Beautiful typography:** Typography is a really big deal. A website that looks great always has beautiful typography. Typography starts with font choices, but goes far beyond into color, sizing, line height, paragraph margins and padding. For example, in the figure 7.8, content is very well designed and put to make it understandable for the visitors.
3. **White space:** Proper spacing is critical for a great site. In fact, it may be the most important element. A message's impact depends on the element of space just as much as that message's content. Without white space, a site will turn into visual garbage quickly. For example, the figure 7.8 given below, proper space is provided between all the major and sub heads.

4. **Logical layout:** Logical Layout is somewhat vague, but a site must be connected in a way that makes sense. A great design will take a prospect through a journey, yet allow them to skip around at will. This is about presenting the right thing at the right time in the right way.

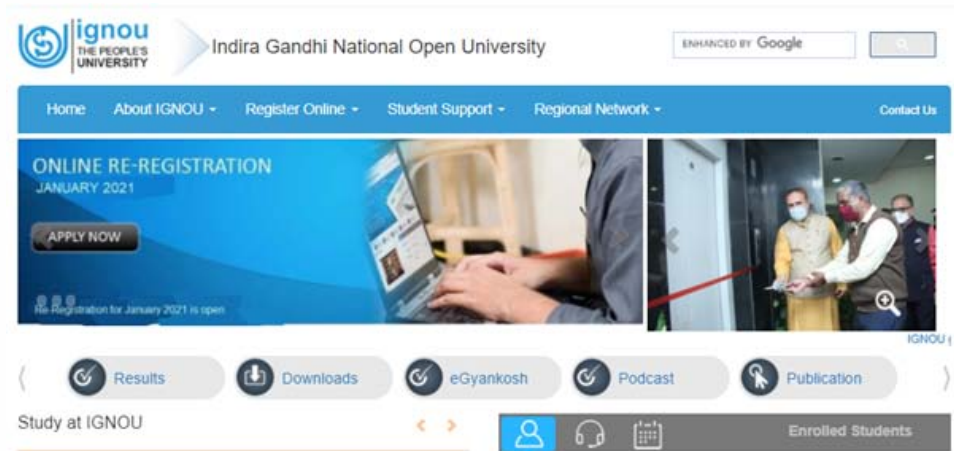


Fig 7.8: IGNOU Website

5. **Design with a purpose:** The best design is as little design as possible. This is a core foundational concept for beautifully designed sites. Everything within a great website should pack a punch; it should all accomplish something without getting in the way of itself. For example, IGNOU website is designed keeping in mind the motive to provide all necessary and mandatory information about the results, admission process, and assignments submission by the learners.
6. **Speed:** Speed wins over the internet. Customers do not like to wait much for their needs and they want to find what they need as soon as possible. Making the desired customers wait is more or less equivalent to losing forever. The speed of the website must be taken into proper consideration, the pages must download quickly and the orders must be processed quickly.
7. **Detail:** The website must provide the details the customers can look for such as product information, service information, customer service information etc. The details provided must be easy to access and sufficient enough to address the queries potential customers may have. For example, the IGNOU website in fig. 7.8 also provides various details about its locations, study centres, headquarter, contact information etc.
8. **Multiple feedback channels:** The website must provide the multiple communication and feedback options to the visitors such as phone number, an email, a live chat link, a discussion board or social media tools so that they can contact the concern authority in no time. In short, the website should be great, but it should also showcase other channels that allow the user to contact easily.

7.9 WEBSITE HOSTING

A web hosting service is a type of Internet hosting service that allows individuals and organizations to make their website accessible via World Wide Web. Web hosts are companies that rent out their services and technologies to host websites on the internet.

A space on a web server is allocated to store the files by the hosting provider. Web hosting makes the files available for viewing online. Web hosting provides services and infrastructure to develop, store, and deploy globally available websites and web apps in the cloud so startups can focus on applications and users.

Once the hosting company hosts the website, users can access it by typing in the web address (domain name) in their web browser. When they do this, their computer connects to the server on which the website is hosted. Web hosts can also provide data center space and connectivity to the Internet for other servers located in their data center, called Co-location. All websites on the internet, need web hosting. When someone enters the domain name in a browser, the domain name is translated into the IP address of the web hosting company's computer. This computer contains website's files, and it sends those files back to the users' browsers.

7.9.1 Types of Website Hosting

Various types of web hosting services are explained in detail below:

1. **Shared hosting:** Shared hosting is perfect for entry-level website hosting. With a shared hosting plan, all domains share the same server resources, such as RAM (Random Access Memory) and CPU (Central Processing Unit). However, because all resources are shared, the costs of shared hosting plans are relatively low, making them an excellent option for website owners in their beginning stages. Although shared hosting provides website owners with a more simplistic approach to the web. This means that surges in usage can ultimately affect the website's user experience. Shared hosting plans are ideal for website owners that do not receive a large amount of web traffic.
2. **Virtual private server (VPS) hosting:** A VPS hosting plan is the ultimate middle ground between a shared server and a dedicated server. It is ideal for website owners, who need more control, but do not necessarily need a dedicated server. VPS hosting is unique because each website is hosted within its own space on the server, though it still shares a physical server with other users. VPS hosting provides website owners with more customization and storage space. Typically, VPS hosting is used by website owners who want dedicated hosting but do not have the technical knowledge needed.

3. **Dedicated server hosting:** Dedicated hosting gives website owners the most control over the server on which their website is hosted. Dedicated servers' cost is one of the most expensive web hosting options. They are mostly used by website owners with high levels of website traffic, and those who are in need of complete control of their servers. In addition, a high level of technical expertise is required for the installation and ongoing management of the server. The user has full administrative access to the server, which means the client is responsible for the security and maintenance of his own dedicated server.
4. **Cloud hosting:** Cloud hosting is the current buzzword of the technology industry. In Web hosting, it means many computers working together, running applications using combined computing resources. This allows users to employ as many resources as they need without having to build and maintain their own computing infrastructure. The resources that are being used are spread across several servers, reducing the chance of any downtime due to a server malfunction. Cloud-based hosting is scalable, meaning that site can grow over time, using as many resources as it requires and while the website owner only pays for what they need.
5. **Managed hosting:** The user gets his or her own Web server but is not allowed full control over it (user is denied root access for Linux/administrator access for Windows); however, they are allowed to manage their data via FTP or other remote management tools. The user is disallowed full control so that the provider can guarantee quality of service by not allowing the user to modify the server or potentially create configuration problems. The user typically does not own the server. The server is leased to the client.
6. **Co-location web hosting service:** Co-location web hosting service is similar to the dedicated web hosting service, but the user owns the co-server; the hosting company provides physical space that the server takes up and takes care of the server. This is the most powerful and expensive type of web hosting service. In most cases, the co-location provider may provide little to no support directly for their client's machine, providing only the electrical, Internet access, and storage facilities for the server
7. **Clustered hosting:** Cluster hosting allows multiple servers hosting the same content for better resource utilization. Clustered servers are a perfect solution for high-availability dedicated hosting, or creating a scalable web hosting solution. A cluster may separate web serving from database hosting capability. Usually, web hosts use clustered hosting for their shared hosting plans, as there are multiple benefits to the mass managing of clients.
8. **Grid hosting:** Grid hosting is a service that provides grid computing Capabilities to its clients This form of distributed hosting is adopted

when a server cluster acts like a grid and is composed of multiple nodes. Much like cluster hosting, grid hosting makes it less likely that a spike in resource needs will take site offline

7.9.2 Web Hosting Alternatives

Websites are an important component of business these days. Hosting of websites may not be feasible due to technology, budget, infrastructure, and continuous updating. Web hosting is referred to as storage of contents on the web server (host) of the hosting service provider. The host can be anywhere in the world but it has power, internet connections and dedicated IP addresses. Data Centre has all necessary hardware and software that provide the connections through the Internet, Intranet, and Extranet. In a Co-location (also spelled Co-location) service, the service provider rents a physical space to the client to install its own server hardware. These features make your site available 24×7×365.

The service provider is responsible for maintaining the Web server hardware and software, and provides the connection to the Internet through its routers and other network hardware. Since the whole world is moving from brick & Mortar system to click & Mortar system and due the usage of Smartphone the app based business restricts to mobile hence the app is taken as a replacement to websites.

Check Your Progress B

1. Differentiate between HTTP and HTML.

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2. What is a URL? Give an example of URL.

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3. What do you understand by web hosting?

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4. Distinguish between cloud hosting and cluster hosting.

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7.10 LET US SUM UP

A website (also in black and white as a web site) is a compilation of web pages and associated content that is acknowledged by a general domain name and published on at least one web server. Various examples of websites are wikipedia.org, google.com, and amazon.com and www.ignou.ac.in etc. Basically, for a layman a website is a set of data and information about a particular subject which is available on the Internet. Websites can be used in various ways for a number of purposes such as a personal website for someone's own business or profession, a corporate website for a company, a government website for any government organization or any other organizational website, etc.

Every URL link that begins with HTTP uses a basic type of "hypertext transfer protocol". Which was developed in early 1990's by Tim Berners-Lee. This network protocol enables web browsers and servers to communicate through the exchange of data. Hyper Text Transfer Protocol Secure (HTTPS) is the secure version of HTTP, the protocol over which data is sent between your browser and the website that you are connected to. The 'S' at the end of HTTPS stands for 'Secure'. It means all communications between browser and the website are encrypted.

The choice of the type of websites depends on the requirement of the seller. Websites can mainly be categorized into four broad categories namely authority website, lead generation website, sales website and utility website explained in detail below respectively. By knowing the requirements of website in advance, one can save unnecessary wastage of time, money and opportunity cost.

Website development is the effort involved in developing a website for the Internet or an intranet. Web development can vary from developing a simple single static page of plain text to complex Web-based Internet applications, electronic businesses, and social network services. Web development is the maintenance and development of a website. Basically, it is the effort that happens in the backdrop to make a website look informative, speedy

processing and provide exact information. Process of website development includes various steps such as, innovative requirement, information gathering, planning, web design, web development, testing & maintenance.

