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## UNIT 9 WEB SERVER HARDWARE AND SOFTWARE

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### 9.0 OBJECTIVES

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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.

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## 9.3 WEB SERVER ESSENTIALS

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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:

- 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).
- 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?**

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

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## 9.4 Mail Server

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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.

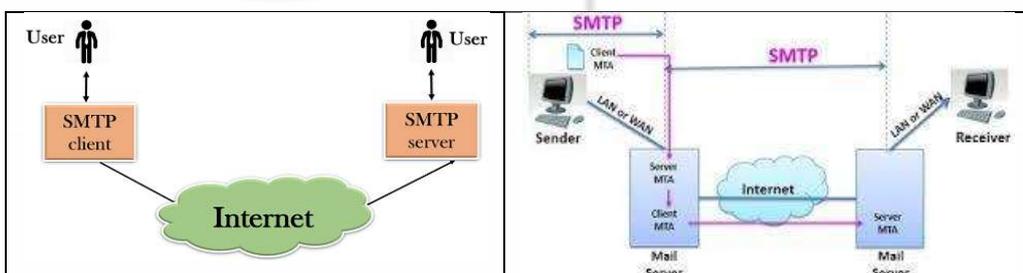


Figure 9.2: SMTP Servers

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.

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## 9.5 OPERATING SYSTEM

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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



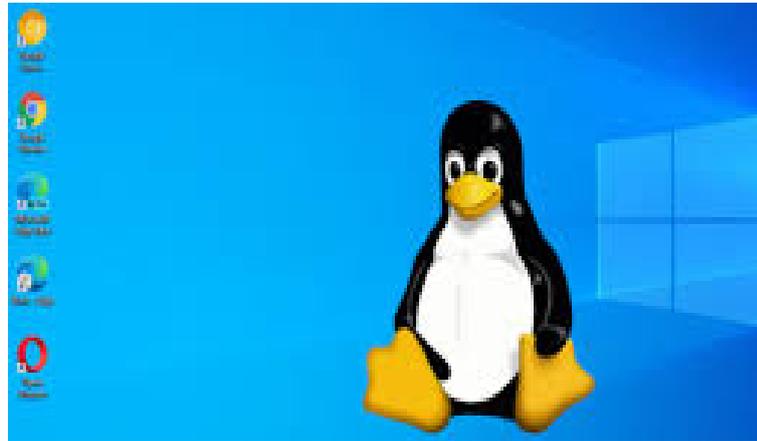


Figure 9.4: Linux

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

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## 9.6 WEB SERVER HARDWARE

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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.

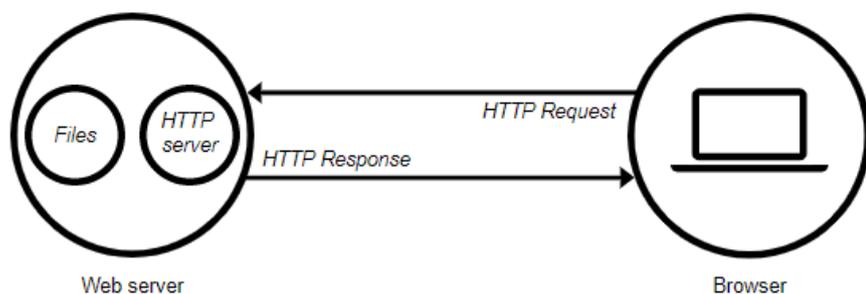
**Table 9.2: Hardware Specifications for Web Server**

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

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## 9.8 APPLICATION SERVER SOFTWARE

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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.

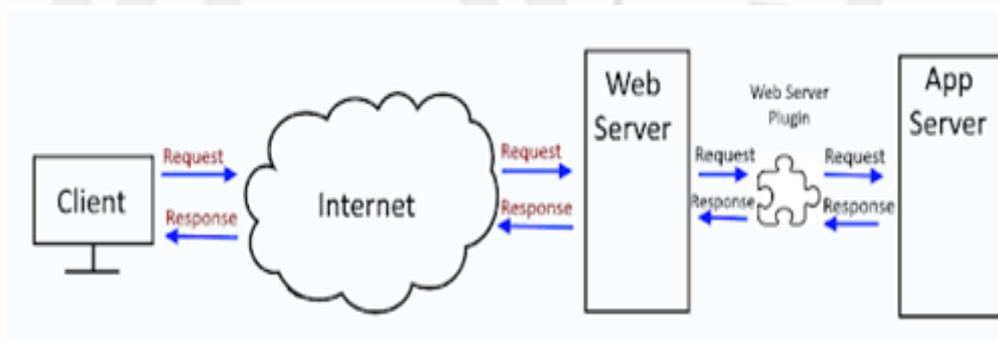
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## 9.9 WEB SERVER & APPLICATION SERVER

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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.

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## 9.10 WEB SITE AND INTERNET UTILITY PROGRAMS

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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

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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.

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## 9.12 KEY WORDS

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**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.

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## 9.13 ANSWER TO CHECK YOUR PROGRESS

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### 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

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## 9.14 TERMINAL QUESTIONS

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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.