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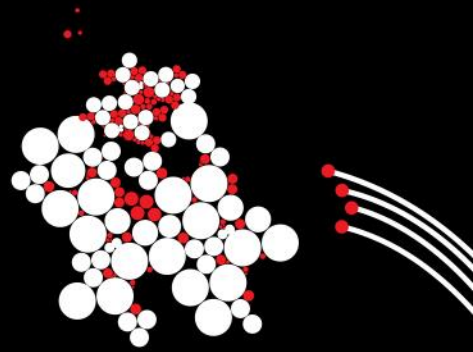
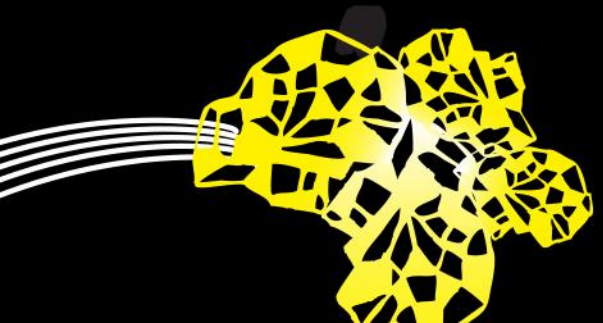


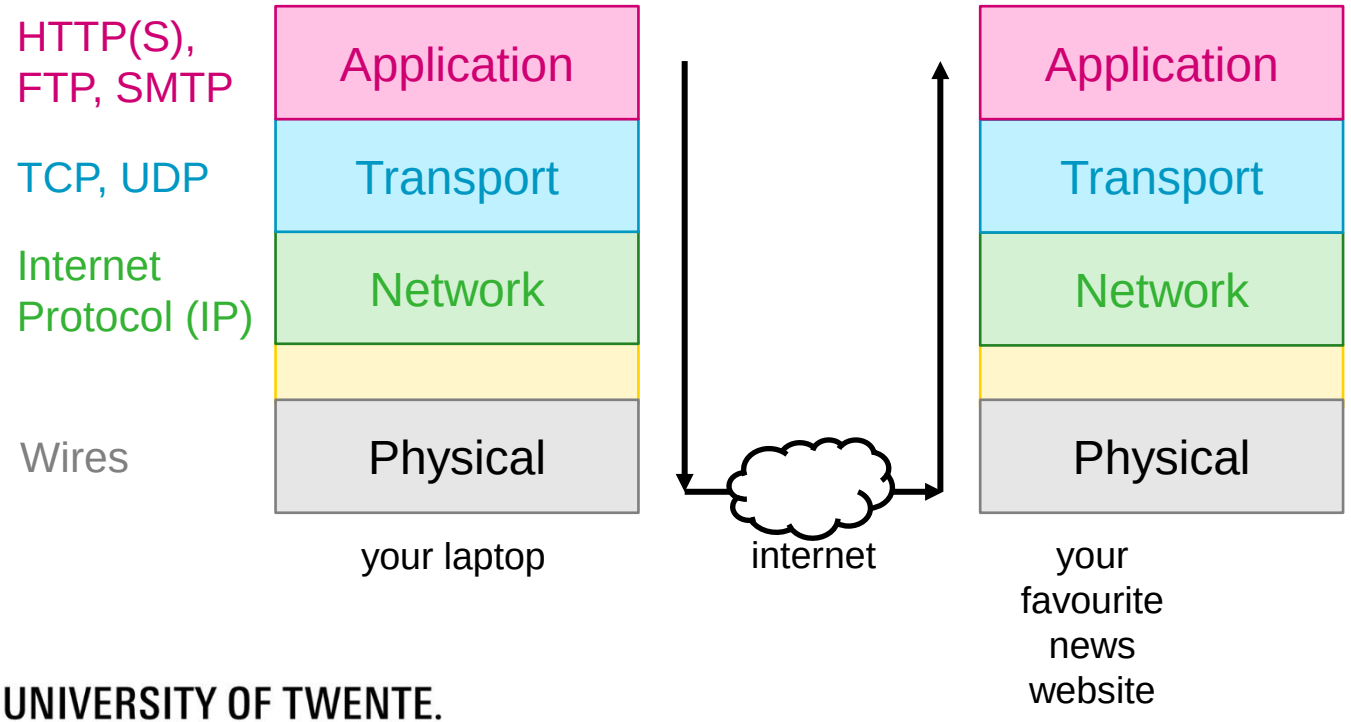
Networking

Topic of Software Systems (TCS module 2)