These days the web is approximately unrecognizable from the early days of white pages with lists of blue links. Now, sites are premeditated with multifaceted layouts, exceptional fonts, and customized color schemes. For staying ahead of the competition, the interactivity of websites is a must and adding some of these types of capabilities requires a stronger programming language. Web design is actually how a site works and user friendliness. Expanded perspective ingredients critical for an optimal website are clear navigation, beautiful typography, white space, logical layout, synergy between message and design, design with a purpose, speed ,detail, multiple feedback channels etc.

A web hosting service is a type of Internet hosting service that allows individuals and organizations to make their website accessible via World Wide Web. Web hosts are companies that rent out their services and technologies to host websites on the internet. Once the hosting company hosts the website, users can access it by typing in the web address (domain name) in their web browser. When they do this, their computer connects to the server your website is hosted on. Various types of web hosting are Shared hosting, Virtual private server (VPS) hosting, Dedicated server hosting, Cloud hosting, Managed hosting, Co-location web hosting service, Clustered hosting, Grid hosting etc.

7.11 KEY WORDS

HTML: Hyper Text Markup Language (HTML) is the set of markup symbols or codes inserted into a file intended for display on the Internet. The markup tells web browsers how to display a web page's words and images.

HTTP: Hypertext Transfer Protocol (HTTP) is a connectionless text-based protocol. Clients (web browsers) send requests to web servers for web elements such as web pages and images. After the request is serviced by a server, the connection between client and server across the Internet is disconnected.

Search Engine: Search engine is a web service that helps in finding other web pages, such as Google, Bing, Yahoo etc. are normally accessed through a web browser or through a web page.

URL: URL stands for Uniform Resource Locator. A URL is nothing more than the address of a given unique resource on the Web.

Web Browser: A web browser is an application used to access and view websites. Examples of most commonly used web browsers are Microsoft

Edge, Internet Explorer, Google Chrome, Mozilla Firefox, and Apple Safari etc.

Web Hosting: Web hosting is an online service that enables the publishing of a website or web application on the Internet. When one signs up for a web hosting service, they basically rent some space on a physical server.

Web Page: Web pages are also called just pages. Basically, a web browser is a document which can be displayed in a web browser.

Web Server: A server is a computer that provides data to other computers. The data may be served to a system either on a local area network (LAN) or on a wide area network (WAN) over the Internet.

Website: A website is a collection of related web pages, including multimedia content, typically identified with a common domain name, and published on at least one web server.

7.12 TERMINAL QUESTION

- 1) What is a website?
- 2) Briefly explain the origin of the website.
- 3) What are the various types of websites?
- 4) State the usages of websites.
- 5) State the differences between HTTP and HTTPS.
- 6) State the various phases of the website development process.
- 7) What are the various ingredients required for making a website?
- 8) What is web hosting? What are the various types of web hosting?



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.

UNIT 8 E-COMMERCE SOFTWARE PLATFORM

Structure

- 8.0 Objectives
- 8.1 Introduction
- 8.2 E-commerce Software Platform
- 8.3 Types of E-commerce Platform
 - 8.3.1 Shopify- An Online Store Builder
 - 8.3.2 E-Auction Processes The Real-Time Visibility
 - 8.3.3 Paypal Holdings Online Payments
 - 8.3.4 SAP Commerce Cloud
- 8.4 Functions of E-Commerce software Platforms
- 8.5 Advanced Functions of E-Commerce Software
- 8.6 E- Commerce Software for Small & Midsize Companies
- 8.7 E- Commerce Software for Midsize to Large Business
- 8.8 E- Commerce Software for Large Business
- 8.9 Planning Electronic Commerce Initiatives
- 8.10 Strategies for Developing E- Commerce Websites
- 8.11 Managing E- Commerce Implementations
- 8.12 Let Us Sum Up
- 8.13 Key Words
- 8.14 Answers to Check Your Progress
- 8.15 Terminal Question

8.0 OBJECTIVES

After studying this unit, you should be able to,

- understand basics of e-commerce software;
- know about various types of software platforms;
- know about the functions of e- to understand commerce software;
- understand the uses of e-commerce software for small, midsize, large business;
- explain strategies for developing e-commerce websites; and
- learn managing the implementation process of e-commerce in business.

8.1 INTRODUCTION

E-commerce software platform is the driving force of an online store, making it feasible to effortlessly manage inventory, add or remove products, calculate taxes, and everything else required to manage a website and fulfill orders.

Today's competitive organizations need to develop a wide range of e-commerce software that can tap as much data as possible and quickly deploy that data via the web to managers, employees, partners, suppliers, customers and constituents everyone they depend on to make decisions. Developing usable, deployable, and scalable e-commerce software is becoming essential every day. Finally, a true Web architecture is essential for rapidly providing these business intelligence applications to unlimited number of people, and see a quick return on investment. It can use the same Web-based, integrated Windows development solution to deploy information with speed, quality, and effectiveness that users of all levels can use to access information in any format. In addition, it can securely manage and administer the system while still allowing power users to develop their own application. The unit further brief on various popular E-commerce software.

8.2 E-COMMERCE SOFTWARE PLATFORM

A platform is basically a position of software and connecting an ecosystem of resources that helps companies to grow the business. A platform enables expansion through relation, its value comes not only from its own features, but from its ability to tie external tools, teams, data, and processes etc. E-commerce software platform is the engine behind the scenes of an online store, making it possible to easily handle inventory, add or remove products, calculate taxes, and everything else required to administer a website and fulfill orders.

E-commerce software simplifies intricate processes in a friendly user interface that enables people from non-technical backgrounds to oversee an entire e-commerce process. Despite the ease of use that e-commerce software brings to an online business, it is a versatile and complex machine. In the coming heads we are going to discuss the various functions of software which would be useful in running a business.

8.3 TYPES OF SOFTWARE PLATFORMS

More or less, every grassroots entrepreneur who starts a setup from scratch or runs the existing business needs some kind of a 'platform'. Yet very few will self-assuredly respond a seemingly simple, but very significant query: What kind of platform do you build?

Google Search, Facebook, Android, Uber, AirBnB, Waze, Amazon Web Services, Amazon Marketplace, WeWork, and even Bitcoin are all platforms. At the same time, these platforms are very dissimilar in how they generate network effects, interactions they facilitate.

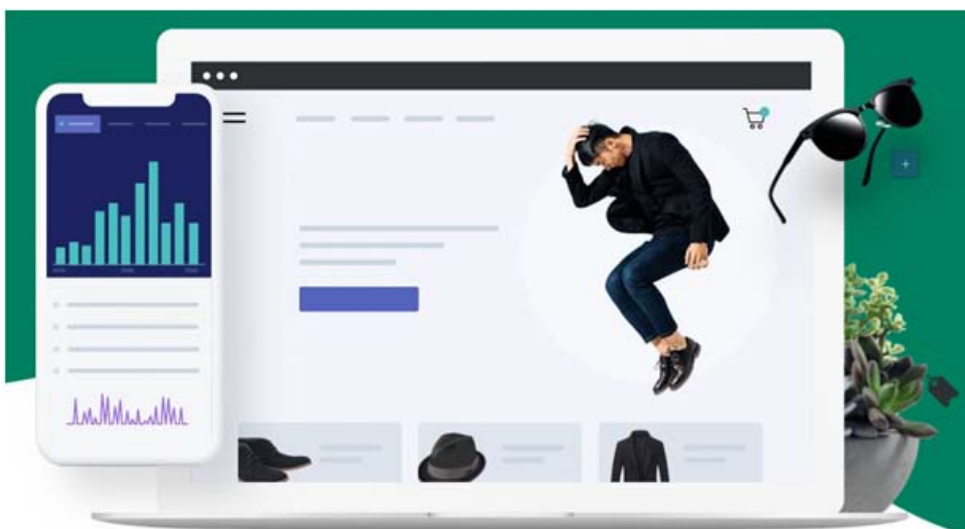
There are various kinds of E-commerce software which have certain characteristics and could be used as per the need and requirement. We will throw light on a few of them on one-to-one basis so that learners are able to visualize how these types of software platforms work.



Figure 8.1: Types of Software platforms

8.3.1 Shopify- An Online Store Builder

Shopify is an easy-to-use online store builder trusted by over 1,000,000 stores. By entering your email, you agree to receive marketing emails from Shopify. 100+ Professional Themes. Drop Shipping Integration. Social Media Integration. Unlimited Bandwidth. SEO Optimized.



*Source: <https://www.shopify.in>

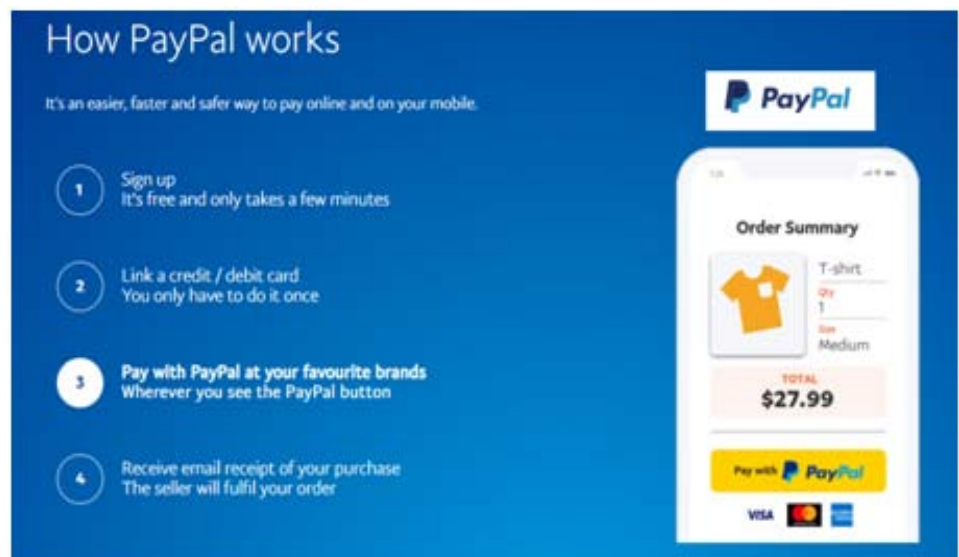
Figure 8.2: Shopify

8.3.2 E-Auction Processes the Real-Time Visibility

E-Auction processes the real-time visibility of the bids happening on any product. Sellers will have the elasticity to offer products with different prices and at the same time, buyers will have a translucent bidding process to show their instant response. Selling Products online with an auction setup helps the merchants to know the competitive environment of E-Commerce as well as the auction industry. Bidders who participate in the auction will have an unlimited reach of the global audience and can easily filter out the products in high demand.

