

B.E.
Fourth Semester Examination, May-2006
INTERNET FUNDAMENTALS

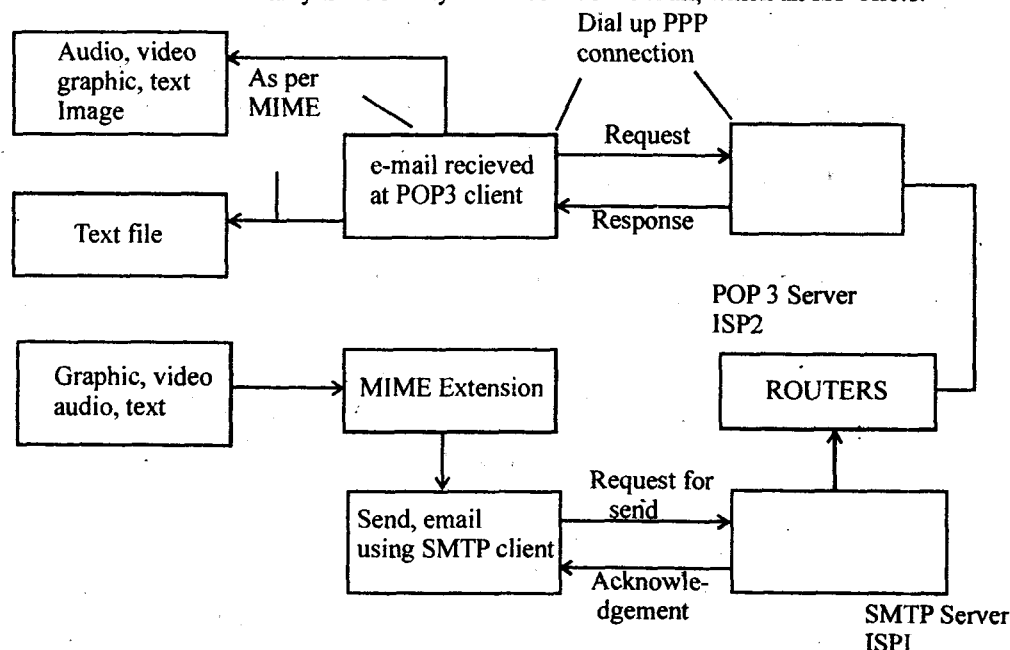
Note : Attempt any five questions.

Q. 1. (a) What is e-mail? Explain its internal working.

Ans. E-mail is the method of sending and receiving formatted messages and files over the Internet to other peoples. Other files, called attachments can be sent along with e-mails. Depending on internet traffic, an e-mail message can go any where in the world in as little as a few seconds. Internet Service Provides (ISP) issue e-mail addresses.

Working : A sender prepares a text, which is then transmitted via the internet. A few clicks of the mouse will connect to the internet and the mail is sent. This mail gets saved on an allocated storage space, which is assigned whenever on Internet address that resides at an ISP host is accessed. The receiver connects to the Internet, finds the e-mail waiting and few clicks later, the message is down loaded and can be read. We must observe Netiquette during the e-mail drafting. Natiquette means on accepted behaviour on the network during the e-mail, Usenet or chat. Never swear on an internet message. It is not ethical.

In a matter of seconds, a e-mail message from one individual transmitt to another individual. Figure (1) explain the procedure for the e-mail connection when the PPP account associated with the e-mail are used by both sender and receiver. Normally there is only one account for e-mail, which an ISP offers.



Q. 1. (b) Explain the following terms related to e-mail : SMTP, MIME, PPP, POP3.

Ans. SMTP (Simple Mail Transfer Protocol) : It is used for executing the process of bending e-mail.

POP3 (Post Office Protocol Version 3) : It is another type of TCP/IP protocol. It is also used for executing the process of receiving e-mail.

PPP (Point to Point Protocol) : It is a protocol for an internet connection over a modem.

MIME (Multipurpose Internet Mail Extension) : A protocol that allows e-mail to contains more than simple text. Used to send other text. Used to send other kind of data, including colour pictures, sound files and video clips.

Q. 2. (a) What is Internet? How does it work? What are its advantages and disadvantages?

Ans. The internet is nearly a way for computers to communicate. As long as a computer or smaller network can speak the internet lingo to other machines, then its "on the internet". If the internet were a language, it would not be french or Farsi or Tagalog or even English. It would be Esperanto.

