

Keeping Things Straight

Question: If there are multiple copies of a server, how does a client interact with the correct copy?

Answer: Use unique identifiers.

With TCP,

- client: (IP address, source port number)
- server: (IP address, destination port number)

Connection-Oriented Transport (TCP)

- Client establishes a connection to server.
- Client and server exchange multiple messages of arbitrary size.
- Client terminates connection.

Connectionless Transport (UDP)

- Client constructs a message.
- Client sends message to server.
- Server responds.

Application Program Interface (API)

- ...the set of procedures a program can call to access a particular service.
- network API - the procedures a program uses to access network protocols.

Definitions

- IP datagram - the form of a packet sent across a TCP/IP network.
- node - a device connected to a network.
- host - an end-user's computer connected to a network.

Socket Basics

- socket - a connection between two hosts.
- Sockets are an innovation of Berkeley UNIX.
- Communication protocol standards do not specify an API. They specify general operations and leave details to the programming or operating system.
- Nevertheless, the socket API has become the *de facto* standard.

Socket Operations

1. Connect to a remote machine.
2. Send data.
3. Receive data.
4. Close a connection.
5. Bind to a port.
6. Listen for incoming data.
7. Accept connections from remote machines on a bound port.

Java Programs & Client Sockets

1. The program creates a new socket with a **Socket ()** constructor.
2. The socket attempts to connect to a remote host.
3. The local and remote hosts get input and output streams from the socket and use those streams to send data to each other. The connection is full-duplex.
4. When the transmission of data is complete, one or both sides close the connection.