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# Client Server in Java

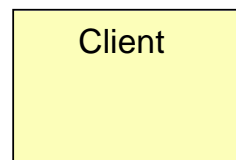
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## Framework

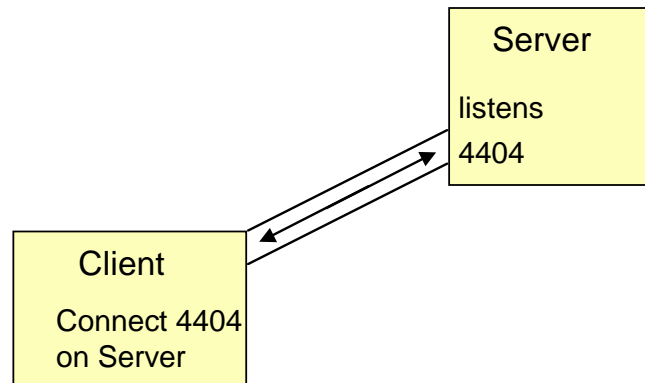
- Server (application)
  - » Java or other language
- Client (applet...)
  - » Java...
- Socket
  - » Connects Server and Client



The server provides a service by listening on a port

# Initializing a Connection

- Socket
  - » Two way link between client and server
- Client Connects to the port at the Server
  - » This creates the socket



# Server Creates Service

```
ServerSocket servsock = new ServerSocket(4404);
    // Create a new service at a port
while (true) {
    // wait for the next client connection
    Socket sock=servsock.accept(); // Listen
        // Blocks until a client connects.
    // handle connection
    ...
}
```

# Client Connects

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```
Socket sock = new Socket("foo.bar.edu", 4404);
    // Connect to a Service at a site.

// Get I/O streams from the socket
in = new BufferedReader(new InputStreamReader (
    sock.getInputStream() ));
out = new PrintStream( sock.getOutputStream() );

String fromServer = in.readLine(); // Get initial string
String reply = ...
...
out.println(reply); out.flush();
```

# Server Responds

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```
while (true) {
    // wait for the next client connection
    Socket sock=servsock.accept(); // Listen
        // Blocks until a client connects.
    PrintStream out =
        new PrintStream( sock.getOutputStream() );
    BufferedReader in = new BufferedReader(
        new InputStreamReader (sock.getInputStream() ));
    // Send our initial message
    String initial = ...;
    out.println(initial ); out.flush();
    ...
}
```

# Either Terminates Connection

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```
...  
sock.close();
```

## Notes

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- Can have several sockets on one port
- Each socket should have its own thread
  - » Reading and writing can even be in different threads
- Should perhaps have a limit on number of threads/sockets handled
- Listening thread creates others.

# Advanced Techniques

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- Can broadcast to all open sockets
  - » e.g. Manage a multi-user game.
- Server can connect to other services and act as an intermediary filter
  - » e.g. This is how you get gopher and ftp service from an http server.
- Streams don't have to be text streams