

建立Web服务器

实验目的

掌握网络程序的设计方法。

实验原理

套接字 (socket) 接口是 TCP/IP 网络的 API 接口函数, 最先应用于 Unix 操作系统, 目前已成为网络程序设计标准接口。socket 函数原型为:

```
int socket(int domain, int type, int protocol) 。
```

面向传输层的常用的Socket 类型有两种: 流式 Socket (SOCK_STREAM) 和数据报式 Socket (SOCK_DGRAM)。流式 Socket 是一种面向连接的 Socket, 针对于面向连接的TCP 服务应用; 数据报式 Socket 是一种无连接socket, 对应于无连接的 UDP 服务应用。

实验流程

UDP

发送端:

```
Visual Studio 2008 Command Prompt
Setting environment for using Microsoft Visual Studio 2008 x86 tools.

C:\work>cl -o Sender Sender.c ws2_32.lib
Microsoft (R) 32-bit C/C++ Optimizing Compiler Version 15.00.21022.08 for 86
Copyright (C) Microsoft Corporation. All rights reserved.

cl : Command line warning D9035 : option 'o' has been deprecated and will be
removed in a future release
Sender.c
Microsoft (R) Incremental Linker Version 9.00.21022.08
Copyright (C) Microsoft Corporation. All rights reserved.

/out:Sender.exe
/out:Sender.exe
Sender.obj
ws2_32.lib

C:\work>Sender.exe -p:8080 -r:192.168.11.4 -n:5 -b:3 -d:"6"

C:\work>Sender.exe -p:8080 -r:192.168.11.4 -n:5 -b:5 -d:"6"

C:\work>Sender.exe -p:8080 -r:192.168.11.4 -n:5 -b:3 -d:"6"

C:\work>
```

接收端:

```
Visual Studio 2008 Command Prompt - Receiver.exe -p:8080 -i:0.0.0.0
cl : Command line warning D9035 : option 'o' has been deprecated and will be removed in a future release
Receiver.c
Microsoft (R) Incremental Linker Version 9.00.21022.08
Copyright (C) Microsoft Corporation. All rights reserved.

/out:Receiver.exe
/out:Receiver.exe
Receiver.obj
ws2_32.lib

C:\work>Receiver.exe -p:8080 -i:0.0.0.0
[192.168.11.3] sent me: '666'
[192.168.11.3] sent me: '66666'
[192.168.11.3] sent me: '66666'
[192.168.11.3] sent me: '66666'
[192.168.11.3] sent me: '66666'
[192.168.11.3] sent me: '66666'
[192.168.11.3] sent me: '666'
[192.168.11.3] sent me: '666'
[192.168.11.3] sent me: '666'
[192.168.11.3] sent me: '666'
[192.168.11.3] sent me: '666'
```

发现最开始传送的一些消息丢失了，表明UDP的传送的数据完整性不能保证。

TCP

Server:

```
Visual Studio 2008 Command Prompt - Server.exe
Sender.obj
ws2_32.lib

C:\work>Server.exe

C:\work>cl -o Server Server.c ws2_32.lib
Microsoft (R) 32-bit C/C++ Optimizing Compiler Version 15.00.21022.08 for 80x86
Copyright (C) Microsoft Corporation. All rights reserved.

cl : Command line warning D9035 : option 'o' has been deprecated and will be removed in a future release
Server.c
Microsoft (R) Incremental Linker Version 9.00.21022.08
Copyright (C) Microsoft Corporation. All rights reserved.

/out:Server.exe
/out:Server.exe
Server.obj
ws2_32.lib

C:\work>Server.exe
Accepted client: 192.168.11.4:1031
RECV: 'This is a test of the emergency broadcasting system'
RECV: 'This is a test of the emergency broadcasting system'
```

Client:

```
Visual Studio 2008 Command Prompt
Copyright (C) Microsoft Corporation. All rights reserved.

cl : Command line warning D9035 : option 'o' has been deprecated and will be removed in a future release
Client.c
Microsoft (R) Incremental Linker Version 9.00.21022.08
Copyright (C) Microsoft Corporation. All rights reserved.

/out:Client.exe
/out:Client.exe
Client.obj
ws2_32.lib

C:\work>Client.exe -p:5150 -s:192.168.11.3 -o -n:2
connect() failed: 10061

C:\work>Client.exe -p:5150 -s:192.168.11.4 -o -n:2
connect() failed: 10061

C:\work>Client.exe -p:5150 -s:192.168.11.3 -o -n:2
Send 51 bytes
Send 51 bytes

C:\work>
```