8.3.3 Paypal Holdings Online Payments

PayPal Holdings, Inc. is an American company operating an online payments system in the majority of countries that support online money transfers, and serves as an electronic alternative to traditional paper methods like checks and money orders. PayPal is one of the largest online payment processors in the world. Shopping or selling with PayPal, make it faster, safer and easier for everyone to shop or sell globally with confidence.



*Source: PayPal

Fig 8.3: PayPal

8.3.4 SAP Commerce Cloud

SAP is at the centre of today's technology revolution. The market leader in enterprise application software, SAP helps organisations fight the damaging effects of complexity, generate new opportunities for innovation and growth, and stay ahead of the competition. SAP Commerce Cloud Helps the business lead through innovation to deliver exceptional omni-channel buying experiences with a cloud-native, headless e-commerce solution. SAP India is the fastest growing subsidiary of SAP SE, the world's leading provider of business software solutions.



*Source: SAP

Figure 8.4: SAP Commerce Cloud

8.4 FUNCTIONS OF E-COMMERCE SOFTWARE PLATFORMS

E-commerce software is the driving force behind the scenes of an online store which making it likely to effortlessly administer stock, add or remove products, compute taxes, and the whole thing else required to handle a website and accomplish orders. The basic function of e-commerce software includes the following three important sections:



Figure 8.5: Function of E-Commerce Software

1. **Catalog display:** To display products offered by an organization they have to be arranged in a systematic manner including customer preferences with the help of simple static catalog. The webpage is written in HTML to display a series of Web pages which can be edited by companies as and when needed. Dynamic catalog stores that are specifically designed on the basis of customer choice including multiple photos of each item description of product including search feature that allows customers easily search product availability. A dynamic catalog stores the information about items in a database, usually on a separate computer that is accessible to the server that is running the Web site itself.
2. **Shopping cart capabilities:** Selected items in the early days of e-commerce, they have to fill a form or a list they want to purchase by

filling out online forms. Using text box and list box form controls to indicate their choices, users enter the quantity of an item in the quantity text box, the SKU (stock-keeping unit) or product number in another text box, and the unit price in yet another text box. This system is full of hassles especially if your order nature is multiple items at the same time.

3. **Transaction processing:** Transaction processing includes, checking in/out process shoppers initiate on website or mobile application. The electronic software performs necessary calculations such as number of items, volume, discounts, tax, and shipping cost. When order is placed and customer checks out; the transaction process enters the next stage where secure communication caution states from buyer to seller for necessary transactions. Transaction process is an important and complex part of online sales. Transaction processing is always a typical part of online business. Once order is placed, then the responsibility and moral duty of the seller is towards the customer to provide secure, effective and in time communication for the delivery of goods and services with feedback.

8.5 ADVANCED FUNCTIONS OF E-COMMERCE SOFTWARE

Integrating different components is important for large businesses houses, because range of products are not limited, their business interest spread over many products and services. The other operations of e-commerce activities are as follows:

1. **Middleware:** Such larger companies need to establish the connections between their e-commerce software and their existing business/accounting system by using a type of software called middleware. Some large companies that have sufficient IT staff write their own middleware. However, most companies purchase middleware that is customized for their businesses by the middleware vendor or a consulting firm. Thus, most of the cost of middleware is not the software itself, but the consulting fees needed to make the software work in a given company. Making a company's information systems work together is called interoperability and is an important goal of companies when they install middleware. Middleware cost range from few lakhs to several millions depending on complexity and existing systems.
2. **Enterprise application integration and databases:** A program that is used to perform specific functions, such as creating and arranging invoices, calculating payroll, or processing payments received from customers, is performed by different application software or, more simply, an application. An application server is a computer that takes the request messages received by the Web server and runs application programs that perform some kind of action based on the contents of the

request messages. The actions that the application server software performs are determined by the rules used in the business. These rules are called business logic. An example of a business rule is, when a customer logs in, check the password entered against the password file in the database. Application servers are usually grouped into two types, page-based and component-based systems. Page-based application systems return pages generated by scripts that include the rules for presenting data on the Web page with the business logic. Larger businesses often prefer to use a component-based application system that separates the presentation logic from the business logic. Each component of logic is created in its own module.

3. **Web services:** Web server includes all information that can be communicated across organization in the different applications and clients. Although a generally accepted definition has not yet evolved, many IT professionals define Web services as a combination of software tools that let application software in one organization communicate with other applications over a network by using a specific set of standard protocols known by their acronyms as SOAP, UDDI, and WSDL etc. Another definition of Web services that IT professionals use is a self-contained, modular unit of application logic that provides some business functionality to other applications through an Internet connection.
4. **Integration with ERP systems:** Enterprise Resource Planning (ERP) connects to existing information available on the basis of B2B websites. ERP software is a collection of different programs that integrate all facts of business including accounting, logistics, manufacturing, planning, project management, and treasury function. The major ERP vendors include Baan, Oracle, PeopleSoft, and SAP. A typical installation of ERP software costs between 10 lakhs to 15 lakhs. Thus, companies that are already running these systems have made a significant investment in them and expect their electronic commerce sites to integrate with them.

8.6 E-COMMERCE SOFTWARE FOR SMALL AND MIDSIZE COMPANIES

Web hosting services can be hired so that in-house burden can be shifted and dedicated hosting services can be used. Web host CSPs (Compute cycles Service Providers) have the same advantages as ISP (Internet Service Provider) hosting services, including spreading the cost of a large Web site over several “renters” hosted by the service. The biggest single advantage - low cost - occurs because the host provider has already purchased the server and configured it.

Mall-style Commerce service providers (CSPs) provide small businesses with a high speed Internet connection, Website creation tools, and little or no banner advertising clutter. Web hosts in this group charge a monthly fee that

is often higher than that of lower-end providers, and may also charge one-time setup fees. Some of these providers also charge a percentage of or fixed amount for each customer transaction. These Web hosts also provide high quality tools, storefront templates, an easy-to-use interface, and quick Web page generation capabilities and page maintenance.

Mall-style CSPs provide shopping cart software or the ability to use another vendor's shopping cart software. They also furnish customer payment processing so that customers can choose to purchase their goods and services with a credit card or other form of payment. The CSP processes the acceptance and authorization of credit cards on behalf of the merchant. Another benefit is that because they are paying a monthly fee to the CSP, sites do not have to display any Web banners, which can be unattractive and distracting. The fourth benefit of the mall-style CSPs is that they provide higher-quality Web store building and maintenance tools than do the basic CSPs. CSPs that offer mall-style commerce services include eBay Stores and Yahoo! Store. Another CSP that began as a mall-style service is big step, but it no longer uses the mall structure. All three of these CSPs offer Web site construction tools that can be used by small and midsize businesses to take their businesses online.

8.7 E-COMMERCE SOFTWARE FOR MIDSIZE TO LARGE COMPANIES

There is a number of E-commerce software available for midsize and large businesses. These software packages differ on price, capabilities, database connectivity, software portability, software customization, tools and technical expertise required to manage the software. Some of them are mentioned below:

1. **Website development tools:** Although they are more often used for creating small business sites, it is possible to construct the elements of a midrange e-commerce Web site using Web page creation and site management tools. For example, recent versions of Macromedia Dreamweaver include all integrated development environments.
2. **Inter shop enfinity:** It Provides search and catalog capabilities, electronic shopping carts, online credit card transaction processing, and the ability to connect to existing back-end business systems and databases.
3. **IBM Web Sphere commerce professional edition:** It is a set of software components that provide software suitable for midsize to large businesses to sell goods and services on the Internet It includes catalog templates, setup wizards, and advance catalog tools to help companies create attractive and efficient electronic commerce sites.

4. **Microsoft commerce server 2002:** It allows businesses to sell products or services on the Web using tools such as user profiling and management, transaction processing, product and service management, and target audience marketing.

Check Your Progress A:

- 1) What is a shopping cart?

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- 2) What are the advantages of mall-style CSPs?

