

# The Internet vs. The World Wide Web

We already explained in the previous lesson that the Internet is the physical network that allows users to communicate while the World Wide Web is the content that can be accessed across the network and shared by users. To get a better idea of the difference, we will learn more about both the Internet and the WWW.

Let's Start by watching this video which gives a brief overview of how everything works

<http://twentytwowords.com/2012/07/10/how-the-internet-works/>

---

## How the Internet Works

Information on the Internet is shared using the client/server model.

### Client/ Server Model

The easiest way to understand the client/server environment, is to think of a restaurant. You are the client who sits down, you look at the menu and decide what you want. The server takes your order, goes to the kitchen, gets what you've asked for and brings it to you. In the case of the internet, your web browser is a client program running on your desktop computer, while computer that is storing the desired information is the server. When you click on a link, you are simply placing your order.

When the client/server model is used on a network, such as the Internet, three elements are required:

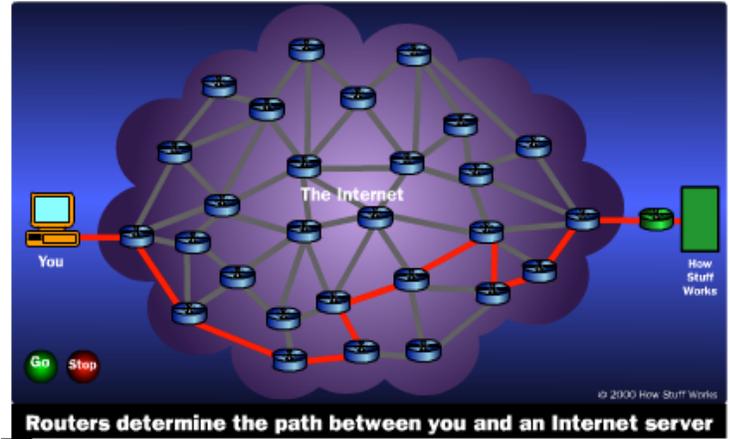
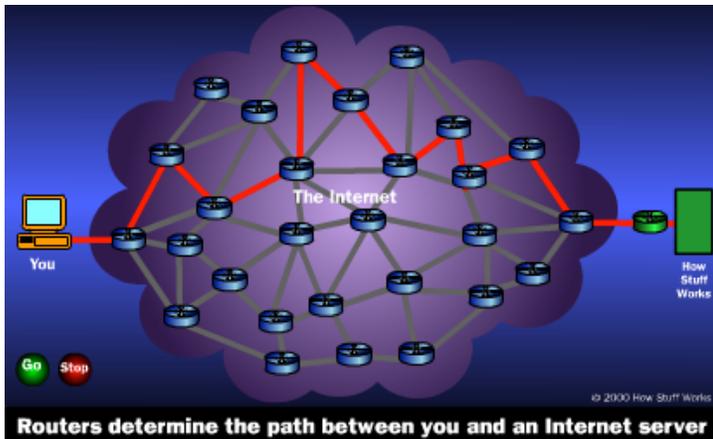
- **Client** – the software running on your desktop computer
- **Server** – the program running on a computer where the information is stored
- **Network** – the hardware allowing communication between the client and the server

Now that we've clarified that, it's time to go a little deeper into understanding how these requests work, and how the browser on your desktop knows where to go to get the information.

## How Information Travels Across the Internet

Internet communication is made possible by the **TCP/IP (Transmission Control Protocol/Internet Protocol)** software on your computer. This software send information to the computer with which you are connected, which then passes it on to other computers until it reaches the destination. Your software does not have a map of the entire Internet, and does not know the route your transmission will take. As seen in the diagram below, numerous possible routes exist between your workstation and any other. In essence, all

paths through the Internet lead to your destination. A network device called a **router** determines the path.



TCP/IP ensures that your information is transferred quickly and reliably. It divides your data into **packets** and sends each packet separately across the Internet. If a single packet is lost, all your data is not re-sent. TCP/IP resends only the missing packet. The destination computer collects the packets and reassembles them into your original data.