The internet is also a collection of different ways to communicate or store information is a retrievable form. Take e-mail, for example. If you work in a office with LAN, then chances are you have an e-mail account and can communicate with people in your office by sending them message.

This is not the internet, likewise, if you have an account at America online and you send a message to same one else at AOL, you are still not using the internet. But if your office network has a gate way to the internet and you send a e-mail to some one who does not work at your office, then you are sending mail over the internet.

But, the internet is not just a collection of networks all talking to each other. A single computer can also participate in the internet by connecting to a network or service provider that is connected to the internet.

Q. 2. (b) Differentiate between :

(i) Web page and home page

(ii) IP v 4 and IPv6.

Ans. (i) Home Page : A document stored on a world wide web server that is starting point for obtaining information about a particular individual, company group or topic. A home page can contain pointers to additional pages of related information or to home pages for other topics.

Or

It is the page you begin with when you start your web browser. It is the main page of the website.

Web Page : It is the hypertext document on the web page.

2. IPv4 and IPv6 (Internet Protocol Version) : IPv4 version of IP currently used in the internet. IPv4 uses 32 bit addresses.

IPv6 is a specific protocol has been chosen by the IETF as a successor to IPv4. uses 128 bit addresses. IPv6 retains many of the design features that have made IPv6 so successful. Both are connectionless-each datagram contains a destination address and each datagram is routed independently. Like IPv4, the header in a datagram contain a maximum no. of hops the datagram can take before being discarded. More important, IPv6 retains most of the general facilities provided by the IPv4 options.

IPv6 uses larger addresses and an entirely new datagram header format. IPv6 uses a series of fixed length headers to handle header information. Unlike IPv4, which places key information in fixed field of the header and only appends variable length options for less important information. The IPv6 header is always variable size.

Q. 3. (a) What is FTP? How it works?

Ans. FTP (File Transfer Protocol) : We send files attached to the e-mail, but this is in-efficient and

wasteful of resources if the files are large. Instead there are FTP a method of retrieving files from (and sending files to) other computers on the net.

Ideally FTP will be built into the windows and MAC operating systems some day, so that managing files on the internet will be as easy as managing files on your own computer. For now, though, you have to do FTP with either a special program designed for that purpose or with the web browser.

How to do FTP : The typical FTP session starts with running the FTP program and connecting to an FTP site. Depending upon the program, either enter your log in information before connecting or you will be prompted to do it after you connect. If you are using a web browser to connect to an anonymous site, you don't need to type a user name or password. Type anonymous and press enter. Then type your e-mail address and press enter. This will put you on an FTP prompts.

Now view file lists and hunt through the directory structure for the files you want. You might have connected to a unix machine or to another type of computer on the net. You only need to know the commands for your FTP program only. The program will then translate your request into whatever format the host computer requires.

If the files you want to transfer are not simple text files, specify binary before doing the transfers. When you find the file you want, transfer them with the get command. Then quit the FTP program.

Q. 3. (b) Explain the working of a search engine.

Ans. On the internet there are over 2 billion paper. When we look out for a resource, we take the help of the search engines. A search engine is a software with the following search features :

1. It maintains a huge database.
2. Each index specifies the URL, site, source origin.
3. Each index also specifies the brief description.
4. It provides the user a specific way or a search form to narrow, widen, or restrict the search to the desired site.

An internet user uses a search site from internet explorer or netscape navigator. Each search site has a search engine. It may also have a meta search engine. This is an interfacing application that employs the multiple search engines. Next the default search engines are mostly used. Table (1) provides the popularly used search sites and meta sites. A search engine performances measures by force. For a web advertiser, the number of hits by the search engine users every day in a measure of success.

A popular compilation of search engine is from Hal Doram.

Q. 4. (a) Write a detailed note on XML.

Ans. XML (Extensible Markup Language) : Although most web pages currently the HTML, other markup language have been created for special purposes. For example, the voice extensible markup language (Voice XML) or (VXML) specifies communication in human speech (e.g. for delivery over a cell phone). The extensible markup language (XML) has also gained acceptance. Unlike HTML, XML does not specify layout. Instead, XML gives an internal representation that provide name for each field in a data item. Tags in XML are well balanced each occurrence of a tag <x> must be followed by an occurrence of </x>.