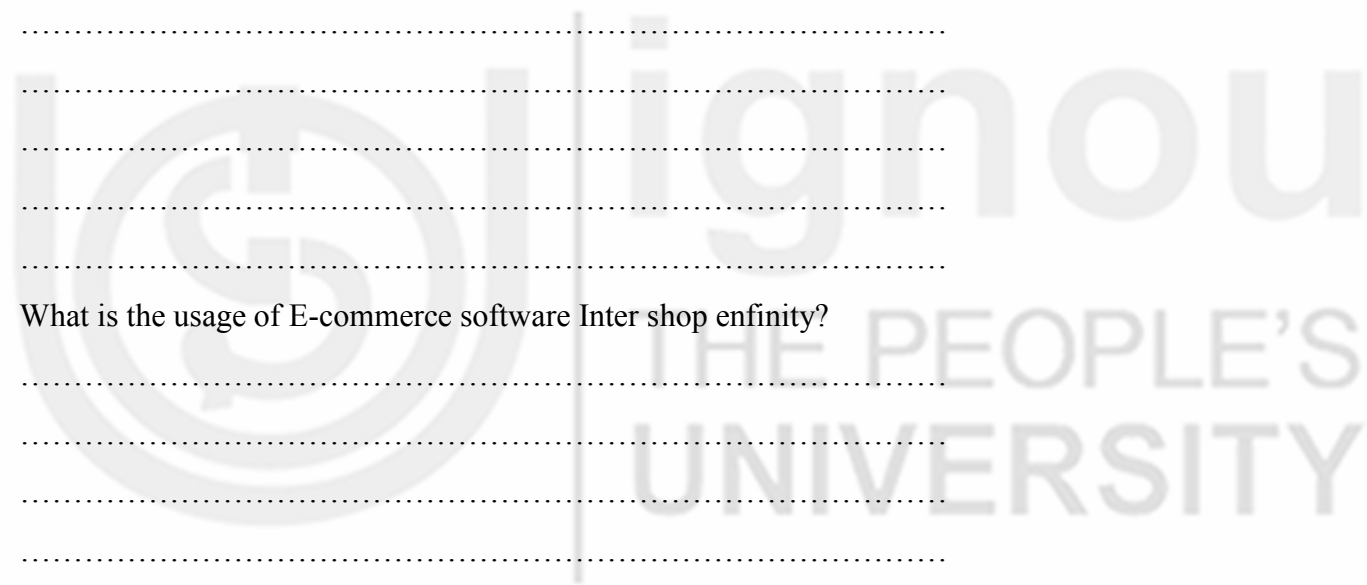
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- 3) What is the usage of E-commerce software Inter shop enfinity?

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- 4) What is a middleware?

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8.8 E-COMMERCE SOFTWARE FOR LARGE COMPANIES

Large e-commerce sites deal with transactions of higher volume and therefore needs dedicated software to handle specific elements of their online business such as customer relationship management, supply chain management, content management and knowledge management. So, the prices as well as support cost are high for large-scale e-commerce software. Large scale e-commerce software is also called enterprise E-commerce software. Enterprise e-commerce software provides tools for both B2B and B2C commerce and can interact with a wide variety of existing systems, including database, accounting, and ERP systems. The enterprise software is also capable of making changes in the system automatically (e.g., inventory checking and order placement for items needed). In contrast, both basic and midrange E-commerce software usually require an administrator to manually make such changes. Enterprise E-commerce software usually requires several dedicated computers. IBM Websphere Commerce Business Edition, Oracle E-Business Suite, and Broad vision Commerce Agility Suite are few examples of E-commerce software. Various e-commerce software for large sized companies are stated below:

1. **Enterprise-class electronic commerce software:** Enterprise-class e-commerce software running large online organizations usually requires several dedicated computers - in addition to the Web server system and any necessary firewalls. Examples of enterprise-class products that can be used to run a large online business with high transaction rates include IBM Websphere Commerce Business Edition, Oracle E-Business Suite, and Broad vision One-To-One Commerce.
2. **Customer relationship management software:** This software obtains the data from operations software that conducts activities such as sales automation, customer service center operations, and marketing campaigns. The software must also gather data about customer activities on the company's Web site and any other points of contact the company has with its existing and potential customers.
3. **Supply chain management software:** This software helps companies to coordinate planning and operations with their partners in the industry supply chains of which they are members. SCM software performs two general types of functions: planning and execution.
4. **Content management software:** These software help in arrangement of data in such a manner that can be accessed easily for business decision making. Helps companies control the large amounts of text, graphics, and media files that have become a key part of doing business. With the rise of wireless devices, such as mobile phones, handheld computers, and

personal digital assistants (PDAs), content management has become even more important.

- 5. Knowledge management software:** This software is used by different companies to do four main things: collect and organize information, share the information among users, enhance the ability of users to collaborate, and preserve the knowledge gained through the use of information so that future users can benefit from the learning of current users. KM software includes tools that read electronic documents (in formats such as Microsoft Word or Adobe PDF), scanned paper documents, e-mail messages, and Web pages processing.

8.9 PLANNING E-COMMERCE INITIATIVES

The ability of the businesses to plan, design and implement cohesive electronic commerce strategies will make the difference between success and failure for the majority of them. The tremendous leverage that a firm can gain by being the first to do businesses a new way on the web has caught the attention of top executives in many industries. The key to successful implementation of any information technology project are planning and execution. A successful business plan for an electronic commerce initiative should include activities that identify the initiative's specific objectives and link those objectives to business strategies. In setting the objective for an electronic commerce initiative, managers should consider the strategic role of the project, its intended scope, and resources available for executing it. Thus, four major steps in planning electronic commerce initiatives are as follows:

- 1. Identify potential e-commerce initiatives:** Electronic-commerce can provide two benefits to companies: first, value creation or value enhancement for one or more of a company's stakeholder groups; and second, lower costs.
- 2. Analyse the functional scope of e-initiatives:** Electronic initiatives decided on the basis of e-commerce network and Functional scope between them. Managers should keep in mind about the architecture needed for e-commerce and its functional scope. Services and capabilities are the basis of the e-commerce network layer which include basic communication services and infrastructure components like security and reliability. These do not add value but are necessary for further process. Decision process ameliorates management's ability to make decisions. Integration process permits the automation of processes between a company and its customers or suppliers. Trade processes support buying and selling online. They can both add value and save costs for business transactions.
- 3. Analyse the sustainability of benefits from e-commerce initiatives:** E-commerce is coordinated use of software and system that enables external parties in business which includes competitors to obtain insight

into a company's operations. Thus, innovations involving electronic commerce interactions can be easily copied and even ameliorated upon by competitors, often at lower cost. So, it is important to examine the sustainability of any competitive advantage that might be derived from an e-commerce project. For the most part, sustainability is acquired from two key factors i.e. barriers to entry and early mover advantages.

- 4. Prioritize e-commerce initiatives:** The outcome of planning is planned since several e-commerce plans may well be under analysis at the same time, perhaps by different groups or units within the same organization. Managers (executives) must be able to choose among them. Decision making is based upon the alternatives available according to plan; the traditional cost-benefit analysis can be applied to electronic commerce initiatives and combined with a portfolio drafting approach for prioritizing and scheduling projects for effective e-commerce houses.

8.10 STRATEGIES FOR DEVELOPING E-COMMERCE WEBSITES

The commerce industry is growing with rapid speed as growth rate is continuously increasing. The process of e-commerce website development project are categories into seven major steps which are as follows:

- 1. Identify the product/service, and the customer:** The first step for e-commerce website development is to identify the products/services which the company wants to sell in the market to the target population. As it is essential to identify which products are to be sold and to whom.
- 2. Know your e-commerce customer:** KYeC is vital for any business to understand who their customer is for success in the long run. So, they can allure them in the best possible way. One way to obtain this is by evaluating the customers of the competitors.
- 3. Choose the right e-commerce website development platform:** Appropriate e-commerce platform is a software suite that aids build the e-commerce store where marketers make their products available, and customers can process transactions. Choosing the right e-commerce platform is vital to any online business as it is the very foundation of the business.
- 4. Choose the right e-commerce website hosting platform:** Business success and failure choice of server and hosting are a crucial factor. It determines the website's accessibility and performance efficiency. Costs cutting are an important factor while deciding about website hosting and support; outsourcing can be exercised.
- 5. Choose the right e-commerce development partner:** Choosing for e-commerce technology development partners or e-commerce vendors

can be very difficult. The market is very crowded with service providers and with each one claiming to offer the services which suit best to company needs.

6. **E-commerce website testing:** After completion of the website development, the next crucial step is e-commerce website testing. Testing checks usability, customer convenience, checks for bugs, and is important to providing a good shopping experience. Testing is usually implemented in various browsers, across platforms, and across devices. Websites can be tested manually, or automatically, or a combination of the two followed by feedback.
7. **Effective marketing:** E- marketing plays a crucial role at this stage, it is important to advertise it to people. For advertising the website, marketers need to have a promotional plan drafted out including all means of advertising. In a crowded market of business owners competing for customers' attention, it is hard to get new customers or sustain existing ones without proper marketing.

8.11 MANAGING E-COMMERCE IMPLEMENTATIONS

E-commerce business depends upon implementation and adoption in process; successful systems have seven key steps such as

1. **Strategic business planning and roadmaps:** Strategy is about making the right choices that will help reach the stated e-commerce business objectives. There should be an articulated vision, mission and objective about what will be achieved, time limit for it, financial budget, identification of the right resources for and constraints in the face of implementing the strategy mentioned in the business plan, and what elements will be considered for future.
2. **Technology selection/ website audit and analysis:** To provide the maximum benefit to or creating value for the end customer, selection of e-commerce technology should have the capability of adapting according to customers' needs, and be able to complement the business model, and ensure the alignment with the existing best practices in offline retail.
3. **Customer acquisition:** Online or popular digital marketing consists multiple tools for contact to the new generation of customers, who access online content through multiple devices, through search engine optimization, search engine marketing (paid advertisement), social media marketing (both cost per click and cost per thousand impressions), email campaigns, display advertisements through various ad networks, referral programs and retargeting campaigns.

4. **Customer engagement:** Engaging customers through various social media channels also instills superior trust in the minds of customers. Nowadays, customers seek to analyse the brands to understand the core benefits and unique value proposition provided by the brand, they look for offers, discounts and offers during special seasons, a mechanism for queries/clarifications relating with the products displayed and interaction with customer support executives etc.
5. **Customer retention:** It should be noted that to fully leverage best technology, there should be a constant effort to pay attention for features and functionalities that will strengthen the customer experience. With the arrival of sophisticated electronic-commerce technologies, one-to-one customer experience is becoming a reality in business and new age retailers will be able to retain by providing customized services and products and that's the best a customer can really expect.
6. **Optimization based on key metrics:** Some of the key elements to measure the health of an e-commerce venture are the total revenue generated, customer acquisition cost, percentage of customers converted, and percentage of customers entering the website by using various channels. However, these elements may vary based on the business objectives and so every electronic business needs a fully customized approach for defining the key elements and further analysis. After that, a deeper level of optimization is needed at 2 levels – on the technology and the business front.
7. **Business analysis and customer insights:** The last step of this process is about knowing the product group that has performed well in comparison to other products in the webstore. Assessing this is crucial for a company to survive in the market as those categories occupy the prime real estate in the online world – the web store. It should consist of understanding the customer segments, demographics, profitable customers, source of channels, per customer contribution in profit of the company in percentage and the marketing spends that has gone into acquiring these customers.

