

What Is an ISP?

An overview of what an 'ISP' is and what it does...

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Introduction

What does ISP stand for - Internet Service Provider.

What does it do - what it says 'on the box', it is a company that provides an Internet service.

What does that really mean - read on...

Background to the Internet

There are many other primer-type documents to describe the Internet, how it came about, what it contains, how it is used, and plenty of technical documents explaining how it works. For the purposes of understanding ISP's, some background knowledge is required.

Networked Computers

The Internet is a collection of computers that are all connected using a common network, much as may be found within an office environment. Different pieces of networking hardware deal with the connection between these computers in worldwide locations. From any one computer that is connected to the Internet, it is possible to reach any other computer on the Internet. Restrictions are applied using software and hardware to implement firewalls, network security and routing between machines, but without these it is possible for data to be transferred between any or all of the computers linked on the Internet.

Network Addresses

Without going into specific technical terms, some form of addressing is required to allow all of these different computers to communicate with each other. This is handled using network addresses, which are numbers of the form '123.456.789.001' and these are defined according to the TCP/IP networking protocol, which is used by the Internet. Groups of numbers are assigned to different companies and organisations to identify their computers where they are connected to the Internet.

Certain groups or ranges of numbers can also be used for network addresses to be used within a company network. This does mean that many computers may share the same actual address, but in this case they do not communicate directly with each other on the same physical network. The process of handling the communication between different networks is the job performed by network routers and does not need to be understood by end users.

In addition to the computer having a network address, there is also a definition whereby each computer can have many different connection points for communications. These points are known as 'ports' and a system may provide many thousands of these for different purposes. The most commonly used services (web and email) have fixed port numbers to allow for all machines to connect to a known point (i.e. port 80 for the web) on each machine. In general, applications handle the use of their required port numbers without the user needing to know any of these internal details.

Domain Names

As numeric network addresses are not memorable nor easily recognisable, an alternative form of addressing is provided for Internet computers. This makes use of a 'domain name' that identifies a company and their computers, for instance 'dat-lab.com' is the domain name used by Dat-Lab for their network presence. These names represent specific network addresses, or ranges of addresses. For example, the domain name dat-lab.com refers to the numeric network address 213.171.192.46.

Within the named domain there may be a range of machines that are connect to the Internet, often providing different types of data. The individual machines can then be named within the domain using a format such as 'www.dat-lab.com' for the Dat-Lab web server.

The conversion between domain name addresses and the actual numeric network address is performed by the 'Domain Name Service' (DNS) software used by all Internet computers. The user does not need to understand this lookup process but should be aware that it exists. This process can sometimes be seen in operation when typing in a web address, or URL, into a web browser, when the status bar sometimes indicates that the domain name lookup is being performed. It is certainly apparent in the error message displayed if an incorrect or unknown domain name is entered into a web browser, as may be shown in the error message text.

Internet Services

The types of services offered by an ISP vary mostly according to whether they are offer 'commercial' or 'consumer' services, although there is a fair amount of overlap between these.

Dial-up Connections

For consumers and small businesses, an ISP offers a dial-up connection service. The most widely known of these in the UK will be AOL, Freeserve and BT, who all advertise the different levels of service that they offer.

A dial-up connection uses a modem and a phone line to make a temporary connection between a PC, or small network, and the Internet. It does this by calling in to an 'Internet Access Point' (or 'Point Of Presence') and making a network connection over the modem link. Whilst connected, the PC may then access all other Internet resources using that link.

Regarding the network address schemes described above, most dial-up connections are assigned a temporary address, allocated by the ISP within their range of addresses. A different address may be assigned to the PC for each dial-up connection that is made.

Permanent Connections

Businesses that require continuous connection to the Internet will require a permanent connection, which is another service provided by the ISP. In the past, this has usually required the installation of a physical network link from a supplier such as BT, with the network connection being made to the ISP site. More recently, newer technologies such as ADSL and Cable Modems have allowed for near-permanent network connections to be offered using existing communications lines into homes and businesses. These alternatives are only suited to lower-volume network usage though, with dedicated network lines still being needed for companies with greater needs.

With an 'always-on' connection, the network link may have a fixed network address so that all other Internet computers will be able to access the system at the end of the connection. This is generally the case for dedicated network links, although ADSL and cable services may use different network addresses from time to time. This is only of importance if the company using the link requires that their computers are available to others on the Internet at all time, such as where a web shopping site may be run by the company.

Web Hosting

A web site consists of a set of html pages and images, plus and database and application processing that the site may offer. The site content is made available from a web server, which allows users to view and interact with the site from the user interface of a web browser.

For a web site to be visible on the Internet, the web server must be located on a machine that is permanently connected to the network and that holds the relevant web site content. The domain name service (DNS) mapping for the web site domain must then refer to the network address of that particular machine. This allows a user to enter a URL such as 'www.rutthenut.com' and for the application software to find the web server and return the content for display in the browser.

Companies with dedicated network connections may run their own web servers, with their domain name pointing to the machines on their own network connection. In this case, the DNS settings are normally managed by the ISP as part of the network connection package.

For the majority of web sites, the content is held on web servers that are run and managed by an ISP, generally at a 'hosting centre' which may have many machines connected to the network to provide their web hosting service. The service offered in this case will generally consist of managing the domain name mapping to the ISP web server and allow access for the web site creator to upload and modify the site content held on the server.

Email Hosting

Besides the world-wide-web, the main use of the Internet is actually for email messages that are exchanged between users and companies throughout the world. This messaging technology makes use of the network connections between mail servers and individual email programs run by users. Mail servers link from one to another to pass messages from the sender to the intended recipient in a number of steps, according to the route required in reaching the recipient. Addressing of email messages uses the domain name of the addressees to determine which computers should receive the messages that are sent.

ISP's provide an email service as part of their other service offerings. They run mail servers in their own network environment and these may then hold messages awaiting delivery when a user checks their email. Companies with a dedicated network connection may run their own mail servers within their network, or they may use the ISP service to avoid the need for configuration and maintenance of this system software.

Summary

If the above comments haven't confused too much, the following summary of an ISP may possibly make some sense:

An Internet Service Provider, or ISP, offers services for consumers and businesses that allow connection to the Internet to view other sites and also provide connection that allow other Internet users to connect to business systems through their networks. ISPs also operate web and email servers on behalf of their customers and configure DNS settings that map domain names to network addresses for computers. They maintain networks of their own computers, with dial-in connections and dedicated network links to their systems to form the overall inter-connected network of computers that is the Internet.