

# TELE 3118 Tutorial 6

## Application layer

### 1. DNS and content replication

The text below shows a sequence of DNS responses obtained when determining the IP address for the Australian Broadcasting Corporation's web site. Underlining indicates where lines have been omitted for brevity. (FYI: "edgesuite" & "akam" are aliases for "akamai")

```
$ host -a www.abc.net.au
-----
;; QUESTION SECTION:
;www.abc.net.au.                IN      ANY

;; ANSWER SECTION:
www.abc.net.au.                147     IN      CNAME   www.abc.net.au.edgesuite.net.

;; AUTHORITY SECTION:
abc.net.au.                    10280   IN      NS      usw5.akam.net.
abc.net.au.                    10280   IN      NS      usw1.akam.net.
-----
abc.net.au.                    10280   IN      NS      ns.abc.net.au.
abc.net.au.                    10280   IN      NS      ns1.telstra.net.

;; ADDITIONAL SECTION:
eur2.akam.net.                39761   IN      A       95.100.173.64
usw1.akam.net.                40152   IN      A       23.61.199.66
-----
ns1-31.akam.net.              38986   IN      AAAA    2600:1401:2::1f
ns1.telstra.net.              36547   IN      A       139.130.4.5
eur5.akam.net.                40144   IN      A       23.74.25.64
-----
$ host -a www.abc.net.au.edgesuite.net.
-----
;; ANSWER SECTION:
www.abc.net.au.edgesuite.net. 13702   IN      CNAME   a1632.w7.akamai.net.
-----
$ host -a a1632.w7.akamai.net.
-----
;; ANSWER SECTION:
a1632.w7.akamai.net.         12      IN      A       203.5.76.11
a1632.w7.akamai.net.         12      IN      A       203.5.76.10
```

- What do the CNAME answers mean: If one name is a CNAME for another then what is the relationship between the names, and why are CNAMEs used?
- Why are multiple nameservers (NS) provided in the authority section?
- What are "IN A" and "IN AAAA" records in the additional section? Why are those values provided?
- The column of numbers, second from left, provide TTL values for each record. Why are the TTLs for name servers large, while the TTLs for the final name `a1632.w7.akamai.net.` are small?

### 2. Overheads in transferring objects from servers

Suppose within your web browser you click on a link to obtain a Web page. Suppose that the IP address for the associated URL is not cached in your local host, so that a DNS look-up is necessary to obtain the IP address. Suppose that  $n$  DNS servers are visited before your host receives the IP address from DNS; the successive visits incur a RTT of  $RTT_1, \dots, RTT_n$ . *Assume for this question that your local host queries these servers iteratively.* Further suppose that the Web page associated with the link contains exactly one object, a small amount of HTML text. Let  $RTT_0$  denote the RTT between the local host and the server containing the object. Assuming zero transmission time of the object, how much time elapses from when the client clicks on the link until the client receives the object?

[Kurose & Ross, Chapter 2 Question 6, with *addition in italics*]