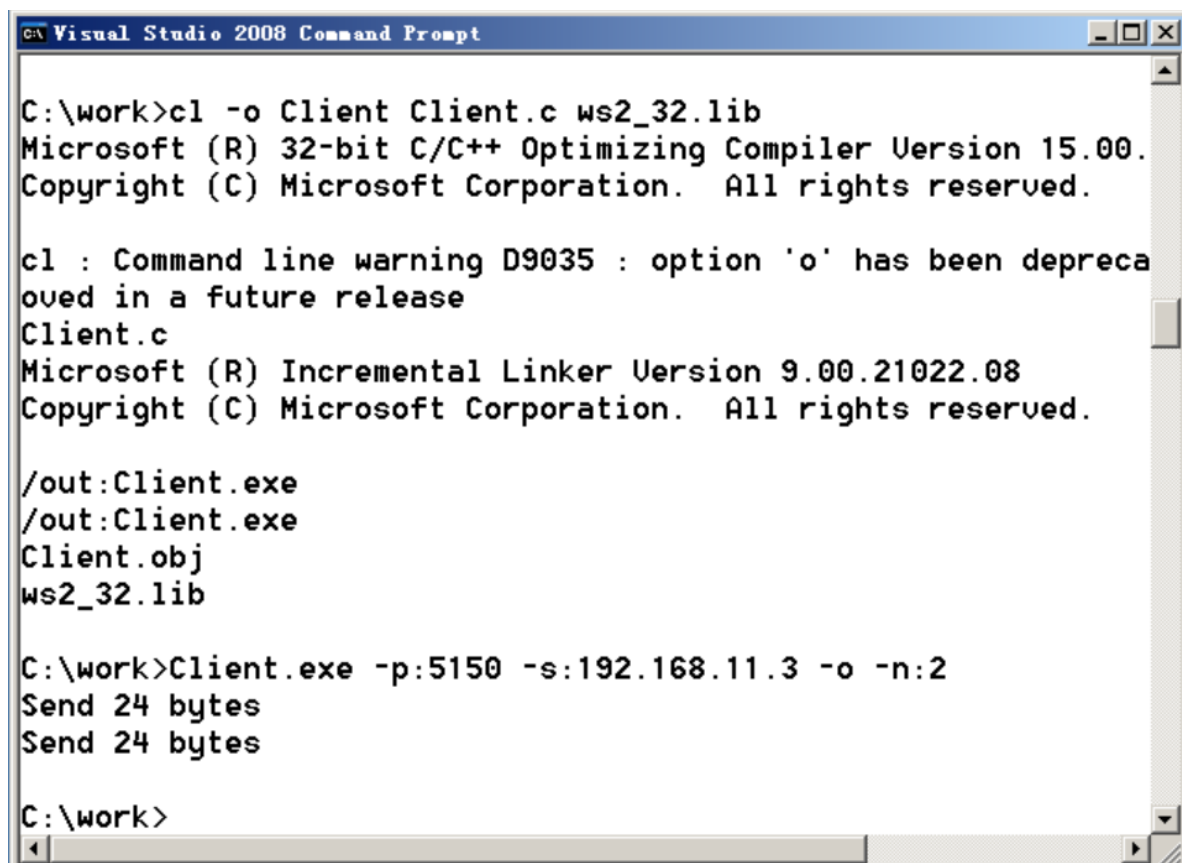
修改程序

```
Visual Studio 2008 Command Prompt - Server.exe
C:\work>cl -o Server Server.c ws2_32.lib
Microsoft (R) 32-bit C/C++ Optimizing Compiler Version 15.00.21022.08 for 80x86
Copyright (C) Microsoft Corporation. All rights reserved.

cl : Command line warning D9035 : option 'o' has been deprecated and will be removed in a future release
Server.c
Microsoft (R) Incremental Linker Version 9.00.21022.08
Copyright (C) Microsoft Corporation. All rights reserved.

/out:Server.exe
/out:Server.exe
Server.obj
ws2_32.lib

C:\work>Server.exe
Accepted client: 192.168.11.4:1031
RECU: 'This is a test of the emergency broadcasting system'
RECU: 'This is a test of the emergency broadcasting system'
Accepted client: 192.168.11.4:1056
RECU: '緇匡紉緇戢綠緇嬪簪璫捐 蓼朵笱闌擲紉'
RECU: '緇匡紉緇戢綠緇嬪簪璫捐 蓼朵笱闌擲紉'
Accepted client: 192.168.11.4:1057
RECU: '嘿! 网络程序设计并不难! 嘿! 网络程序设计并不难! '
```



```
Visual Studio 2008 Command Prompt

C:\work>cl -o Client Client.c ws2_32.lib
Microsoft (R) 32-bit C/C++ Optimizing Compiler Version 15.00.
Copyright (C) Microsoft Corporation. All rights reserved.

cl : Command line warning D9035 : option 'o' has been deprecated in a future release
Client.c
Microsoft (R) Incremental Linker Version 9.00.21022.08
Copyright (C) Microsoft Corporation. All rights reserved.

/out:Client.exe
/out:Client.exe
Client.obj
ws2_32.lib

C:\work>Client.exe -p:5150 -s:192.168.11.3 -o -n:2
Send 24 bytes
Send 24 bytes

C:\work>
```

找到合适的编码后，我们会发现，嘿！网络程序设计并不难！