Routers are constantly checking their various connections to see which will be the fastest to use. If one of the connections or routes, between computers is not working, the surrounding routers will recognize that the route is damaged, and will send data through other routes until the connection is repaired. In this way TCP/IP software ensures that we can have a reliable connection despite problems others may be having.

This all happens between routers using lines that run all over the world. In fact, lines even run under water!

<http://twentytwowords.com/2012/07/13/world-map-of-all-the-underwater-cables-that-take-the-internet-across-the-oceans/>

## IP Addresses

Alright, so if TCP/IP software can do all of this wonderful stuff, how does it know where to go to get the stuff that I want? The answer is **IP (Internet Protocol) Addresses**. As you can imagine, the original creators of the Internet recognized the need for a flexible addressing system powerful enough to accommodate the enormous number of current and future users. They decided that every device on the Internet would be given an IP address, just as every house and business is given a street address. Instead of a street address format, such as 123 Main street, a 32-bit address format is used, such as:

**204.115.34.10**

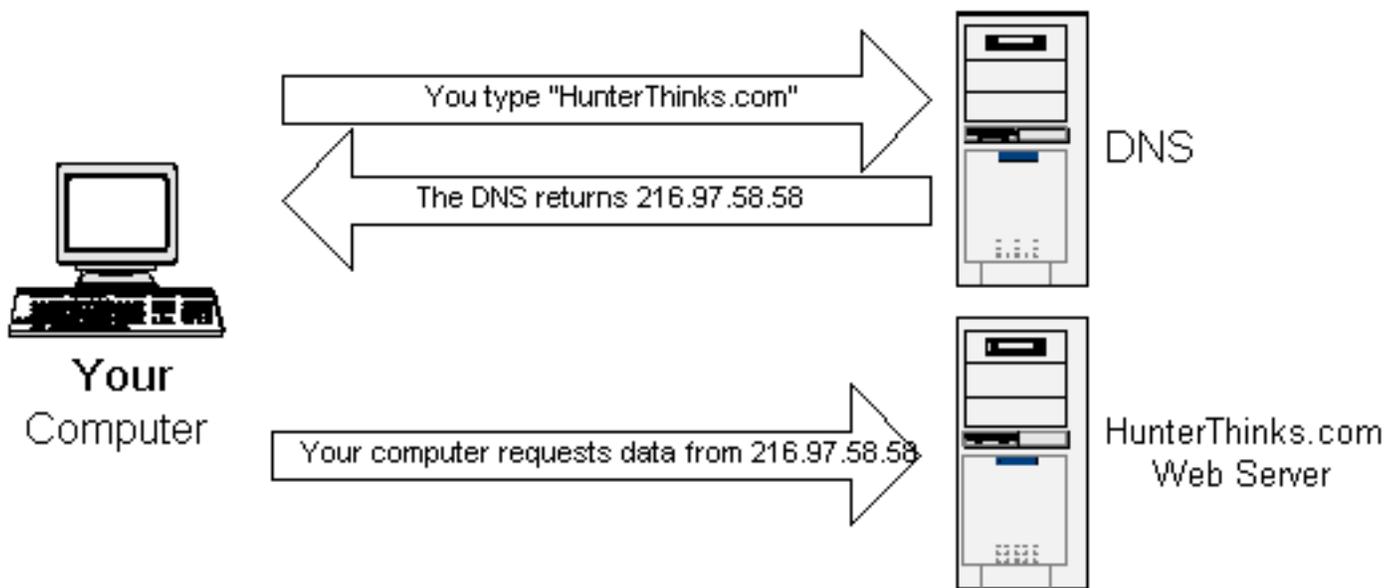
Sometimes people call an IP address a **"dotted quad"**, because the series of numbers is separated by a period or dots. Each of these four numbers must be between 0 and 255. Some number values are reserved, but if you want to figure out just how many possible IP addresses there are, you need only multiply  $256 \times 256 \times 256 \times 256$ . It gives roughly 4 billion possible addresses!