Check Your Progress B:

Part A: State which of the following statements is true and which are false.

- i) Websites are effective tools for E-business.
- ii) E-commerce software is a tool that drives online processes.
- iii) There is no role of the Internet for dramatic transformation of companies.
- iv) E-commerce strategies are a group of E-business plan.
- v) Future of business is E-commerce prioritization.

Part B: Fill in the blanks.

- i) _____ is a collection of web pages.
- ii) Web hosts can _____ in the world.
- iii) Language to write web pages is _____.

8.12 LET US SUM UP

Websites are an important component of business these days, hosting of websites may not be feasible due to technology, budget, infrastructure, and continuous updating. Web hosting referred to as service providers where the website has to be stored on some server, that server is your host. The host can be anywhere in the world but it has power, internet connections and dedicated IP addresses.

More or less every grassroots entrepreneur who started a setup from scratch or runs the existing business currently fabricates some kind of a 'platform'. Google Search, Facebook, Android, Uber, AirBnB, Waze, Amazon Web Services, Amazon Marketplace, WeWork, and even Bitcoin are all platforms. At the same time, these platforms are very dissimilar in how they generate network effects, interactions they facilitate. There are various kinds of E-commerce software which have certain characteristics and could be used as per the need and requirement.

The basic function of e-commerce software includes catalog display, Shopping cart capabilities and Transaction processing. Integrating different components is important for large businesses houses, because range of products are not limited, their business interest spread over many products and services. The other operations of electronic commerce activities are Middleware, Enterprise Application Integration and Databases, Web Services, and Integration with ERP Systems. Web hosting services can be hired so that in-house burden can be shifted and dedicated hosting services can be used. Web host CSPs (Compute cycles Service Providers) have the same advantages as ISP (Internet Service Provider) hosting services, including spreading the cost of a large Web site over several "renters" hosted by the service. The biggest single advantage - low cost - occurs because the host provider has already purchased the server and configured it.

There are a number of E-commerce software available for midsize and large businesses. These software packages differ on price, capabilities, database connectivity, software portability, software customization, tools and technical expertise required to manage the software. Some of them are Web site development tools, Inter shop enfinity, IBM WebSphere Commerce Professional Edition and Microsoft Commerce Server 2002. Large e-commerce sites deal with transactions of higher volume and therefore needed dedicated software to handle specific elements of their online business such as customer relationship management, supply chain management, content

management and knowledge management. The enterprise software is also capable of making changes in the system automatically (e.g., inventory checking and order placement for items needed). In contrast, both basic and midrange E-commerce software usually require an administrator to manually make such changes. Enterprise E-commerce software usually requires several dedicated computers.

The ability of the businesses to plan, design and implement cohesive electronic commerce strategies will make the difference between success and failure for the majority of them. The key to successful implementation of any information technology project are planning and execution. four major steps in planning electronic commerce initiatives are Identify Potential e-Commerce Initiatives, Analyse the Functional Scope of Electronic Initiatives, Analyse the Sustainability of Benefits from e-commerce Initiatives and Prioritize e-Commerce Initiatives.

The commerce industry is growing with rapid speed as growth rate is continuously increasing. The process of e-commerce website development project are categories into seven major steps which are identify the product/service, and the customer, Know your e-commerce customer, Choose the right electronic commerce website development platform, Choose the right electronic commerce website hosting platform, Choose the right electronic commerce development partner, Electronic commerce website testing and effective marketing. E-commerce business depends upon implementation and adoption in process; successful systems have seven key steps such as Strategic business planning and roadmaps, Technology selection/ website audit and analysis, Customer acquisition, Customer engagement, Customer retention, Optimization based on key metrics and Business analysis and customer insights.

8.13 KEYWORDS

Enterprise resource planning (ERP): ERP is a process used by companies to manage and integrate the important parts of their businesses. Many ERP software applications are important to companies because they help them implement resource planning by integrating all of the processes needed to run their companies with a single system.

Middleware: Middleware is software which lies between an operating system and the applications running on it. It establishes connection between e-commerce software and existing business and enables communication and data management for distributed applications

Online Business: Online Business or e-business is any kind of business or commercial transaction that includes sharing information across the internet. Online business does not only deal with online transactions of selling and buying of a product and/or service but also enables to conduct business processes within the value chain through internal or external networks.

Shopping Cart: A shopping cart is a piece of software that keeps the record of the items a buyer has ‘picked up’ from the online store. Shopping cart enables consumers to select products, review what they selected, make modifications or add extra items if needed, and purchase the products.

Web Hosting: Web hosting makes the files that comprise a website (code, images etc.) available for viewing online. Every website you've ever visited is hosted on a server. When a hosting provider allocates space on a web server for a website to store its files, they are hosting a website.

Website: A website (also written as a web site) is a collection of web pages and related content that is identified by a common domain name and published on at least one web server. Notable examples are wikipedia.org, google.com, and amazon.com etc.

8.14 ANSWER TO CHECK YOUR PROGRESS

Check Your Progress B

Part A:

- (i) True ii) True iii) False iv) True v) False

Part B:

- (i) website ii) anywhere iii) HTML

8.15 TERMINAL QUESTIONS

- 1) What is web hosting software? Why are they important in online business?
- 2) Describe various types of software platforms.
- 3) Name commonly used e-commerce software for small & midsize companies.
- 4) How do we plan e-commerce initiatives?
- 5) What are the most advanced functions of e-commerce software?
- 6) “Web site development is a creative process” comment.
- 7) Why is customer engagement and retention an important tool for an e-commerce business?



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.

UNIT 9 WEB SERVER HARDWARE AND SOFTWARE

Structure

- 9.0 Objectives
- 9.1 Introduction
- 9.2 Meaning of Server
- 9.3 Web Server Essentials
 - 9.3.1 Different Types of Web Server
 - 9.3.2 Characteristics of a Web Server
 - 9.7.3 Functioning of a Web Server
- 9.4 Mail Server
 - 9.4.1 Types of E-mail Server
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- 9.10 Web Site and Internet Utility Programs
- 9.11 Let Us Sum Up
- 9.12 Key Words
- 9.13 Answers to Check Your Progress
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9.0 OBJECTIVES

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

- understand about web servers and its essentials;
- understand different operating systems;
- know about various types of utility programs; and
- differentiate between web server and application server.

9.1 INTRODUCTION

We subsist in a world where the community is totally reliant on smart phones and laptops. Just with a sheer internet connection, everything can be easy to get in a present scenario. Be it online shopping, e-commerce, procuring information, downloading music or movies, and social media, it's all at the moment a click away! But have you ever thought how it has become feasible?

The web server can refer to hardware or software, or both of them working in sync. On the hardware side, a web server is a computer or gadget or device that stores web server software and a website's component files. On the software side, a web server includes numerous parts that control how web user's admittance hosts files. The Web server includes the hardware, operating system, Web server software, TCP/IP protocols and site content (Web pages, images and other files). If the Web server is used within and is not exposed to the public, it is an "Intranet Server".

9.2 MEANING OF SERVER

A server is any computer used to present (or "serve") files or make programs available to other computers associated with it through a network (such as a LAN or a WAN). In computing, a server is a piece of computer hardware or software (computer program) that endows with functionality for other programs or devices, called "clients".



Figure 9.1: Servers

Archetypal servers are database servers, file servers, mail servers, print servers, web servers, game servers, and application servers. The software that the server computer uses to formulate these files and programs easy to get to the other computers is sometimes called server software. Sometimes this server software is integrated as part of the operating system that is running on the server computer. Thus, a few information systems professionals off the

record refer to the operating system software on a server computer as server software, a live out that adds substantial confusion to the use of the term “server”.

We may occasionally use the terms server and web hosting interchangeably, though there are obviously varying levels of differences depending on which plan type you purchase. For example, if you purchase a shared hosting plan, talking about a physical server might include more than you have access to.

9.3 WEB SERVER ESSENTIALS

The foremost work of a Web server computer is to act in response to requests from Web client computers. The three main elements of a Web server are the hardware (computers and related components), operating system software, and Web server software.

It is well versed from the above term that the term web server can refer to hardware or software, or both of them working together. On the hardware side, a web server is a computer that stores web server software and a website's component files. On the software side, a web server includes several parts that control how web user's access hosted files. All three of these elements must work together to provide sufficient capacity in a given situation. We will discuss all these terms in a more elaborate manner in the coming sub head but prior to that let's talk about different types of web server.

9.3.1 Different Types of Web Server

1. **Static web server:** Static web server is a stack which consists of a computer (hardware) with an HTTP server (software). It is called as “static” because the server sends its hosted files as-is to your browser’
2. **Dynamic web server:** It consists of a static web server plus extra software, most commonly an application server and a database. It is called "dynamic" because the application server updates the hosted files before sending content to your browser via the HTTP server.

For example, to produce the final Web Pages you see in the browser, the application server might fill an HTML template with content from a database. Sites like MDN or Wikipedia have thousands of Web Pages. Typically, these kinds of sites are composed of only a few HTML templates and a giant database, rather than thousands of static HTML documents. This setup makes it easier to maintain and deliver the content. There are many other different types of servers, such as:

- **File server:** It is a computer and storage device dedicated to storing files. Any user on the network can store files on the server.

- **Print server:** It is a computer that manages one or more printers and a network server is a computer that manages network traffic.
- **Database server:** It is a computer system that processes database queries.

