6.033 Handson Exercise 5

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1. (a) Ping with 56 byte long packets

Host	Response Rate	Min	Avg	Max
www.lcs.mit.edu	100%	6.633	27.105	89.972
www.stanford.edu	100%	69.978	95.268	149.982
www.cs.vu.nl	100%	128.197	157.877	189.967
www.kyoto-u.ac.jp	100%	209.978	233.350	269.982

   (b) These results indicate that the round trip time (RTT) between MIT and LCS are very small while RTT between MIT and Stanford is an order of magnitude higher. The RTT to the Dutch university is twice that of Stanford's and the RTT to Japan is nearly three times that of Stanford's. These differences suggest that the minimum round trip times are proportional to physical distance.

   (c) Ping with 512 byte long packets

Host	Response Rate	Min	Avg	Max
www.lcs.mit.edu	100%	19.828	32.401	69.884
www.stanford.edu	100%	79.970	100.145	129.972
www.cs.vu.nl	100%	138.235	163.883	209.975
www.kyoto-u.ac.jp	100%	219.893	243.700	319.903

   Ping with 1024 byte long packets

Host	Response Rate	Min	Avg	Max
www.lcs.mit.edu	100%	9.967	34.237	89.977
www.stanford.edu	100%	79.966	106.184	139.975
www.cs.vu.nl	100%	142.344	170.074	259.954
www.kyoto-u.ac.jp	100%	229.958	249.293	279.961

   (d) For Stanford and Vrije, the minimum RTTs increase slightly (about 10%) when the packet size increases from 56 to 512 bytes and increases very little when the packet size increases from 512 to 1024 bytes. RTTs to Kyoto increase by the same small amount (about 10ms) when the packet size increases from 56 to 512 bytes and then from 512 to 1024 bytes. RTTs to LCS are very unusual. They double when the packet size goes from 56 to 512 bytes. However, 1024 byte packets have nearly the same RTT as 56 byte packets.

2. (a) Ping with 56 byte long packets

Host	Response Rate	Min	Avg	Max
www.pku.edu.cn	90%	439.955	479.618	519.972
www.wits.ac.za	100%	468.956	490.371	589.900
atlas.lcs.mit.edu	100%	4.206	32.999	85.922
www.microsoft.com	0%	0	0	0

(b) There are many reasons why we would receive fewer packets than we originally sent. Since ICMP is based on IP and IP does not guarantee reliable delivery, if the ICMP message was dropped or corrupted at any point on its way to the destination host, we would never get a response back. The same thing could have happened to the ICMP response on its return path through the network. Intermediate routers that are overloaded are most like to drop low priority packets. Since ICMP packets don't carry any real data, they're amongst the first to be dropped. Some networks block ICMP packets at the firewall. Microsoft does this. In addition, some hosts are configured to ignore ICMP packets.

3. I spent about one hour on this assignment.