Lecturer: Ömer Şakar



PROTOCOL LAYERS



HOST ADDRESS

- Part of the networking layer
- 130.89.3.231 or 192.168.1.3 (IPv4)
- 2001:0db8:85a3:0000:0000:8a2e:0370:7334 or 2001:0db8:85a3::8a2e:0370:7334 (IPv6)
- Domain names like utwente.nl or utoday.nl
- 127.0.0.1 or localhost

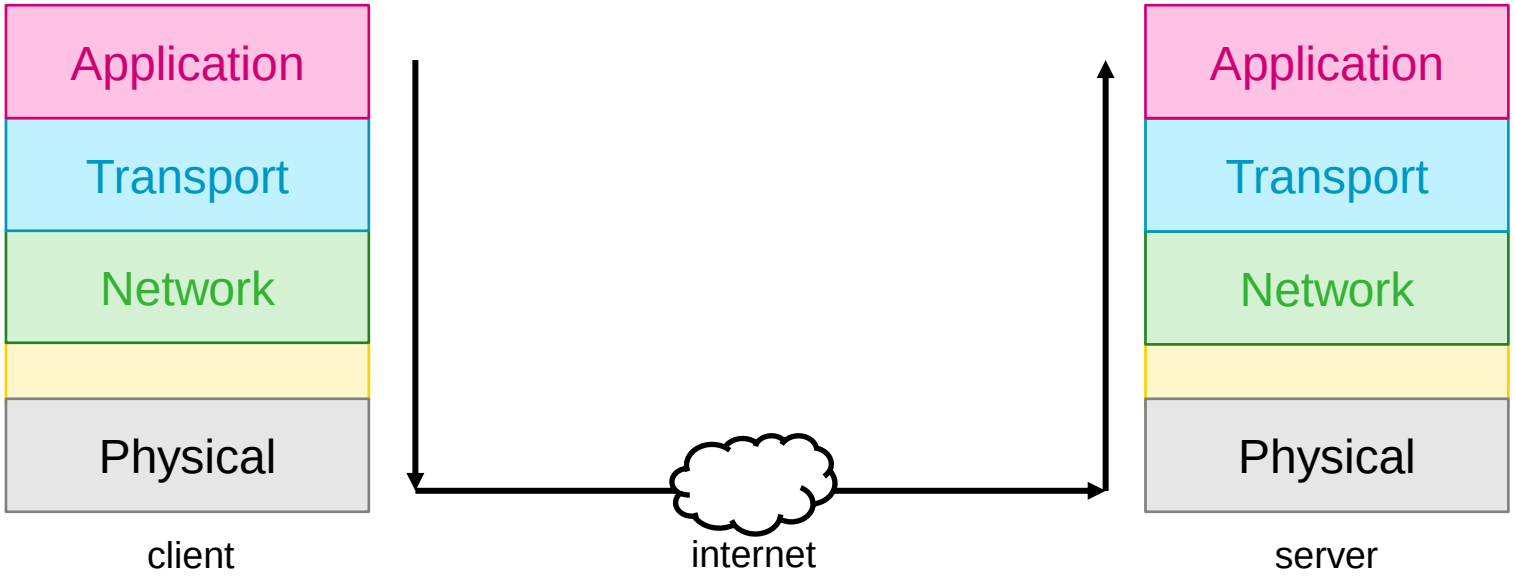
PORT NUMBER

- Part of the transport Layer
- A number between 0 and 65535
- Ports 0 through 1023 are reserved
- Port number associated with an application

