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Lab Report

Department of Information and Communication Technology

Report No: 02

Report Name: Socket Programming

Course Title: Network Planning and Design Lab.

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Objective: Socket programming is a way of connecting two nodes on a network to communicate with each other. One socket(node) listens on a particular port at an IP, while other socket reaches out to the other to form a connection. Server forms the listener socket while client reaches out to the server.

They are the real backbones behind web browsing. In simpler terms there is a server and a client.

Socket programming is started by importing the socket library and making a simple socket.

```
import socket
```

```
s = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
```

Here we made a socket instance and passed it two parameters. The first parameter is AF_INET and the second one is SOCK_STREAM. AF_INET refers to the address family ipv4. The SOCK_STREAM means connection oriented TCP protocol.

Now we can connect to a server using this socket.

Server side: Server-side network programming involves designing and implementing programs to be run on a server. Server-side applications run as processes on a dedicated physical machine, virtual machine, or cloud infrastructure. Server-side applications receive requests from the clients and perform tasks as requested by the clients.

Server side code:

```
import socket # for socket
```

```
import sys
```

```
try:
```

```
    s = socket.socket(socket.AF_INET,  
                      socket.SOCK_STREAM) print "Socket successfully created"
```

```
except socket.error as err:
```

```
    print "socket creation failed with error %s" %(err)
```

```
port = 80
```

try:

```

host_ip = socket.gethostbyname('www.google.com')
except socket.gaierror:
    print "there was an error resolving the host"

sys.exit()

s.connect((host_ip, port))
print "the socket has successfully connected to google \non port == %s" %(host_ip)

```

Client side: In a client environment, each computer still holds (or can still hold) its (or some) resources and files. Other computers can also access the resources stored in a computer, as in a peer-to-peer scenario. One of the particularities of a client/server network is that the files and resources are centralized. This means that a computer, the server, can hold them and other computers can access them. Since the server is always ON, the client machines can access the files and resources without caring whether a certain computer is ON.

Client side code:

```

# standard Python
sio = socketio.Client()

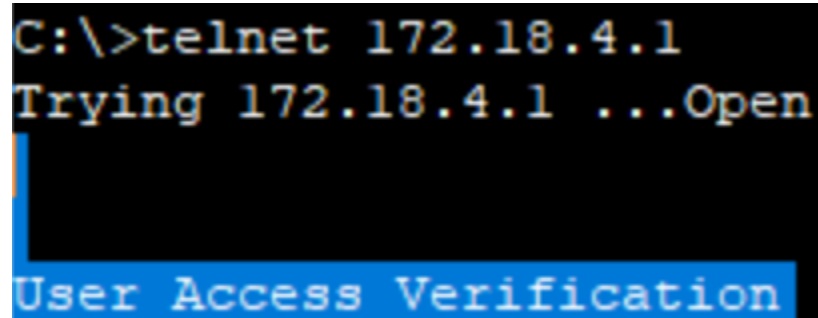
# asyncio
sio = socketio.AsyncClient()
sio.connect('http://localhost:127.0.0.1')
await sio.connect('http://localhost:127.0.0.1')
sio.event(namespace='/chat')
def my_custom_event(sid, data):
    pass

@sio.on('connect', namespace='/chat')

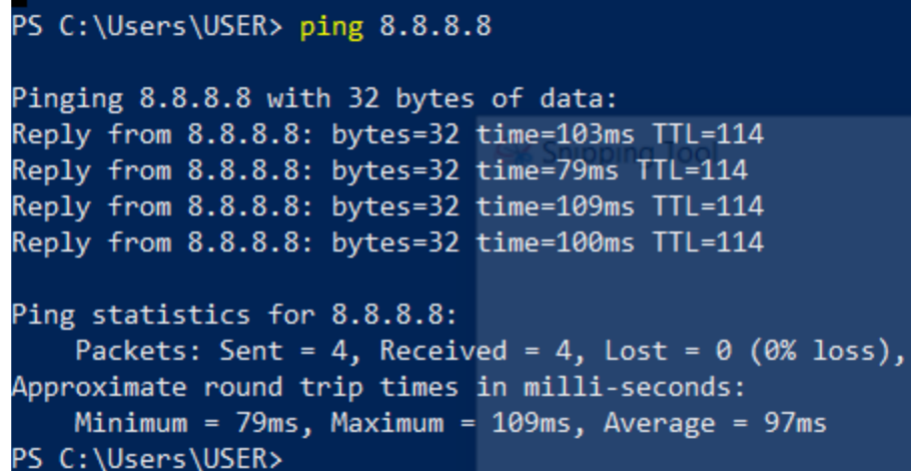
```

```
def on_connect():  
    tracer( 172.18.4.1)
```

Output : Socket successfully created the socket has successfully connected to google on port == 80 to IP 172.18.4.1



```
C:\>telnet 172.18.4.1  
Trying 172.18.4.1 ...Open  
  
User Access Verification
```



```
PS C:\Users\USER> ping 8.8.8.8  
  
Pinging 8.8.8.8 with 32 bytes of data:  
Reply from 8.8.8.8: bytes=32 time=103ms TTL=114  
Reply from 8.8.8.8: bytes=32 time=79ms TTL=114  
Reply from 8.8.8.8: bytes=32 time=109ms TTL=114  
Reply from 8.8.8.8: bytes=32 time=100ms TTL=114  
  
Ping statistics for 8.8.8.8:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 79ms, Maximum = 109ms, Average = 97ms  
PS C:\Users\USER>
```

```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\USER> ping 9.9.9.9

Pinging 9.9.9.9 with 32 bytes of data:
Reply from 9.9.9.9: bytes=32 time=105ms TTL=53
Reply from 9.9.9.9: bytes=32 time=97ms TTL=53
Reply from 9.9.9.9: bytes=32 time=97ms TTL=53
Reply from 9.9.9.9: bytes=32 time=92ms TTL=53

Ping statistics for 9.9.9.9:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 92ms, Maximum = 105ms, Average = 97ms
PS C:\Users\USER>
```

Conclusion: Sockets are the endpoints of a bidirectional communications channel. Sockets may communicate within a process, between processes on the same machine, or between processes on different continents.

Sockets may be implemented over a number of different channel types: Unix domain sockets, TCP, UDP, and so on. The socket library provides specific classes for handling the common transports as well as a generic interface for handling the rest.