CISC 181 Lab 9 Internet Communications

This lab may not make much sense to you if you do not read through the annotated Week 9 slides first, so I advise doing that, or at least keeping the Notes 09.pptx file open for reference.

1. (2 marks) Let us first establish how the world identifies your computer (or your router if your computer is attached to one physically or by wireless). Open a search engine (Google, Bing, Baidu, whatever) and ask it

what is my ip address

Report the answer in the box, below. Note that being attached to a virtual private network (a VPN) may give you different results than if you were not attached to one, but do not worry about that. If you get two addresses, give one or the other, not both.

[**184.148.146.80**](https://whatismyipaddress.com/ip/184.148.146.80)**184.148.146.80**

Is the above an IPv4 address, or an IPv6 address?

IPv4

1. (2 marks) As mentioned in this week's notes, the domain name system (DNS) allows for the translation of human-friendly host names into numeric IPv4 or IPv6 addresses. It is possible that an entity like a large company, expecting a lot of internet traffic, would map two or more of their servers to the same host name, and DNS allows for this possibility. They might do this for so-called "load balancing" software that directs incoming internet traffic to the least busy server, or to a server that handles internet traffic coming from certain types of devices (like phones, for example). There is a handy command line interface program available on Windows, macOS, and on Linux/UNIX called **nslookup** that checks host names against their DNS records and reports on their corresponding IP addresses (or vice-versa).

Start your computer's command line interface program (perhaps Command Prompt on Windows, or Terminal on other systems), type **nslookup**, and press the **Enter** (Windows) or **Return** (Mac) key to start it. The Windows version will display a "Default server" and an "Address" and then a ">" indicating the keyboard input position. Users of non-Windows systems may just see a ">".

Now, type in the following host names, following each with a press of the **Enter/Return** key, and record in the box or boxes below each the IP address or addresses associated with that host.

cs.queensu.ca

130.15.1.11

queensu.ca

13.107.246.10

To get out of nslookup, type **exit** and press **Enter/Return**, or simply close your command line interface program as you would any other app.

1. Now here's something a little weird. If I run nslookup in Windows on the websites www.microsoft.com and www.apple.com, I get the following output:

Text

Description automatically generated

(In an Ubuntu Terminal window, and presumably in a Mac's Terminal window, the output is formatted differently, but the data is similar.) Note that each server has multiple IP addresses. Most are IPv6, but each also has an IPv4 address. If I run the same commands again, the list of IPv6 servers may well change. Also note that the host names are not [www.microsoft.com](http://www.microsoft.com) and [www.apple.com](http://www.apple.com). Instead, these are given as *aliases* in Windows, implying that the "true" host names belong to servers at akamaiedge.net. (On the Mac and in Ubuntu, the "true" host names are called "canonical names.") But what is akamaiedge.net? I note that neither akamaiedge.net nor www.akamaiedge.net are websites.

(1 mark) Do a web search on "akamaiedge.net," then give me a link to the actual website of the company behind akamaiedge.net.

https://www.akamai.com

(Note: You may be able to do the rest of this lab by making good use of the search function on that website!)

(1 mark) Among the network services this company provides is one called CDN. What do the letters in CDN stand for?

Content Delivery Solutions

(1 mark) What feature of networking does a CDN try to reduce?

Latency

(3 marks) In your own words, how does a CDN work?

By placing multiple data centres across the world, the CDN allows internet users to access a data centre much closer to them then if they didn’t have these distributed data centres, thus lowering latency as the time and distance for the data to travel from your computer to the data centre will be less.