9.3.2 Characteristics of a Web Server

The web server has following characteristics:

- The primary function of a web server is to store, process and deliver web pages to clients.
- A web server can, in general, contain one or more websites.
- A web server processes incoming network requests over HTTP and several other related protocols.
- The web server process is an example of the client/server model.

9.3.3 Functioning of a Web Server

The main job of a web server is to display the website content. If a web server is not exposed to the public and is used internally, then it is called Intranet Server. When anyone requests for a website by typing the URL or web address on a web browser's (like Chrome or Firefox) address bar (like www.economicstimes.com), the browser sends a request to the Internet for viewing the corresponding web page for that address. A Domain Name Server (DNS) converts this URL to an IP Address (For example 192.168.216.345), which in turn points to a Web Server.

The Web Server is requested to present the content of the website to the user's browser. All websites on the Internet have a unique identifier in terms of an IP address. This Internet Protocol address is used to communicate between different servers across the Internet. These days, Apache server is the most common web server available in the market. Apache is open source software that handles almost 70 percent of all websites available today. Most of the web-based applications use Apache as their default Web Server environment. Another web server that is generally available is Internet Information Service (IIS).

Check Your Progress A

1. Fill in the blanks with appropriate words:

- i) A is any computer used to present (or "serve") files or make programs available to other computers associated with it through a network (such as a LAN or a WAN).
- ii) The foremost work of a Web server computer is to act in response to requests from computers.

- iii) web server is a stack which consists of a computer (hardware) with an HTTP server (software).
- iv) web server consists of a static web server plus extra software, most commonly an application server and a database.
- v) server is a computer and storage device dedicated to storing files. Any user on the network can store files on the server.

2. State whether the following are true or false.

- i) The three main elements of a Web server are the hardware (computers and related components), operating system software, and Web server software.
- ii) File server is a computer that manages one or more printers and a network server is a computer that manages network traffic.
- iii) Print server is a computer system that processes database queries.
- iv) Any computer can be turned into a Web server by installing server software and connecting the machine to the Internet.
- v) Static web server is a stack which consists of a computer (hardware) with an HTTP server (software).

3. What is a server?

.....
.....
.....
.....
.....

4. What are the three elements of a web server?

.....
.....
.....
.....
.....

9.4 Mail Server

A mail server (sometimes also referred to an e-mail server) is a server that handles and delivers e-mail over a network, usually over the Internet. A mail server can receive e-mails from client computers and deliver them to other mail servers. A mail server can also deliver e-mails to client computers.

Some examples of the most common free email servers and the format for their mail server addresses are given below:

- **AOL outgoing mail server-** smtp.aol.com.
- **Outlook incoming mail servers-** eas.outlook.com or imap-mail.outlook.com or pop-mail.outlook.com.
- **Outlook outgoing mail servers-** smtp-mail.outlook.com.

An email server (or mail server) is a digital postal service. It is a machine or application responsible for handling messages. In other words, an email server receives and delivers emails.

So, when you send an email, your message usually goes through a series of email servers until it reaches the recipient. The process is so fast and efficient that it looks simple, but there is a great deal of complexity behind sending and receiving emails. To avoid confusion, it is important to be clear that the term email server can have different meanings depending on the context. Sometimes an email server can mean a computer or a machine that has a complete system that includes different services or applications. At other times, the term email server can be used precisely as a synonym for some of these services or applications.

9.4.1 Types of E-mail Server

When we use the term email server in the sense of services or applications, we can separate email servers into 2 main categories: outgoing email servers and incoming email servers.

1. **SMTP:** Outgoing email servers are called SMTP servers. SMTP stands for Simple Mail Transfer Protocol. It is a set of communication guidelines that allow software to transmit an electronic mail over the internet. It is a program used for sending messages to other computer users based on e-mail addresses.

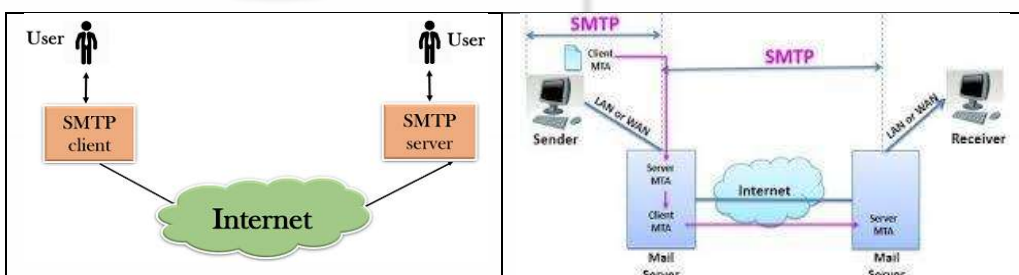


Figure 9.2: SMTP Servers

2. **POP3:** Incoming email servers are known by the acronyms POP3 (Post Office Protocol). In computing, the Post Office Protocol is an application-layer Internet standard protocol used by email clients to retrieve e-mail from a mail server. POP version 3 is the version in common use.
3. **IMAP (Internet Message Access Protocol):** IMAP (Internet Message Access Protocol) is a standard email protocol that stores email messages

on a mail server, but allows the end user to view and manipulate the messages as though they were stored locally on the end user's computing device(s).

In general, IMAP is more complex and flexible than POP3. With IMAP, messages are stored on the server itself. While with POP3, messages are usually kept on the device, that is, on your computer or cell phone.

9.4.2 Process of sending E-mails

To facilitate understanding, we have created a basic step-by-step process for sending email. It is a very simplified version, but it allows you to understand how an email is sent and delivered.

Step 1: Connecting to the SMTP server: When you send an email, your email service or provider, such as Gmail, Exchange, Office 365, and Zimbra, will connect to the SMTP server. That SMTP server is connected to your domain and has a specific address, such as smtp.gatefy.com. or smtp.example.com. At this stage, your email service will provide the SMTP server with some important information, such as your email address, the message body, and the recipient's email address.

Step 2: Processing the recipient's email domain: After connecting to the SMTP server it will now identify and process the recipient's email address. If you are sending an email to someone else in your company, that is, to the same domain, the message will be directed directly to the IMAP or POP3 server. Otherwise, if you are sending the message to another company, for example, the SMTP server will need to communicate with that company's email server.

Step 3: Identifying the recipient's IP: At this stage, SMTP server will need to connect with DNS (Domain Name System) to find the recipient's server. The DNS works like a translation system. It will help to convert the recipient's domain into an IP address. By the way, the IP is a unique number that identifies a machine or server connected to the internet. SMTP needs IP to perform its function correctly, thus being able to direct the message to the recipient's server.

Step 4: Delivering the email: When the recipient receives the email, the SMTP checks the message and then directs it to the IMAP or POP3 server. The email then enters a queue and is processed until it is available for the recipient to access. There, now the email can be read.

9.5 OPERATING SYSTEM

In our preceding course BCOS-183 we had elaborately defined the term Operating system. An Operating System (OS) is an interface between computer user and computer hardware. The foundational software on a server is the operating system. Commonly speaking, it is the basis on which

everything else you use runs. Without an operating system, the server is just a collection of electronics that does not identify how to communicate with the rest of the humankind. An operating system is software which performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers. A web Server software must match with Operating System. Windows systems are usually used only by those who aim to use and therefore, to choose which Operating System to use, one must know about the Web Server software they choose. There are two types of operating systems commonly used for web servers, Windows and Linux/Unix.

9.5.1 Windows

Microsoft Windows, commonly referred to as Windows, is a group of several proprietary graphical operating system families, all of which are developed and marketed by Microsoft. Each family caters to a certain sector of the computing industry. If you use The Official Microsoft ASP.NET Site, MS SQL or Access databases you need Windows hosting because those technologies are not available on other platforms. The support for traditional Asp is better on Windows and ColdFusion hosting is most common on Windows servers, even though ColdFusion runs just as nice on Linux. On the downside, Windows servers are more exposed to viruses and hacker attacks. Windows hosting is also more expensive, and Windows servers tend to crash a bit more often. Windows also takes more server resources than Linux, resulting in fewer hosting accounts on each server and higher prices.



Figure 9.3: Windows

9.5.2 Linux

With Linux, one get a stable server platform with high security and no threatening viruses. Linux is free, and does not take as much server resources as Windows, so Linux hosting is cheaper.

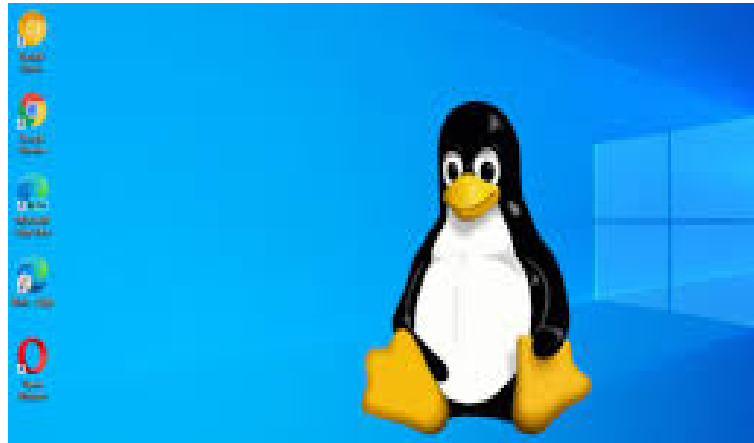


Figure 9.4: Linux

It provides a good selection of scripting languages (most are also supported by Windows servers). The most common database solution for Linux is MySQL, which also is open source and works great. PostgreSQL is on its way to Windows, but not quite there yet. And with the great selection of free online resources, Linux hosting is the best choice for most self-taught webmasters and businesses too. Ubuntu or Fedora was the most common choice.

9.5.3 Linux vs. Windows

Those seeking to privately operate a web server or rent one as a part of a web-hosting package through a provider are often confronted with a seemingly age old question: Linux or Windows? These two operating systems have dominated the web-hosting market for years and compete today for digital hegemony, with Linux maintaining a noticeable lead.

