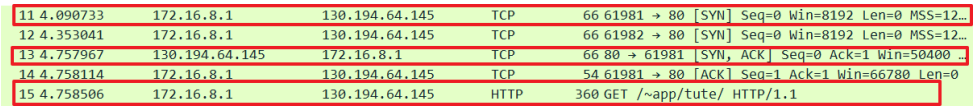
# Lecture 04 addendum tutorial:

Study the TCP Flow Graph that you obtained in Tutorial4 (copy on Moodle) and answer the following questions:

1. Describe activities in frames 11,13,15




TCP 3-way handshake

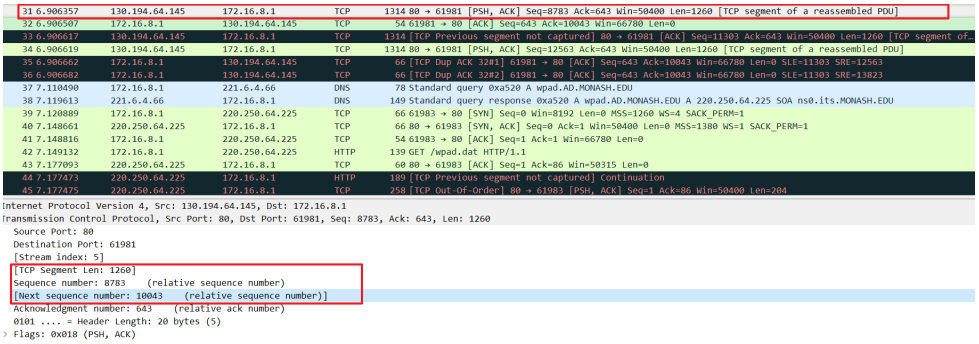
The first two handshakes in the TCP three-way handshake between frame 11 and frame 13.

Frame 11 sends a segment with seq 0 to the host with ip address 172.16.8.1 to the host with ip address 130.194.64.145.

Frame 13 is sent by the host with the ip address 130.194.64.145 to ack and seq to the host with the ip address 172.16.8.1.

HTTP connection gets GET command on frame 15

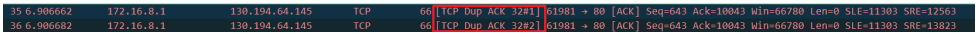
2. In the frame 32 why we have Ack=10043




ACK=segment len+seq = Next sequence number

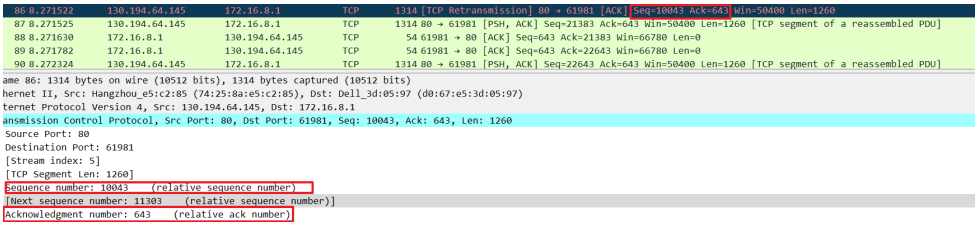
Because the next sequence number of frame 31 is 10043, need the next sequence number is 10043 so the ACK for frame 32 is 10046.

3. Ack=10043 has been repeated in many frames after the frame 32. What does it mean?




Indicates that the data segment has been lost, 32 is the location where the data was lost, #1 represents the lost one, #2 means lost twice.

4. What is happening in the frame 86?




TCP Restransmission

Frame 86 retransmits the packet with seq = 10043 ack = 643

5. Are there any retransmissions occurring.In which frames?

115,143,150,151,153,159,160,164,165,169,171,176,177,180,220,228,229,235,236,243,245,246,247,251,255,256.

