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PartA_HTTP_HugoLin_916394826_ZheWang_915996102.txt

PartA_HugoLin_916394826_ZheWang_915996102.py

PartB_HugoLin_916394826_ZheWang_915996102_Client.py

PartB_HugoLin_916394826_ZheWang_915996102_Server.py

PartC_HugoLin_916394826_ZheWang_915996102_Client.py

PartC_HugoLin_916394826_ZheWang_915996102_Server.py

Part A. Implement DNS Client

1. Describe in detail the DNS request and response header format in your implementation.
   We first initial the flags (the last 16 bits of the header), and most of the flags are
   initialized to 0 with the exception of RD (recursion desired), which we set to 1.

2. Compute the RTT between your DNS client to each of the public DNS resolvers. Do you
   notice any meaningful differences across different DNS resolvers? Explain.

Public DNS resolvers	91.245.229.1 Iran	142.103.1.1 USA	184.94.80.170 Canada
RTT (microseconds)	407662	46155	108148

   The RTT between the DNS client and the public DNS resolver is impacted by the
   distance between the client and the resolver. For example, the RTT between the client and
   the public DNS resolver (in USA) is 46155 microseconds, but the RTT between the client
   and the public resolver (in Iran) is 407662 microseconds, which is ten times the RTT of
   the public DNS resolver in the USA.

3. Compute the RTT between your HTTP client to the HTTP server of the resolved
   hostname.
   The RTT is 18111 microseconds.

Part B. Implement DNS Server

1. Compute the RTT from your local DNS server to each of the DNS servers including the
   root name server, the TLD name server, and the authoritative DNS server of tmz.com.

Root server	TLD server	Authoritative server	RTT (microseconds)	HTTP
a.root-servers	192.12.94.30	205.251.193.129	199733	18.155.202.100
b.root-servers	192.5.6.30	205.251.193.129	72246	18.155.202.107
c.root-servers	192.55.83.30	205.251.193.129	79444	18.155.202.71
d.root-servers	192.5.6.30	205.251.193.129	64811	18.155.202.107
e.root-servers	192.55.83.30	205.251.193.129	283145	18.155.202.161
f.root-servers	192.12.94.30	205.251.193.129	97138	18.155.202.16
g.root-servers	192.55.83.30	202.251.193.129	92883	18.155.202.16
h.root-servers	192.5.6.30	205.251.193.129	146374	18.155.202.16
i.root-servers	192.55.83.30	205.251.193.129	246030	18.155.202.107
j.root-servers	192.5.6.30	205.251.193.129	123769	18.155.202.16
k.root-servers	192.5.6.30	205.251.193.129	342522	18.155.202.107
l.root-servers	192.5.6.30	205.251.193.129	242905	18.155.202.16
m.root-servers	192.5.6.30	205.251.193.129	341047	18.155.202.107

Part C. Implement DNS Server with Caching

1. Report the time it takes to resolve each of these hostnames from your local DNS server.

	youtube.com	facebook.com	tmz.com	nytimes.com	cnn.com
time	109576	156040	103497	95364	95982

2. Report the TTL value in the DNS responses to each of these host names.

	youtube.com	facebook.com	tmz.com	nytimes.com	cnn.com
TTL (microseconds)	300	300	60	120	60

3. Report the time it takes to resolve each of these hostnames by your DNS client from your local DNS server when it did implement the cache (and the answers are already in the cache).

	youtube.com	facebook.com	tmz.com	nytimes.com	cnn.com
Time (microsecond)	1309	1679	1382	1257	1393