Despite the fact that this seems like a ridiculous number of IP addresses, experts fear that we will soon deplete our resources. Not specifically because of world population, but because the number of devices that each person may own that requires an IP address, is beginning to increase. Cell phones, a home workstation, a Laptop, and even your [fridge!](#)

## Domain Name Servers (DNS)

So you're probably wondering how it is then that we don't have to walk around with memorized IP addresses. The average human brain can only recall 7 random pieces of information at one time (which is why phone numbers are 7 digits). So instead of trying to remember a 12-character address, we've invented the DNS system.

The **Domain Name System (DNS)** translated the IP addresses into easily recognizable names. For example The Certified Internet Webmaster (CIW) program has a web server at 63.72.51.85 which can also be reached at [www.ciwcertified.com](http://www.ciwcertified.com). Because domain names are unique just like IP addresses, they will not be confused with other Web pages. The diagram below shows how DNS works



This is great news because now you simply have to remember a name that is relevant to what you are looking for. For example, if you want information about Tim Hortons Restaurants you will definitely remember <http://www.timhortons.ca>

# Understanding The World Wide Web

## It is Distributed

The World Wide Web is a Hyper Text information system that allows you to follow information in a non-linear way. The amazing thing about the WWW is that it is **distributed**. This means that there is not one giant computer holding all the information of the Internet. Millions of computers are responsible for keeping the web up all over the world.

Information is often duplicated (mirrored) on different continents for back-up information (in case one site goes down) and for speed of use. Web pages can link to another page stored on another computer across the world, and it looks seamless to you. The real issue is bandwidth. Why go to Japan to pull up a web site when the same site can be accessed from Toronto?

## The WWW is interactive

The WWW can be interactive in many ways here are just a few:

1. Surveys
2. Online Shopping
3. Guest books
4. Online Discussion Groups (BLOGS)
5. Chat rooms
6. Online Gaming
7. Web Casting (Group Conferencing)
8. Voice Communication (Voice Over IP)
9. Instant Messaging

and the list goes on...

The reason the WWW is revolutionizing the way we do things is because it can facilitate two-way communication. The only other technologies we've had to date that allow this is the telephone and two-way radio. Both of which are severely lacking when it comes to developing new ways to interact and communicate. Ask yourself, which of the above listed forms of interacting are possible on the telephone? A few, but very painfully!

## **It is Dynamic**

The contents of the WWW are constantly changing. People all over the world are putting up new pages every day, while others take down old ones. Now more than ever the WWW is changing rapidly by the second even with live webcasts, blogs, RSS feeds, social networking sites, up-to-the minute news, weather, and sports reports.

The implications here are severe when it comes to using information from the WWW, it may be outdated, or no longer correct. It is important to find out when the page was written to be accurate. For example, have you ever searched Google when looking for an answer and found what you were looking for in a help forum? Did you check the date of when the information was posted? Often, not checking the date will result in getting information that was relevant at the time of the posting, but not the best answer for today.

For example, you're looking for a piece of software that will convert .wave files to .mp3 files but you are using a Mac, so you need software for Mac OS X. You type this into Google. A forum site is returned as your top hit and gives you the following information:

Forum Post Site 1: Does anyone know of a good converter software to convert .wave files to .mp3 files? I can't find any such software for my Mac.

Response 1: There is currently no software available for this that is free. You can buy superconverter for \$29.99.

What you didn't check was that this post was written in 1999 when there were very few third party software developers for Mac. If you would have check the second hit from Google, you may have found:

Forum Post Site 2:

Does anyone know of a good converter software to convert .wave files to .mp3 files? I can't find any such software for my Mac.

Response 2: There are several freeware options available. Take your pick from the list below!

Whatever you do, always check for the relevance the information that you are getting as it pertains to today.

