Poject 1 – TCP ping

What is ping

Ping is a computer network administration software utility used to test the reachability of a host on an Internet Protocol (IP) network.

It measures the round-trip time for messages sent from the originating host to a destination computer that are echoed back to the source.

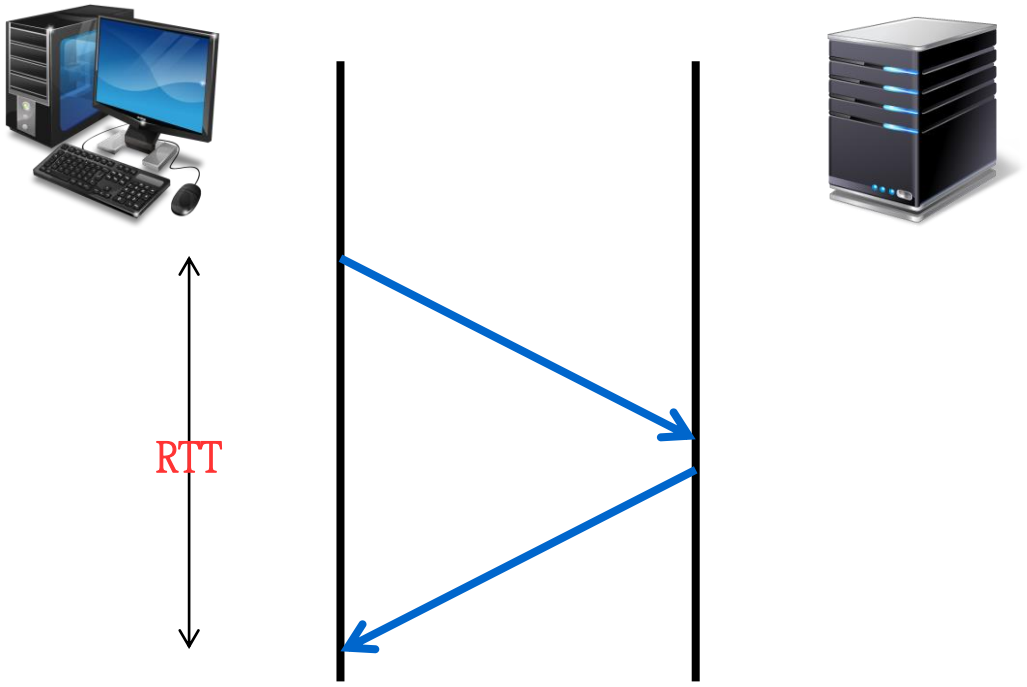
What is ping

Ping operates by sending Internet Control Message Protocol (ICMP) Echo Request packets to the target host and waiting for an ICMP Echo Reply

ICMP is at Network Layer as same as IP

Round-Trip Time

Round-Trip Time (RTT) is the length of time it takes for a signal to be sent plus the length of time it takes for an acknowledgment of that signal to be received



Ping

```
C:\Users\506B09haoxiang>ping google.com

Ping google.com [216.58.200.238] (使用 32 位元組的資料):
回覆自 216.58.200.238: 位元組=32 時間=1ms TTL=54
回覆自 216.58.200.238: 位元組=32 時間=1ms TTL=54
回覆自 216.58.200.238: 位元組=32 時間=1ms TTL=54
回覆自 216.58.200.238: 位元組=32 時間=1ms TTL=54

216.58.200.238 的 Ping 統計資料:
    封包: 已傳送 = 4，已收到 = 4，已遺失 = 0 (0% 遺失)，
大約的來回時間 (毫秒):
    最小值 = 1ms，最大值 = 1ms，平均 = 1ms
```

Ping (cont.)

```
C:\Users\506B09haoxiang>ping -n 6 216.58.200.238

Ping 216.58.200.238 (使用 32 位元組的資料):
回覆自 216.58.200.238: 位元組=32 時間=2ms TTL=54
回覆自 216.58.200.238: 位元組=32 時間=2ms TTL=54
回覆自 216.58.200.238: 位元組=32 時間=1ms TTL=54
回覆自 216.58.200.238: 位元組=32 時間=2ms TTL=54
回覆自 216.58.200.238: 位元組=32 時間=2ms TTL=54
回覆自 216.58.200.238: 位元組=32 時間=2ms TTL=54

216.58.200.238 的 Ping 統計資料:
    封包: 已傳送 = 6，已收到 = 6，已遺失 = 0 (0% 遺失)，
大約的來回時間 (毫秒):
    最小值 = 1ms，最大值 = 2ms，平均 = 1ms
```

Instruction of Homework

We will implement ping function with TCP

This project has two part

- Client
- Server

Examine the reachability and calculate Round-trip time

Client

Command

./client [-n number] [-t timeout] host_1:port_1 host_2:port_2 …

number

packet number you have to send to each server, if number is 0 means that keeps to send message until closing program (default:0)

timeout

the maximum millisecond that client need to wait. (default:1000)

host

host name or ip,

Client (cont.)

Output

if server is reachable and RTT is smaller or equal than timeout

recv from [server_ip], RTT = [delay] msec

if server is not reachable or RTT is bigger than timeout

timeout when connect to [server_ip]

Server

Command

./server listen_port

listen_port the port server socket listen to

Server(cont.)

Output

recv from [client_ip:client_port]

Grading

Client (60%)

- receive/send message to single server with IP/Port (20%)
- translate host name into IP and receive/send message to server (10%)
- support -n -t command(10%)
- print output according to P.9 (10%)
- receive/send message to multiple server (10%)

Grading(cont.)

Server (40%)

- receive/send message from one client(20%)
- receive/send message from multiple client (10%)
- print output according to P.11 (10%)

Bonus (20%)

- Client can ping multiple server simultaneously (20%)

Requirement

Language

C/C++

program can run under linux

external library is forbidden

Submmit

Deadline: upload to ceiba before 11/6 12:00(Tue)

need upload

client

server

readme (how to run and what you have done)

other file needed to run your program

place all file under folder with [student_id_pj1] (ex: r07922163_pj1)

and compress in zip or tar file and name with student id

(ex: r07922163_pj1), too.