Furthermore because XML does not assign any measuring to tags, tag names can be created as needed. In particular, the tag name can be selected to make data easy to parse or access. For example if two companies are agree to exchange corporate telephone directories, they can define an XML format that has data items such

as an employee's name, phone number and office. The companies can choose to further decide a name into a last name and a first name. Fig. (1) contains an example.

```
<ADDRESS>
  <NAME>
    <FIRST> John </FIRST>
    <LAST> PAUL </LAST>
  </NAME>
  <OFFICE> Room 320 </OFFICE>
  <PHONE> 765-555-1234 </PHONE>
</ADDRESS>
```

(An example of XML for a corporate phone book. Each data item is given by a name).

Q. 4. (b) Write a note on server side programming in Javascript.

Ans. Server Side Programming : Server side scripting technologies allow a dynamic page to be created from a template or skeleton that contains embedded commands or program scripts. Instead of using a computer program to generate an entire page, an interpreter copies the page and replace only the scripting commands.

Dynamic document technologies have been invented to handle the case where only a small portion of the page must be changed. Instead of running a separate program that generates the page, such technologies are closely integrated with server software. The server has a built in interpreter that can make small modifications to a page as needed. The stored form of the page, which is known as a template or skeleton, contains a mixture of conventional HTML and scripting information. The interpreter allows conventional HTML to pass through unchanged and replacing the scripting information with the results of interpreting the scripts. To make interpretation run at high speed, special system is used to bracket the scripting information.

* **ASP (Active Server Page) :** It is a dynamic page technology from microsoft. The scripting information is written in the visual basic programming language and the interpreter is closely integrated with microsofts web server. Internet information server (IIS).

* **JSP (Java Server Page) :** It is a dynamic page technology that is intended to be platform independent. As the name implies, pages contain embedded scripting code written in the Java programming language.

PHP (PHP : Hyper text Preprocessor) : It is a dynamic web page technology that uses the pearl programming language. Proponents claims that PHP is faster than JSP or ASP; detractor claim that the embedded code is difficult to read.

* **Cold Fusion :** It is a dynamic web page technology used to embedded SQL data base queries in pages. When a server handles such a page, the interpreter sends each SQL query to the database systems. Convert the result to HTML and replaces the query.

Q. 5. What are web servers? What is their utility? Discuss about IIS.

Ans. If we consider the world wide web as the beautiful garden, then each web server is analogous to a more plant. Just as each plant has several branches each server has also multiple ports. Just as each branch has flowers, similarly each port also has multiple sockets. The socket at a server provides a document, a page, or a resources.

A web server is a software. A computer running that software connects to all other servers on the Internet.

Examples of servers are Apache, Web Server, Net Scape TM, and microsoft IIS (Inte.net Information Server). The server computer also hosts the websites of registered users, that is, website owners. Web servers are therefore also called hosts. The hosting computers have physical connections on the Internet. A web server is also called HTTP daemon (HTTPd) when it offers only one application hosting HTTP websites. The server does the hosting and provides HTTP-based connections to websites. The server does the hosting and provides HTTP-based connections to websites. (The term 'daemon' according to collins dictionary, means a person who concentrates very hard, who is highly skilled, and who works with a lost of energy). A web administrator monitors the HTTPd server. Besides HTTP, a web server may also link multiple applications and services by providing the logical connections of websites to other application. Examples of other applications are e-mail, FTP, and Telnet Services.

Figure 1 shows a server with a group of applications. A server runs multiple applications simultaneously. Figure 2 shows a group of servers for the same application HTTP. The latter is used when requests per second to a server are many. The load then balances between the various servers in the group.

