

What are the Internet and the World-wide Web?

These two terms are, unfortunately, frequently used interchangeably. They are not the same, and this conflation is the cause of a lot of confusion.

What is the Internet?

The Internet is the name given to a set of computer communications data protocols designed to allow computer networks to be linked together. A *protocol* is a language computers can understand, and it includes data formatting and message types.

The basics of getting data from computer A to computer B can be quite complicated. But for now, there are really only a few concepts to understand.

- 1) Every individual computer actually “on the Internet” must have a unique IP address. This number is very much like a phone number, and looks something like this: **206.44.155.6**.
- 2) Different services offered on a computer (such as email, FTP or the Web) are carried over “ports”. A *port* is like a phone extension number in an office building. For example, if I want to connect to the web server on a computer, I use port 80.
- 3) The designers of the Internet understood that no one would love IP addresses: they’re hard to remember and may change over time. For this reason they invented a “pretty” name, called a domain name, such as “amazon.com”. A function on the Internet called **Domain Name Services** knows how to convert from a “pretty” name (used by people) to an IP address (used by computers).
- 4) There are many, many ways two computers can communicate over the Internet, just as there are many languages two people can use to understand each other. You don’t really need to know all the details: just know that finding a computer entails getting its IP address and knowing the port (extension) you want to talk to.

What is the World-wide Web?

The World-wide Web was invented by Tim Berners-Lee of CERN in Switzerland to allow scientists to communicate experimental results to each other very quickly. It was based on earlier work that book publishers undertook to automate the process of book publishing on modern computers.

When a web browser (like Internet Explorer) connects to a web server (at cnn.com, for example) what it does is locate the necessary IP address using DNS and connect to port 80 on that machine (80 is the reserved “extension” for the web). It then asks the remote computer for copies of pages coded in a special language called HTML, which stands for *Hypertext Markup Language*.

In other words, the two computers speak to each other using a special protocol called HTTP (for hypertext transfer protocol) that merely sends documents from the server (cnn.com) to the client (your computer).

The web is just one particular application (albeit a very useful one) that is carried using the same general data packets of the Internet. It uses all the same name resolution (DNS) and low-level protocols that any other Internet application does.

What Does Your ISP Do For You?

At the simplest level, your Internet Service Provider assigns you an IP address (dynamically, from its allocated pool of addresses or statically, if you've paid for this) and routes packets from you to the Internet and packets from the Internet to you. This is why some folks call an ISP an "Internet on-ramp".

One important feature that many ISPs do is to link your computer to its Domain Name Service (DNS) computers. Without a DNS server, your computer would be unable to convert pretty (DNS) names to useful IP addresses. You are not required to use your ISP's DNS servers, but it's generally a good idea because they're faster.

What about Email?

Email is just another Internet application; it's technically known as SMTP (for sending mail) and POP3 (for received mail). ISPs love to bundle email service with your account so they can charge you more and push advertising to you by selling your name to advertisers and, in some cases, altering your email to contain advertisements.

In reality, buying email from your ISP is like buying your toaster from the power company. Sure, a toaster uses A/C power, but is that wise?

There are many free and for-fee email companies out there. I always recommend ignoring your ISP's email offerings and instead buying separate email services from a provider that isn't going to sell your email address, such as usermail.com.

What about Multiple Computers?

When you have a home network, some device in your home has to perform an essential "translation" function. To your ISP, it must pretend to be the one and only computer using your IP address. It also must accept requests from other computers in your home and forward them to the Internet for you. This is called "routing".

In other words, to your ISP, your home has a single IP address; in your home, each computer thinks that your DSL or cable modem is the Internet and that each computer has its own address. This game is called NAT: Network Address Translation. The router (usually embedded in your modem) fiddles with the

source and destination addresses of the packets it receives to create this bi-directional illusion.