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Lab Report No: 06

Lab Report on: Socket Program with python.

Objective:

Socket programming shows how to use socket APIs to establish communication links between remote and local processes. The processes that use a socket can reside on the same system or different systems on different networks. Sockets are useful for both stand-alone and network applications.

The processes that use a socket can reside on the same system or different systems on different networks. Sockets are useful for both stand-alone and network applications. Sockets allow you to exchange information between processes on the same machine or across a network, distribute work to the most efficient machine, and they easily allow access to centralized data. Socket application program interfaces (APIs) are the network standard for TCP/IP. A wide range of operating systems support socket APIs. i5/OS™ sockets support multiple transport and networking protocols. Socket system functions and the socket network functions are threadsafe.

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.

Code of server side:

```
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 \on port
== %s" %(host_ip)
```

Client side:

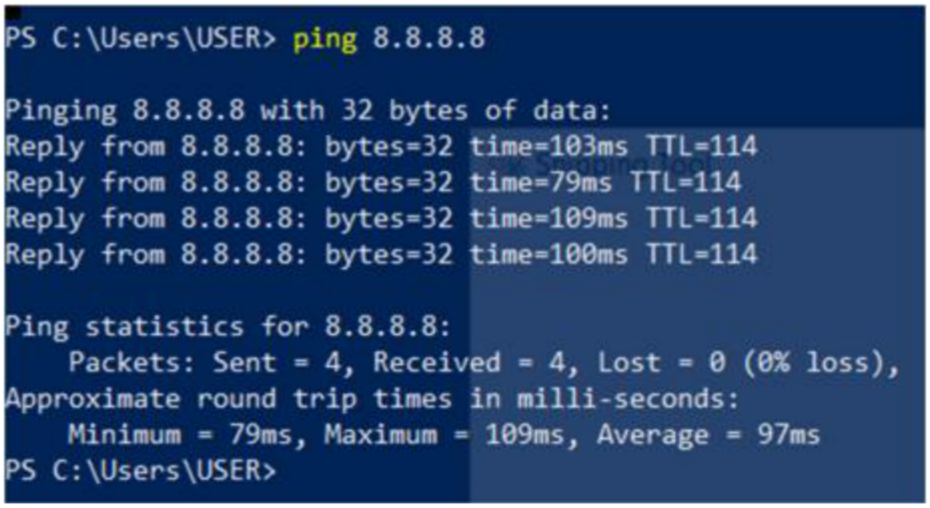
In a client environment, each computer still holds (or can still hold) its (or some) resources and files. Other computers can also access the resources stored in a computer, as in a peer-to-peer scenario. One of the particularities of a client/server network is that the files and resources are centralized. 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.

Code of Client side:

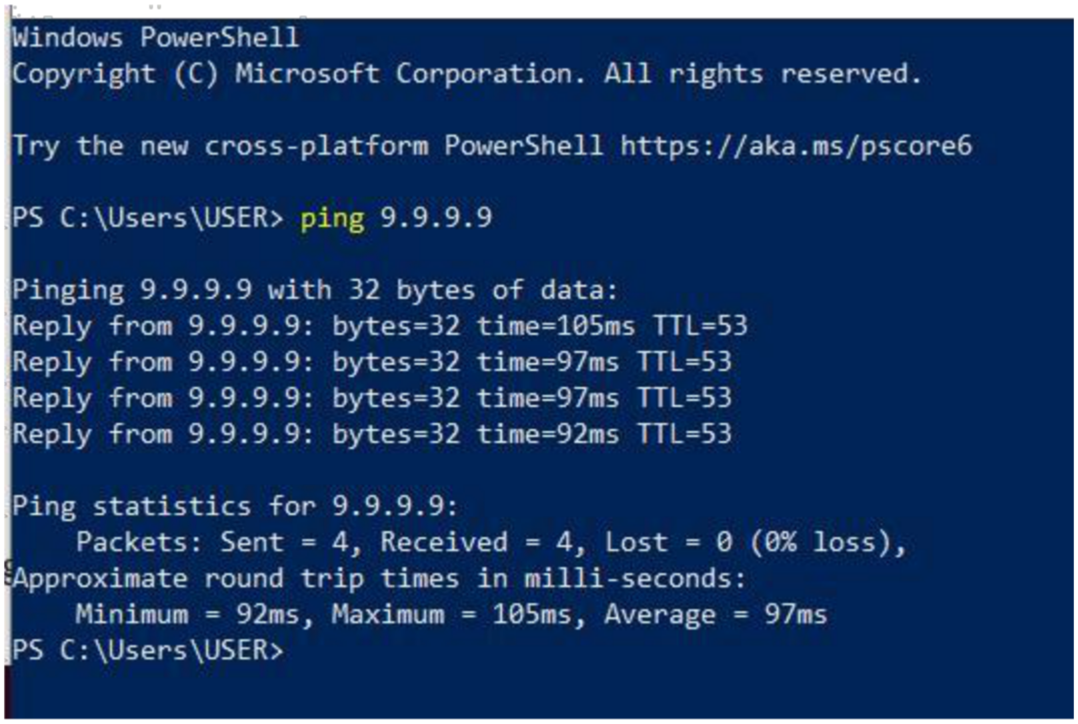
```
# standard
Python sio =
socketio.Client()

# 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():
```

```
tracert( 172.18.4.1)
```

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



```
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:

Modern network sockets are typically used in conjunction with the IP, TCP, and UDP internet protocols. Libraries that implement sockets for internet protocol use TCP for streams, UDP for datagrams, and IP for raw sockets.

To communicate over the internet, IP socket libraries use the IP address to identify specific computers. Many parts of the internet work with naming services, so that the users and socket programmers can work with computers by name (for example, thiscomputer.wireless.lifewire.com) instead of by address (for example, 208.185.127.40).

Stream and datagram sockets also use IP port numbers to distinguish multiple applications from each other. For example, web browsers on the internet know to use port 80 as the default for socket communications with web servers.