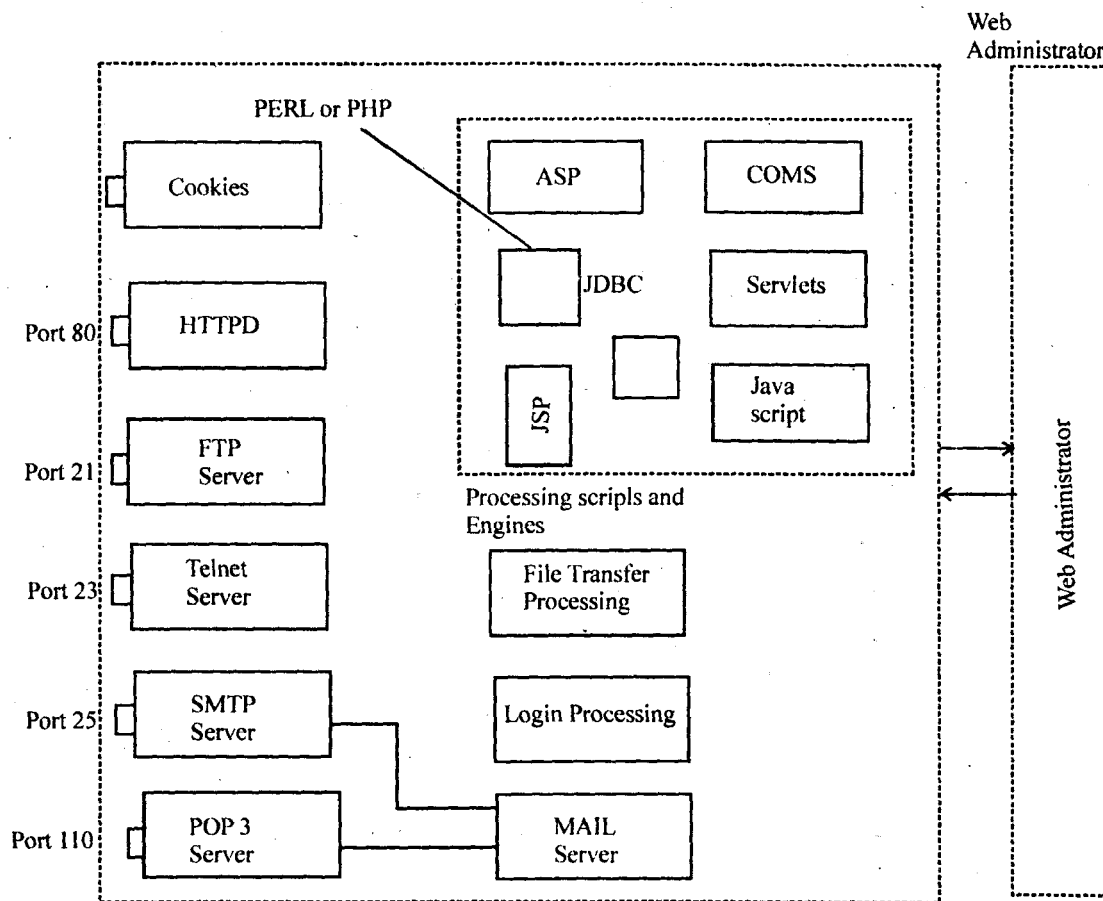


Fig. 1. A server for group of Applications

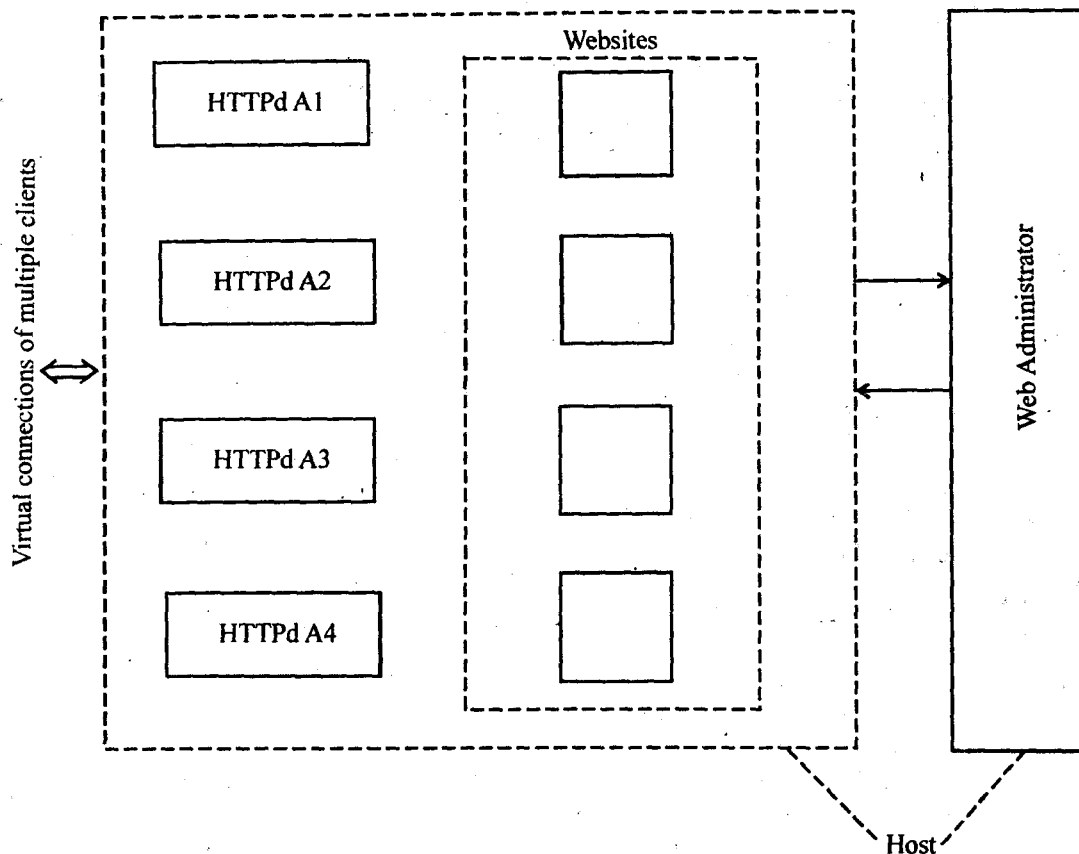


Fig. 2. A group of servers for the same application of load balancing

Microsoft IIS base is windows. The world wide web is linked by a special application program (HTTP) that can access through the Internet, documents spread over thousands of machines all over the world.

Q. 6. (a) Differentiate between the following :

(i) Authorization and Authentication.

(ii) Privacy and Secrecy.

Ans. (i) Authorization : Authorization refers to responsibility for each item of information and how such responsibility is delegated to others : who is responsible for where information resides and how does a responsible person approve access and change.

Authentication : The methods encodes transmitted data with a message authentication code (MAC) that an attacker cannot break or forge. Typical encoding schemes used cryptographic hashing mechanisms. For example, one cryptographic hashing scheme uses a secret key known only to the sender and receiver. A sender uses the secret key to compute the cryptographic hash H, that depends upon the content of the message. The sender transmits H along with the message. Only the sender can create H, and only the receiver can unscramble H; an attacker who does not have the key will not be able to modify the message without introducing the error. Thus 'H' provides message authentication because a receiver knows that a message that arrives with a valid hash is authentic.

(ii) Privacy : A network is said to be private if use of the network is restricted to the corporate or individual owner. Although a private local area network can be owned outright, only the basic packet switching hardware for a private wide Area Network can be owned outright, digital circuits in a private network are leased from a common carrier.

Secrecy : The term network security refers in the broad sense to confidence that information and services available on a network cannot be accessed by unauthorized user. Security implies safety, including assurance of data integrity, freedom from unauthorized access of computational resources, freedom from snooping or wire tapping and freedom from disruption of service.

Q. 6. (b) Explain the following terms :

(i) Preventive maintenance

(ii) Troubleshooting.

