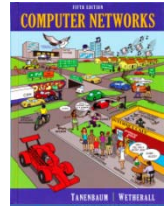


Solutions – DNS



The solutions below are based on our capture and use of tools. Your answers will differ in the details if they are based on your own capture and use of tools in a different network setting. Nonetheless, we expect our solutions to help you understand whether your answers are correct.

Step 1: Manual Name Resolution

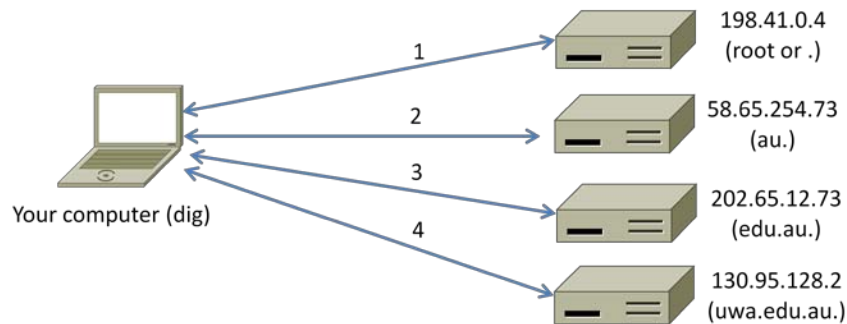


Figure 1: Sequence of nameservers in resolving www.uwa.edu.au

Notes:

1. The IP addresses and domains for the nameservers depend on the domain name that is being resolved. The details we provide are for resolving www.uwa.edu.au, and further selecting the alphabetically lowest of the alternatives.
2. The requests are numbered in the order they are sent; each arrow denotes both the request and the reply.
3. The reply to the last request is the IP address of the target, www.uwa.edu.au, rather than another nameserver, and the resolution is complete. That is, there is no request sent to www.uwa.edu.au.

Step 4: Details of DNS Messages

Answers to the questions:

1. The Transaction ID is 16 bits long, which makes collisions unlikely,. Since the host computer is setting this value, it can use all 2^{16} choices before repeating. This means that 2^{16} query/response pairs would need to be outstanding at the same time to cause a collision. For a normal computer, this is an extremely or implausibly high DNS workload.
2. The first flag bit signifies query or response. A “0” indicates a query, and hence a “1” a response.
3. The DNS header is 12 bytes long.
4. The names of nameservers are carried in the Authority section in an NS (NameServer) record.
5. The IP addresses of the nameservers are carried in the Additional section. The Type of record is A, for an IPv4 address, or AAAA for an IPv6 address.

6. The IP address of the queried domain name is carried in the Answer section (in an A or AAAA record.)

[END]