IERG4180 Network Software Design and Programming
Project 2 Report

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GitHub Repository: https://github.com/Catalpa1maple/IERG4180-Project

Requirement: **C++11** and **ws2_32.lib** (for windows)

(a) Detail and more information will be shown at Exp. Part below

(b) Concurrent Server – multithread implement

```
⊗ maplewong@Maples-Mac Project_2 % ./NetProbeServer
  Server is listening on port 4180
  Connected to 127.0.0.1 port 60057 SEND, TCP, 1215752192
  Bps
  Connected to 127.0.0.1 port 60061 SEND, TCP, 1000 Bps
  Connected to 127.0.0.1 port 60065 SEND, TCP, 1000000 Bps
  Connected to 127.0.0.1 port 60069 SEND, TCP, 100000 Bps
  Connected to 127.0.0.1 port 60077 SEND, TCP, 0 Bps
  Connected to 192.168.1.13 port 60080 RECV, TCP, 0 Bps
```
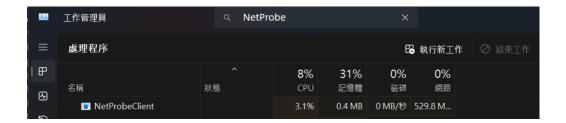
Noted: Where 0 Bps suggests unlimited pktrate

(c) Multiple Platform –Linux and Windows
Mainly implemented by import different libraries as different platform
Code snippet:

```cpp
#ifdef _WIN32
#include <winsock2.h>
#include <ws2tcpip.h>
#pragma comment(lib, "ws2_32.lib")
#else
#include <sys/types.h>
#include <sys/ioctl.h>
#include <sys/fcntl.h>
#include <sys/socket.h>
#include <netinet/in.h>
#include <netinet/tcp.h>
#include <arpa/inet.h>
#include <netdb.h>
#include <unistd.h>
#include <string>
#include <cstring>
#include <errno.h>
#define SOCKET int
#define INVALID_SOCKET -1
#define SOCKET_ERROR -1
#define WSAWOULDBLOCK EWOULDBLOCK

//Macros to translate winsock API to Linux API
#define WSAGetLastError() (errno)
#define closesocket(s) close(s)
#define ioctlsocket ioctl
#define Sleep(x) usleep(x*1000) //Sleep() is in ms

#endif
using namespace std;
#include <iomanip>
#include <iostream>
#include <getopt.h>
#include <string>
#include <sys/time.h>
#include "NetProbe.h"
```

Exp 1.
Windows Platfotm

```
PS Z:\IERG4180-Project\Project_2> .\NetProbeClient.exe -recv -rhost 192.168.1.8 -proto TCP
Failed to resolve hostname: 192.168.1.8
Mode:                RECV
Stat:                500 ms
Remote Host:         192.168.1.8
Remote Port:         4180
Protocol:            TCP
Packet Size:         1000 bytes
Packet Rate:         1000 bytes/second
Packet Number:       1000000000
Send Buffer Size:    0 bytes
Receive Buffer Size: 0 bytes
connected to server, port 60275
Elapsed 8.5s Pkts 24 Lost 0, 0.0% Rate 0.0KBps Jitter 28mss
```

工作管理員	Q NetProbe	×					
處理程序					🔂 執行新工作	⊘ 結束工作	
名稱	狀態	^	8% CPU	31% 記憶體	0% 磁碟	0% 網路	
🟦 NetProbeClient			3.1%	0.4 MB	0 MB/秒	529.8 M...	

Linux Platform

```
Stat:                500 ms                                    Find        Aa ab .*  No results   ↑ ↓ ×
Remote Host:         localhost
Remote Port:         4180
Protocol:            UDP
Packet Size:         1000 bytes
Packet Rate:         0 bytes/second
Packet Number:       1000000000
Send Buffer Size:    0 bytes
Receive Buffer Size: 100000 bytes
UDP socket bound to port: 4180
^Capsed 11.5s Pkts 2529325 Lost 0, 0.0% Rate 214.2MBps Jitter 0ms
maplewong@Maples-Mac Project_2 % ./NetProbeClient -recv -proto TCP
Mode:                RECV
Stat:                500 ms
Remote Host:         localhost
Remote Port:         4180
Protocol:            TCP
Packet Size:         1000 bytes
Packet Rate:         1000 bytes/second
Packet Number:       1000000000
Send Buffer Size:    0 bytes
Receive Buffer Size: 0 bytes
connected to server, port 59793
Elapsed 15.5s Pkts 32 Lost 0, 0.0% Rate 0.0KBps Jitter 42ms
```

```
Optimer 14 days, 01.59:28
[Main]
  PID USER      PRI NI  VIRT   RES S  CPU%▽MEM%  TIME+   Command
34428 maplewong  24  0  391G  1120 ?  48.9  0.0  0:02.00 ./NetProbeClient -send -proto TCP -pktrate 0
```

Exp 2.
UPD:

```
^Capsed 9.0s Rate 1106070.1MBps
maplewong@Maples-Mac Project_2 % ./NetProbeClient -send -proto UDP -pktrate 0
Mode:                SEND
Stat:                500 ms
Remote Host:         localhost
Remote Port:         4180
Protocol:            UDP
Packet Size:         1000 bytes
Packet Rate:         0 bytes/second
Packet Number:       1000000000
Send Buffer Size:    0 bytes
Receive Buffer Size: 0 bytes
Elapsed 5.0s Rate 237735.9MBps
```

TCP

```
failed to connect to server. Error: 61
maplewong@Maples-Mac Project_2 % ./NetProbeClient -send -proto TCP -pktrate 0
Mode:                SEND
Stat:                500 ms
Remote Host:         localhost
Remote Port:         4180
Protocol:            TCP
Packet Size:         1000 bytes
Packet Rate:         0 bytes/second
Packet Number:       1000000000
Send Buffer Size:    0 bytes
Receive Buffer Size: 0 bytes
connected to server, port 60474
Elapsed 5.0s Rate 1086919.7MBps
```