6. Indicate frames related to the congestion control. What is happening after such frames have been received?

| | | | | | | |
|---|---|---|---|---|---|---|
| 21 6.235946 | 130.194.64.145 | 172.16.8.1 | TCP | 60 | 80 → 61981 [ACK] Seq=1223 Ack=643 Win=50400 Len=0 | |
| 22 6.238276 | 130.194.64.145 | 172.16.8.1 | TCP | 1314 | 80 → 61981 [ACK] Seq=1223 Ack=643 Win=50400 Len=1260 [TCP segment of a reassembled PDU] | |
| 23 6.238279 | 130.194.64.145 | 172.16.8.1 | TCP | 1314 | 80 → 61981 [ACK] Seq=2483 Ack=643 Win=50400 Len=1260 [TCP segment of a reassembled PDU] | |

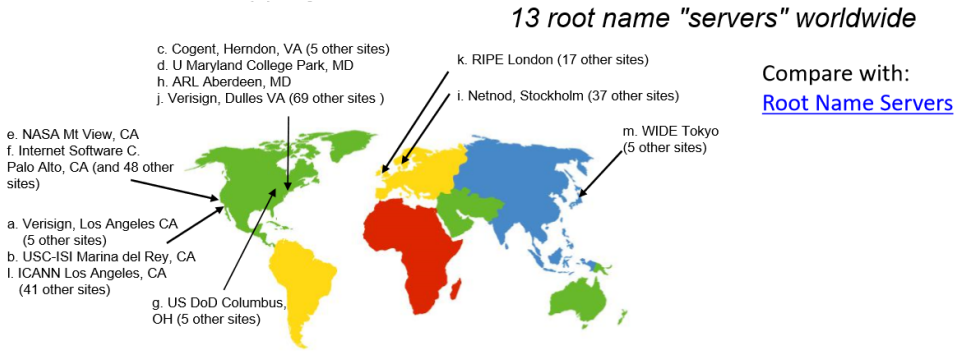
When the sender continuously receives more than 3 identical acknowledgments, it means that the packet is lost, immediately uses fast retransmission, and enters the fast recovery state. After receiving these frames, ssthresh = cwnd / 2, and cwnd = ssthresh.

# Q13

Where are the DNS root servers?

**List of Root Servers**

| HOSTNAME | IP ADDRESSES | MANAGER |
|---|---|---|
| a.root-servers.net | 198.41.0.4, 2001:503:ba3e::2:30 | VeriSign, Inc. |
| b.root-servers.net | 199.9.14.201, 2001:500:200::b | University of Southern California (ISI) |
| c.root-servers.net | 192.33.4.12, 2001:500:2::c | Cogent Communications |
| d.root-servers.net | 199.7.91.13, 2001:500:2d::d | University of Maryland |
| e.root-servers.net | 192.203.230.10, 2001:500:a8::e | NASA (Ames Research Center) |
| f.root-servers.net | 192.5.5.241, 2001:500:2f::f | Internet Systems Consortium, Inc. |
| g.root-servers.net | 192.112.36.4, 2001:500:12::d0d | US Department of Defense (NIC) |
| h.root-servers.net | 198.97.190.53, 2001:500:1::53 | US Army (Research Lab) |
| i.root-servers.net | 192.36.148.17, 2001:7fe::53 | Netnod |
| j.root-servers.net | 192.58.128.30, 2001:503:c27::2:30 | VeriSign, Inc. |
| k.root-servers.net | 193.0.14.129, 2001:7fd::1 | RIPE NCC |
| l.root-servers.net | 199.7.83.42, 2001:500:9f::42 | ICANN |
| m.root-servers.net | 202.12.27.33, 2001:dc3::35 | WIDE Project |




The root server is mainly used to manage the home directory of the Internet. There are only 13 root servers in the world, and one is the main root server in the United States. The remaining 12 are secondary root servers, 9 of which are in the United States, two in Europe, in the United Kingdom and Sweden, and one in Asia in Japan.

But I believe that there will be more DNS root servers in the world in the future.

# Q14

Open the command window and practice using nslookup command

app> nslookup zz.cn

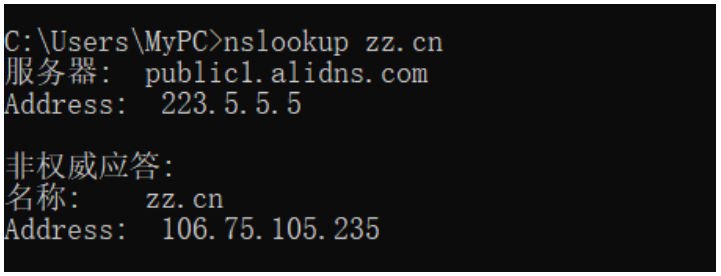
Server: ns1.its.monash.edu.au

Address: 130.194.1.99

Non-authoritative answer:

Name: zz.cn

Address: 211.100.61.67




Nslookup (name server lookup) is used to query the DNS records, check whether the domain name resolution is normal, and use it to diagnose network problems when the network is faulty.

From this we know the list of IP addresses of the zz.cn server group.