Due to the minimal differences between the two systems in terms of functions and applications, making a decision sometimes proves to be no easy feat. Taking a closer look at Windows and Linux is a task worth its while and allows users to more clearly understand the different advantages of both systems. Most of the time, such comparisons come down to a question of compatibility for applications. Looking into these various differences between Windows and Linux are stated below:

Table 9.1: Comparison between Windows and Linux

S. No	Windows	Linux
1.	It is a closed source software	It is a open source software
2.	It is a cost software	It is a free software
3.	It is less efficient	It is more efficient in comparison
4.	It is not customizable	It can be customized according to the needs
5.	Windows provides less security in comparison to Linux.	Linux provides more security in comparison to Windows
6.	It has high hardware cost	It has low hardware cost
7.	Windows does not provide much efficiency in hacking.	It is widely used in hacking purpose-based systems

9.6 WEB SERVER HARDWARE

1989, the first web server, known as CERN http, was created, along with a browser called World Wide Web. As we know that a web server is software and hardware that uses HTTP (Hypertext Transfer Protocol) and other protocols to act in response to client requests made over the World Wide Web. The foremost situation of a web server is to exhibit website content through storing, processing and delivering web pages to users. Besides HTTP, web servers also hold up SMTP (Simple Mail Transfer Protocol) and FTP (File Transfer Protocol), used for email, file transfer and storage. If we go more into the relevance of a topic which focuses on a hardware perspective, it is a web server that stores web server software and a website's component files.

9.6.1 Meaning of Hardware Servers

A hardware server is the actual computer that stores the website data and delivers it to site visitors when they demand it by click on the website. These big computers are housed in datacenters that are manned by a gamut of security squad and other security measures such as video surveillance, CCTV monitoring in brick-and-mortar mode or cloud mode.

Planning for hardware capability necessitate focusing on the whole lot from server frame to network card, everything from making an accurate estimate of how much physical space one need to logical space and the connection infrastructure.

There is a big role of web server hardware as it facilitates in connecting to the internet and allows data to be exchanged with other connected devices, while web server software controls how a user accesses hosted file. Thus, for a very small company either it could be MSME, SME, a single computer can control the HTTP server along with an FTP server for file downloads, an SMTP server for email and other Internet-related functions. In a large company which has a multiple location and has cross border business, every service would run in one or more dedicated servers, and a gigantic website may require hundreds of servers to switch through Web hosting and cloud computing.

The three main hardware components to consider when choosing a web server are the CPU or processor, memory (RAM) and hard drive (storage). However, it is also important to consider other factors such as bandwidth, reliability, security, support, backups and other issues that help your server to run efficiently.

9.6.2 Hardware used in Web Servers

A static web server, or stack, consists of a computer (hardware) with an HTTP server (software). We identify it "static" for the reason that the server sends its hosted files as-is to your browser. A dynamic web server consists of a static web server plus extra software, most frequently an application server and a database.

Table 9.2: Hardware Specifications for Web Server

Large	Medium	Small
Supports up to 7500 concurrent users.	Supports up to 1000 concurrent users.	Supports up to 400 concurrent users.
1 TB of disk space for cache	500 GB of disk space for cache	200 GB of disk space for cache
16 CPU cores	12 CPU cores	8 CPU cores
64 GB RAM	32 GB RAM	16 GB RAM

9.7 WEB SERVER SOFTWARE

A web server software that uses HTTP (Hypertext Transfer Protocol) and other protocols to respond to client requests made over the World Wide Web. A web server software, dedicated to running this software, which can gratify client requests on the World Wide Web. Web servers can repeatedly be found embedded in devices such as printers, routers, webcams and serving only a local network.

On the software side, a web server includes several parts that control how web user's access hosted files. At a minimum, this is an HTTP server. An HTTP server is software that understands URLs (web addresses) and HTTP (the protocol your browser uses to view web pages). An HTTP server can be accessed through the domain names of the websites it stores, and it delivers the content of these hosted websites to the end user's device.

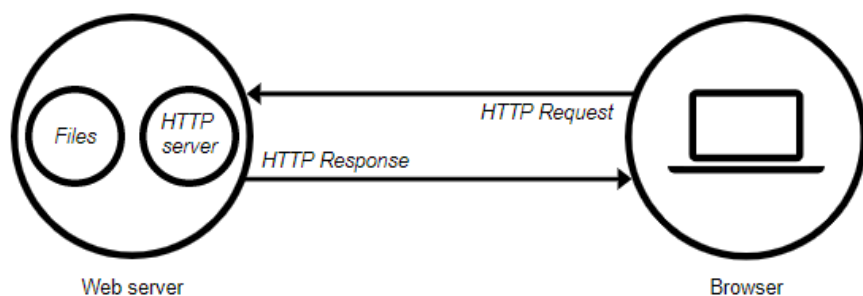


Figure 9.5: Web server and Browser

The web server may then be used as a part of a system for monitoring or administering the device in question. This typically means that no other software has to be installed on the client computer since only a web browser is obligatory (which now is incorporated with most operating systems). These web pages are more often than not static content that includes HTML documents, images, style sheets, tests etc. Apart from HTTP, a web server

also supports SMTP (Simple Mail transfer Protocol) and FTP (File Transfer Protocol) protocol for emailing and for file transfer and storage.

Web Stone is popular benchmarking software that measures performance on various types of Web pages (static and dynamic) such as:

- **HTML:** This is the standard static Web page containing only HTML tags.
- **CGI:** Common Gateway Interface or CGI protocol causes the Web server to run another program and return the result to the Web server.
- **API:** Application Programming Interface or API is a set of protocols that uses “multithreading” to handle user requests of the dynamic Web pages.

9.7.1 Features of Web Server Software

Various features of web server software are explained below:

- **Client Request Processing:** A Web server processes client requests that are sent using HTTP protocol, both for static and dynamic pages
- **IP-Sharing or Virtual Server:** A Web server can work as many virtual Web servers, serving many businesses with individual domain names but all domains directing to the same IP address of the computer.
- **Logical File:** A Web server can have a logical file name corresponding to a physical file. The physical file may be in the same computer or in another computer, and also the logical name and the physical name do not have to be the same. The Web server translates a logical URL into a physical file address.
- **Security:** Web servers are located publicly on the Internet or privately in an organizational intranet, usually behind the firewalls. The public documents are configured to be viewed by anonymous users. For extranet users, the files and folders are configured for validation of username and password. Access controls provide or deny access to files based on the username or by extranet company URL. Web servers allow processing digital certificates and private/public key pairs and also support Secure Socket Layer (SSL)
- **Site Management:** Web server provides tools to manage multiple Web sites, file security, virtual file, and log file analysis Administration of a Web server can be performed from a remote computer in the network Administrators can grant or deny Web access to individual computers, groups of computers, or entire domains. Administrators can stop and restart all Web services without stopping and restarting the computer Site management also include authoring tools such as Microsoft Front page 2000.
- **Application Development:** Application development includes Web editors and extensions to produce Web pages – either static or dynamic.

These include HTML editors such as FrontPage for static Web pages for dynamic Web pages, there are protocols such as Common Gateway Interface (CGI), Application programming Interface (API), and Active Server Pages (ASP) that are used by programs such as Java, C++, and VBScript to develop dynamic Web pages.

9.8 APPLICATION SERVER SOFTWARE

An application server is a server particularly designed to run applications. The "server" includes both the hardware and software that make available an environment for programs to run. Application servers are used for countless purposes such as, running web applications, hosting a hypervisor that manages virtual machines, etc. The various types of application software are explained below:

1. **IBM Server:** Power Systems is a family of server computers from IBM that are based on its POWER processors. These accelerated computing servers are built for modern analytics, high-performance computing HPC, and Artificial intelligence (AI).
2. **NGINX:** NGINX Unit is a dynamic application server, capable of running beside NGINX Plus and NGINX Open Source or standalone. NGINX Unit supports a RESTful JSON API, deploys configuration changes without service disruptions, and runs apps built with multiple languages and frameworks. Designed from scratch around the needs of your distributed applications, it lays the foundation for your service mesh.
3. **Tomcat:** Tomcat 3.x can be remotely caused to crash or shut down by a connection sending the right sequence of bytes to the AJP12 protocol port (TCP 8007 by default). Tomcat 3.x users are advised to ensure that this port is adequately firewalled to ensure it is not accessible to remote attackers. There are no plans to issue an update to Tomcat 3.x for this issue
4. **IIS 7.5:** Internet Information Services is extensible web server software created by Microsoft for use with the Windows NT family. IIS supports HTTP, HTTP/2, HTTPS, FTP, FTPS, SMTP and NNTP.
5. **vCenter Server:** vCenter Server is the centralized management utility for VMware, and is used to manage virtual machines, multiple ESXi hosts, and all dependent components from a single centralized location. VMware vMotion and svMotion require the use of vCenter and ESXi hosts.
6. **Oracle WebLogic:** Oracle WebLogic Server is a Java EE application server currently developed by Oracle Corporation. Oracle acquired WebLogic Server when it purchased BEA Systems in 2008.

7. **LiteSpeed Web Server:** LiteSpeed Web Server is proprietary web server software. It is the 5th most popular web server, estimated to be used by 6.4% of websites as of April 2020. LSWS is developed by privately held LiteSpeed Technologies
8. **Apache:** Apache Tomcat is an open-source application server that executes Java Servlets, renders and delivers web pages that include JavaServer Page code, and serves Java Enterprise Edition (Java EE) applications. Released in 1998, Tomcat is the most widely used open-source Java application server.

9.9 WEB SERVER & APPLICATION SERVER

Despite the contrast implied by “application server vs. web server,” on the Internet the two types of server are usually deployed together for a common purpose: fulfilling user requests for content from a website. There are no standard documents that define the properties of web servers and application servers, but let’s look at how the terms are commonly understood.