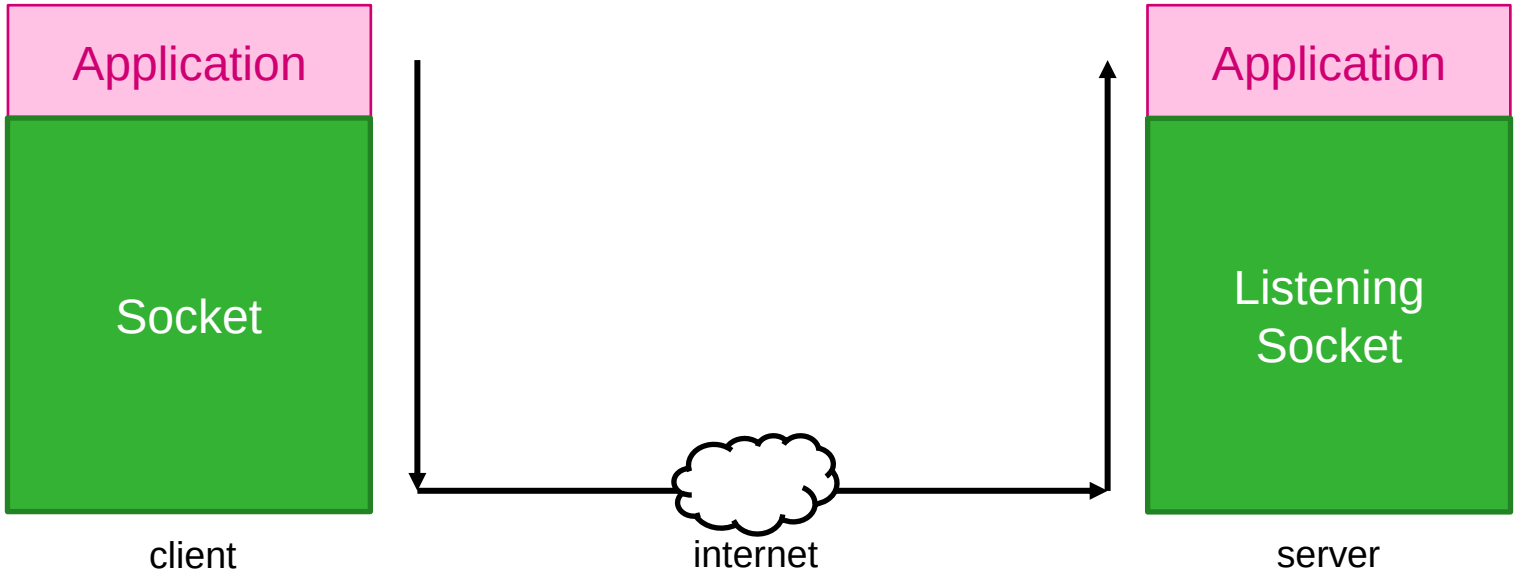
SOCKETS

- Socket is a common abstraction of the transport layer
  - Combines host address and port number
- Provides communication between program parts
  - Server waits on a port at an Internet address
  - Client tries to connect with port at an host address

PROTOCOL LAYERS



PROTOCOL LAYERS



TO SUMMARIZE

- Basic networking
- Host addresses (IPv4 or IPv6)
- Port numbers
- Sockets

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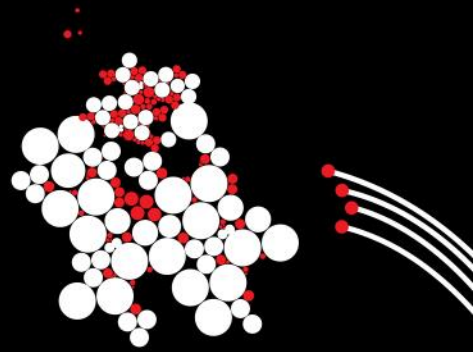

Networking

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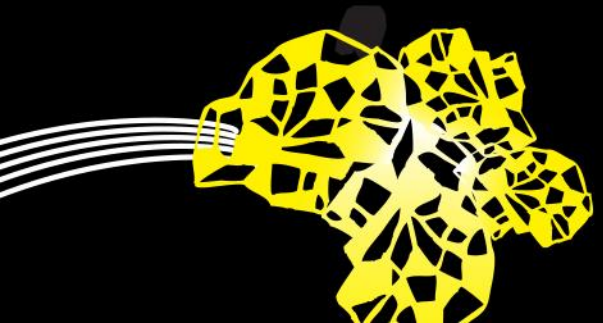

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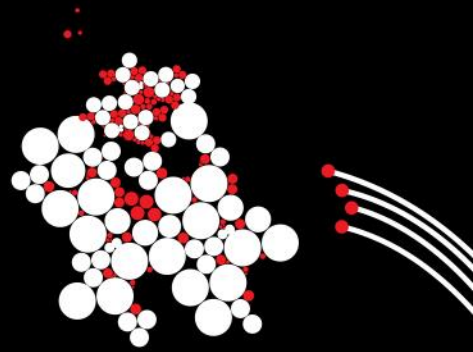

Java Sockets

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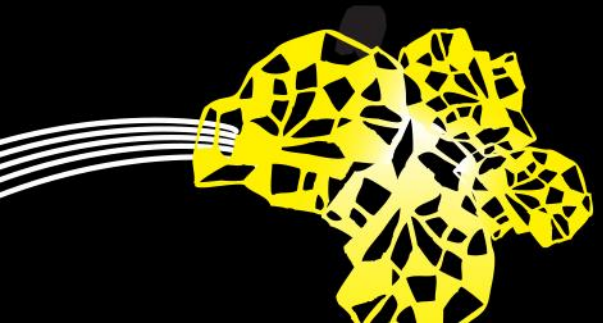