Ans. (i) Preventive Maintenance : Many applications will need to be updated on a regular basis. The method chosen will depend upon variety of factors : the number and location of kiosks, the amount and type of data, the frequency of updating and the budget available. Updating may be unidirectional or bidirectional. The systems may be used to collect information on every key stroke and to identify both areas of the system where users go most frequently and those they do not visit at all. The means of updating may include disks, local area networks, modems on switched telephone lines, ISDN connections and radio.

(ii) Trouble Shooting : Because the SBS configuration concentrated so much power in a single machine, the environment is more complex than if ISA server were installed on a dedicated server. This section touches on some common issues related to ISA server running in the SBS environment. You will receive the following error message if ICW is not installed or if it was removed : "Cannot find the file ICW." Make sure that the path and file name are correct and the required libraries are available.

To resolve this issue, run Add/Remove programs from the control panel.

Q. 7. (a) What is an HTML document? Draw the structure of such a Document.

Ans. A Hypermedia Document available on the web is called a page; the main page for an organization or an individual is known as a home page. To ensure that web browsers correctly interpret the contents of each page, the web uses a standard representation known as Hyper Text Markup Language (HTML). HTML is classified as a markup language because it only gives general guidelines for display, but does not include detailed formatting instructions. The general form of HTML document is :

<HTML>


```

<HEAD>
    <TITLE>
        text that forms the document title
    </TITLE>
</HEAD>
<BODY>
    body of document appears here
</BODY>
</HTML>

```

Fig. Structure of HTML document

Q. 7. (b) What are different ways of connecting to Internet?

Ans. The different ways of connecting to a internet are :

(i) **We must possess a host machine :** A computer or terminal providing computer resources. A host machine can be a PC running windows 95, windows 98, or PC running UNIX or some other operating system. A socket is an application layer interface between the two applications on the local or remote computer. A socket forms a virtual circuit between two resources.

(ii) A user must possess a modem that transmits and receives the data at 14.4 Kbps, 28.8 kbps, 33 kbps, or 56 kbps. A modem at these four speeds uses a telephone line. A modem is a modulation demodulation circuit. It converts bits from computer into appropriate signals for the line and vice-versa.