A web server’s fundamental job is to accept and fulfill requests from clients for static content from a website (HTML pages, files, images, video, and so on). The client is almost always a browser or mobile application and the request takes the form of a Hypertext Transfer Protocol (HTTP) message, as does the web server’s response.

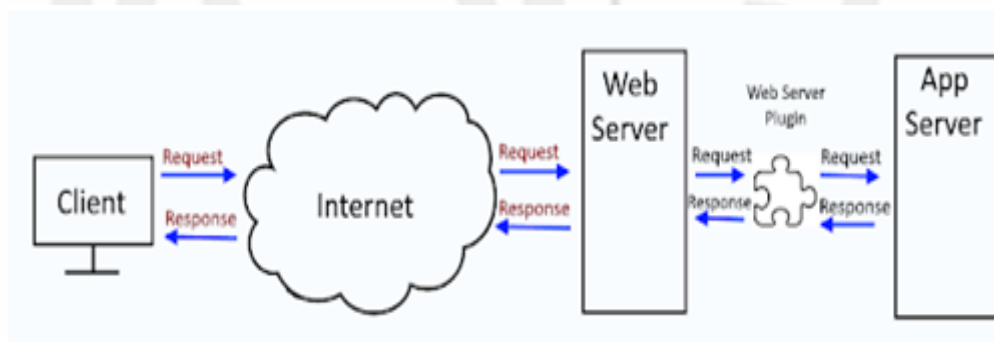


Figure 9.6: Web Server and App server

An application server’s fundamental job is to provide its clients with access to what is commonly called business logic, which generates dynamic content; that is, it’s code that transforms data to provide the specialized functionality offered by a business, service, or application. An application server’s clients are often applications themselves, and can include web servers and other application servers. Communication between the application server and its clients might take the form of HTTP messages, but that is not required as it is for communication between web servers and their clients. Many other protocols are popular, including the variants of CGI.

Table 9.2: Difference between Web server and Application server

S. No	Web Server	Application Server
1.	It is a server that handles HTTP protocol.	It is a server that exposes business logic to client applications through various protocols including HTTP.
2.	It is used to serve web-based applications.	It is used to serve web-based applications and enterprise-based applications.
3.	It encompasses web containers only.	It encompasses Web container as well as EJB container.
4.	It is useful or fitted for static content.	It is fitted for dynamic content.
5.	It consumes or utilize less resources.	It utilizes more resources.
6.	These arrange the run environment for web applications.	These arrange the run environment for enterprise applications.
7.	In web servers, multithreading is not supported.	In the application server, multithreading is supported.
8.	Their capacity is lower than application server.	Their capacity is higher than web server.
9.	In web servers, HTML and HTTP protocols are used.	In application servers, GUI as well as HTTP and RPC/RMI protocols are used.

9.10 WEB SITE AND INTERNET UTILITY PROGRAMS

To run any software and work on different programs, on a computer system, one needs the operating system to work smoothly. Utility programs, as the name suggests not only help in executing various crucial tasks for the operating system but also help in overall maintenance of the system. Utility software helps to manage, maintain and control computer resources. Examples of utility programs are antivirus software, backup software and disk tools. A device driver is a computer program that controls a particular device that is connected to the computer. There are many programs that are used with Web server software. Some of these programs are on the server, while some are on the computer being used by the Web designer. One of the most used Internet utility programs is e-mail. Electronic mail (e-mail) is a process, by which digital information can be sent, received, forwarded, and stored using telecommunications networks. Using the Internet, e-mail can be transmitted outside of corporate networks. Messages can also be sent to bulletin boards.

About Utility Program

Utility program is a system application that executes a specific task, generally pertaining to optimal maintenance or operation of the system resources. Operating systems such as Windows, macOS and Linux come with their own set of utility programs to maintain and execute different utility functions such as formatting, compressing, scanning, exploring and much more. Utility programs also assist with the management of computer functions, resources and files. one can ensure complete password protection and keep systems virus free using different utility programs.

9.10.1 Types of Utility Programs

Various functions are executed by a utility program to make the system's operations smoother and more efficient. Overall, utility programs can be broadly categorized into four parts:

1. **System Utilities:** Some of the system utility programs are memory manager, antivirus and firewall, registry checker and cleaner, package installer and explorer. Also, with the help of such system utility programs, users can execute functions that are crucial for smooth running of an operating system.
2. **File Management Utilities:** File management utilities include tools such as data archives, software backup tools, file compression tools and managers. With the help of these, users can manage their data in the form of files and folders. These utilities help users to sort out, store and categories files according to the requirement.
3. **Storage Device Management Utilities:** Storage device management utility programs provide solutions for enhancing disk capacity, such as disk clean-up, partition management, formatting, disk space allocation, defragmentation, etc. With the help of this utility program, users can compartmentalize systems and external drives for efficient management of programs and files that are stored within.
4. **Miscellaneous Utilities:** Apart from these three utility program categories, there are various other programs that help in managing business operations. Some of these programs include data generators, HTML checkers and hex editors, to name a few.

Check Your Progress B

1. Fill in the blanks with appropriate words:

- i) An is an interface between computer user and computer hardware.
- ii) is a group of several proprietary graphical operating system families, all of which are developed and marketed by Microsoft.
- iii) Computer includes the physical parts of a computer, such as the case, central processing unit, monitor, mouse and others.
- iv) is a server that exposes business logic to client applications through various protocols including HTTP.
- v) utilities include tools such as data archives, software backup tools, file compression tools and managers.

2. State whether the following are true or false.

- i) Windows server is more exposed to viruses and hacker attacks.

- ii) A web server is software and hardware that uses HTTP (Hypertext Transfer Protocol) and other protocols to respond to client requests made over the World Wide Web.
- iii) Web server encompasses Web container as well as EJB container.
- iv) Utility program is a system application that executes a specific task, generally pertaining to optimal maintenance or operation of the system resources.
- v) With the help of file management utility programs, users can execute functions that are crucial for smooth running of an operating system.

3. What is an electronic mail?

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4. What are the four types of utility programs?

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9.11 LET US SUM UP

A server is any computer used to present (or “serve”) files or make programs available to other computers associated with it through a network (such as a LAN or a WAN). In computing, a server is a piece of computer hardware or software (computer program) that endows with functionality for other programs or devices, called "clients".

The foremost work of a Web server computer is to act in response to requests from Web client computers. The three main elements of a Web server are the hardware (computers and related components), operating system software, and Web server software.

An Operating System (OS) is an interface between computer user and computer hardware. The foundational software on a server is the operating system. Commonly speaking, it's the basis on which everything else you use runs. There are two types of operating systems commonly used for web servers, Windows and Linux/Unix. Computer hardware includes the physical parts of a computer, such as the case, central processing unit, monitor, mouse, keyboard, computer data storage, graphics card, sound card, speakers and

motherboard. A web server is software and hardware that uses HTTP (Hypertext Transfer Protocol) and other protocols to respond to client requests made over the World Wide Web. A web server is server software, or hardware dedicated to running this software, that can gratify client requests on the World Wide Web.

Web server is a server that handles HTTP protocol whereas application server is a server that exposes business logic to client applications through various protocols including HTTP. Web server is used to serve web-based applications (i.e. servlets and jsps) whereas application servers are used to serve web based applications and enterprise based applications (i.e. servlets, jsps and ejbs). It may contain a web server internally.

Utility program is a system application that executes a specific task, generally pertaining to optimal maintenance or operation of the system resources. Various functions are executed by a utility program to make the system's operations smoother and more efficient. Overall, utility programs can be broadly categorized into four parts namely; system utilities, file management utilities, storage device management utilities and miscellaneous utilities.

9.12 KEY WORDS

Application server: It is a server that exposes business logic to client applications through various protocols including HTTP.

Database server: It is a computer system that processes database queries.

Dynamic web server: It consists of a static web server plus extra software, most commonly an application server and a database. It is called "dynamic" because the application server updates the hosted files before sending content to your browser via the HTTP server.

File server: It is a computer and storage device dedicated to storing files. Any user on the network can store files on the server.

Hardware: Hardware includes the physical parts of a computer, such as the case, central processing unit, monitor, mouse, keyboard, computer data storage, graphics card, sound card, speakers and motherboard.

Operating System: An Operating System (OS) is an interface between computer user and computer hardware.

Print server: It is a computer that manages one or more printers and a network server is a computer that manages network traffic.

Server: A server is any computer used to present (or "serve") files or make programs available to other computers associated with it through a network (such as a LAN or a WAN). In computing, a server is a piece of computer hardware or software (computer program) that endows with functionality for other programs or devices, called "clients".

Static web server: It is a stack which consists of a computer (hardware) with an HTTP server (software). It is called as “static” because the server sends its hosted files as-is to your browser’

Utility program: It is a system application that executes a specific task, generally pertaining to optimal maintenance or operation of the system resources.

Web server: It is software and hardware that uses HTTP (Hypertext Transfer Protocol) and other protocols to respond to client requests made over the World Wide Web.

Windows: It is a group of several proprietary graphical operating system families, all of which are developed and marketed by Microsoft.

9.13 ANSWER TO CHECK YOUR PROGRESS

Check Your Progress A

1. (i) Server (ii) web client (iii) static (iv) dynamic (v) file
2. (i) True (ii) False (iii) False (iv) True (v) True

Check Your Progress B

1. (i) Operating system (ii) Windows (iii) hardware (iv) application server (v) file management
2. (i) True (ii) True (iii) False (iv) True (v) False

9.14 TERMINAL QUESTIONS

1. What are the different types of web servers?
2. What is a mail server? What are different types of E-mail servers?
3. Explain various steps of sending an E-mail
4. What is an operating system? Explain the two most commonly used operating systems.
5. Explain web server software.
6. What are the various features of web server software?
7. Differentiate between web server and application server.
8. What are utility programs? What are the different types of utility programs?



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.