



INTERNET FUNDAMENTALS – How do domains work?

On a daily, probably almost hourly basis, we all use internet browsers to connect to websites and fill our brains with information. But how do internet domains actually work? Well, using the Domain Name System.

The Domain Name System, or DNS as it is more commonly referred to, is essentially the internet's equivalent of a massive phonebook that maintains a directory of domain names and the IP addresses that they translate to, with the websites living on servers behind those IP addresses. This is necessary because although domain names are easy to remember, they don't really have any purpose in networking other than that – they are easy for humans to remember and refer to. Computers on the internet access websites based on their IP addresses and it is DNS that connects the human and computing worlds together.

This DNS translation information is stored on DNS servers across the world, which are usually strategically placed geographically based on where the highest levels of internet traffic occur. Domain host companies and ISPs interact with these servers on a regular schedule to retrieve and publish updated DNS information as it happens, so for instance if you were to move your domain to a different IP address.

So let's try a very simple domain DNS query and follow the steps that allow it to function. To begin with, you will type a domain name into your browser's address bar, let's say www.manutd.com. The first server that your machine interacts with is usually whatever DNS server is presented to you by your ISP, although you can manually alter this value to whatever you please and use any DNS server of your choosing. Your machine queries this server for the translation of www.manutd.com -- what IP address is this website located at? The server knows what other servers across the internet it has to interact with to get the answer.

The next servers in the chain are called Root Servers and the DNS server that you originally queried will go here next to get the required answer. Root Servers run all over the world and each one knows the location of the DNS translation information for top level domains (a top level domain being .com .net etc.). The query enquires about the top level domain, so in our example .com, and the Root Server refers the query to the relevant Top Level Domain server, which contains all the translation information for that Top Level domain -- a massive address book that contains the IP addresses of every single .com domain that has an IP address.

The Top Level Domain server answers the query with the corresponding IP address of the webserver that hosts the website, so in our example that would be 195.46.50.112. In Manchester United's case, they probably have a dedicated server that hosts their website with associated media and nothing else, but it is very common for a webserver to host hundreds or even thousands of individual websites.

The webserver replies to the original request with a "Yes, I'm over here!" type response which is fed back to the original server that you queried and in turn along to your machine, thus informing your browser where on the internet it needs to go. This entire process typically completes within milliseconds.