(iii) We use the OS, windows or lynx. These possess a dial up program that is integrated into and is available with the system. This program connects to the internet and its services by dialing through the modem to the ISP. Our computer then connects to the Internet.

(iv) We need a dial up PPP account with our ISP. A dial up means establishing a connection on dialing. A point to point protocol is an account with an ISP supports access to all (PPP) Internet resources.

The we cannot the internet using a modem and a dial up PPP account.

Q. 8. Write note on :

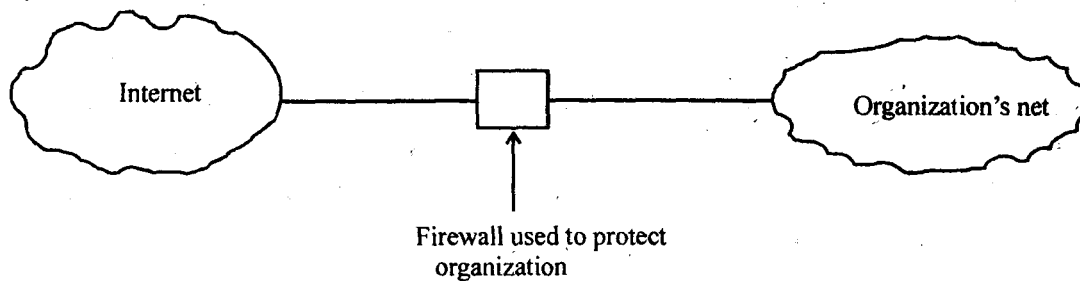
(a) **Firewalls**

(b) **Digital Signatures**

(c) **DNS**

(d) **ISP.**

Ans. (a) Firewalls : A firewall is placed between an organization and the rest of the Internet.



Firewalls are the most important security tool used to handle network connections between two organizations that do not trust each other. By placing a firewall on each external network connection, an organization can define a secure perimeter that prevents outsiders from interfering with the organization's computers. In particular, by limiting access to a small set of computers, a firewall can prevent outsiders from probing all computers in an organization, flooding the organization's networks with unwanted traffic, or attaching a computer by sending a sequence of IP decagrams that is known to cause the computer system to misbehave. Furthermore, the fire wall itself must be secure. That is,

- All traffic entering the organization passes through the firewall.
- All traffic leaving the organization passes through the firewall.
- The firewall implements the sensitivity policy and rejects any traffic that does not adhere to the policy.
- The firewall itself is immune to security attacks.

(b) Digital Signatures : An encryption mechanism can also be used to authenticate the sender of a message. This technique is known as digital signature. To sign a message, the sender encrypts the message using a key known only to the sender. The recipient uses the inverse function to decrypt the message. The recipient knows who sent the message because only the sender has the key needed to perform the encryption. To ensure that encrypted messages are not copied and resent later, the original message can contain the time and date that the message was created. Consider how public key system can be used to provide a digital signature. To sign a message, a user encrypts the message using his or her private key. To verify the signature, the recipient looks up the user's public key and uses it to decrypt the message. Because only the user knows the private key, only the user can encrypt a message that can be decoded with the public key.

(c) DNS : The automated system used to translate computer names into equivalent IP addresses. A DNS server responds to a query by looking up the name and returning the address. The naming scheme used in the internet is called Domain Name system (DNS). Syntactically, each computer name consists of a sequence of alpha-numeric segments separated by periods. For example, a computer in the computer science. Department at Purdue university has the domain name :

mordred : cs. purdue. edu

and a computer at cisco systems, incorporated has the domain name :

anakin.cisco.com

Domain names are hierarchical, with the most significant part of the name on the right. The left most segment of a name is the name of individual computer. Other segments in a domain name identify the group that owns the name. For e., the segment purdue gives the name of university.

(d) ISP : Throughout an internet, each network prefix must be unique. For networks connected to the global Internet, an organization obtains network numbers from the communication company that supplies internet connections. Such companies are called Internet Service Providers (ISPs) Internet service providers coordinate with a central organization, the Internet Assigned Number Authority to ensure that each network prefix is unique throughout the entire Internet.

For a private internet, the choice of network prefix can be made by the organization. To ensure that each prefix is unique, a group that builds a private internet must decide how to coordinate network number assignments. Often, a single network administrator assigns prefixes to all networks in the company's internet to ensure that numbers are not duplicated.