

CECS 277 – Lecture 21 – Client/Server Connections

Two things are required to make your programs networked: A Server and a Client.

Server – A server is a program that runs on a computer that client program connects to.

There are five steps to creating a server:

1. Create a Server Socket – This is the object that creates a port, through which Client programs can make a connection. It specifies how many connections can be made, and prohibits any extra connections from being formed.
2. Wait for a Connection – the server listens and waits for a connection on the specified port from a Client program. When the connection is made, a socket is created and then is passed to a new port for further communications. This frees up the ServerSocket to make new connections with other Client programs.
3. Set up the IO Streams – the Server sends messages to the Client through an OutputStream, and receives messages from the Client through an InputStream.
4. Process the Information – the Server and Client communicate through the open IO Streams and process the necessary information.
5. Close the Connection – when the connection is complete, the streams and the socket are closed.

Example: A Simple Server.

```
import java.net.*;
import java.lang.*;
import java.io.*;
public class Server {
    public static void main(String [] args){
        ServerSocket server;
        Socket s=null;
        BufferedReader in;
        PrintStream out;
        System.out.println("Waiting...");
        try{
            server = new ServerSocket(1025);
            s = server.accept();
            System.out.println("Connected: "+ s.getInetAddress());
            //get message from client
            in = new BufferedReader(new
                InputStreamReader(s.getInputStream()));
            System.out.println(in.readLine());
            //send message to client
            out = new PrintStream(s.getOutputStream());
            out.println("Yes, this is Server.");
            //close connections
            out.close();
            s.close();
        }catch(Exception e){
            System.out.println(e.getMessage());
        }
    }
}
```

Client – A client is a program that connects to a server.

There are four steps to creating a client:

1. Create a Socket – this socket is used to connect to the Server.
2. Get the Socket's IO Streams – the Client sends messages to the Server through an OutputStream, and receives messages from the Server through an InputStream.
3. Process the Information – the Server and Client communicate through the open IO Streams and process the necessary information.
4. Close the Connection – when the connection is complete, the streams and the socket are closed.

Example: A Simple Client.

```
import java.net.*;
import java.lang.*;
import java.io.*;

public class Client {
    public static void main(String [] args){
        Socket s=null;
        BufferedReader in;
        PrintStream out;
        try{
            InetAddress ip = InetAddress.getByName("localhost");
            s = new Socket(ip, 1025);
            //send message to server
            out = new PrintStream(s.getOutputStream());
            out.println("Hello Server, are you there?");
            //get message from server
            in = new BufferedReader(new InputStreamReader
            (s.getInputStream()));
            System.out.println(in.readLine());
            //close connections
            out.close();
            s.close();
        }catch(Exception e){
            System.out.println(e.getMessage());
        }
    }
}
```

Run the Server program first, and then run the Client program. The server will wait for the connection from the Client program.

```
/* Output of Server
Waiting
Connected: /127.0.0.1
Hello Server, are you there?
*/

/* Output of Client
Yes, this is Server.
*/
```