HOST ADDRESS IN JAVA

- Class java.net.InetAddress encapsulates an IP address
- String getHostName() gives host name (e.g., ”utoday.nl")
- String getHostAddress() gives address (e.g., "130.95.72.134")
- Factory method InetAddress getByName(String hostName)
    - hostName can be ”utwente.nl" or "130.95.72.134"
- Localhost InetAddress getLocalHost()

JAVA SOCKET

- java.net.Socket (TCP)
- java.net.ServerSocket (TCP)
- java.net.DatagramSocket (UDP)

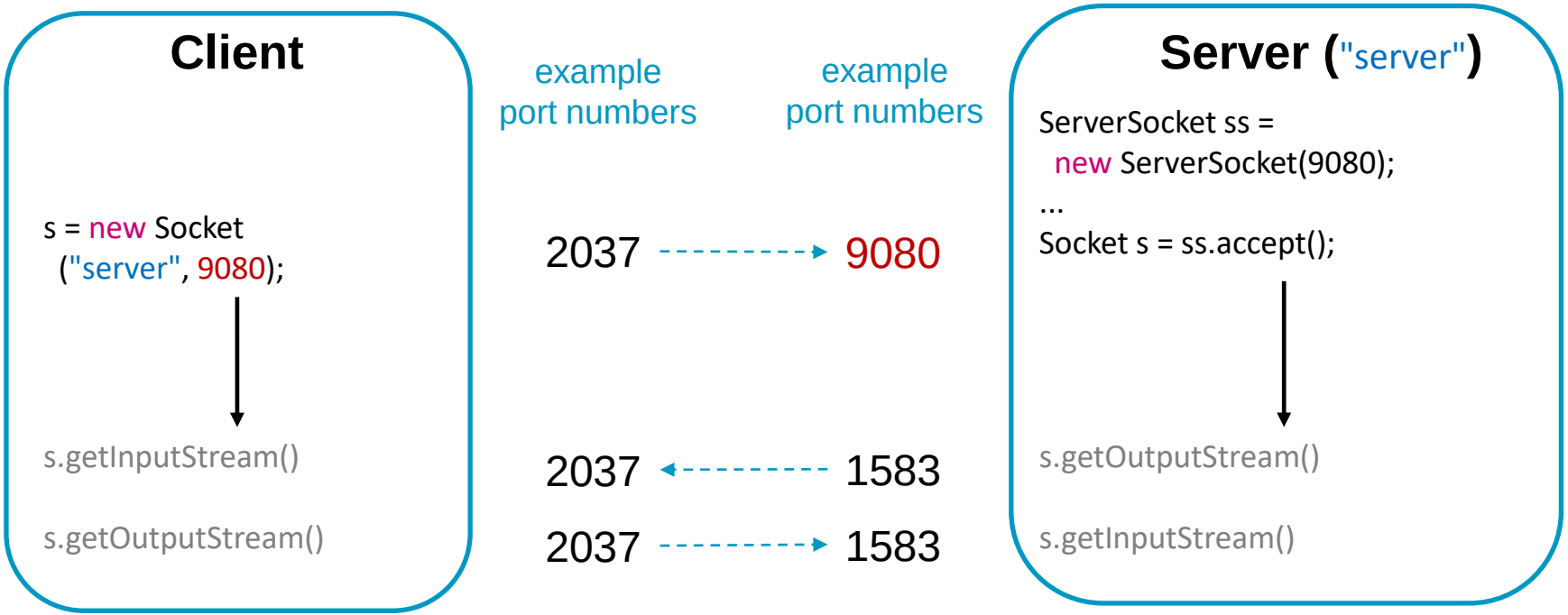
SERVERSOCKET

- Listens on fixed port for incoming connections
  - Creates a connection on a certain port for each incoming request
- ServerSocket(int port): constructor; if port is 0 chooses a free port
- Socket accept() returns a Socket if the attempt is successful
- Socket close() closes the server
- InetAddress getInetAddress() returns the local IP address
- int getLocalPort() returns the port the server is listening on.

SOCKET

- Bi-directional communication between sender and receiver
- Socket(String remoteHost, int port) starts a connection with remote host at port
- InputStream getInputStream() allows data from the other party to be received
- OutputStream getOutputStream() allows data to be sent to the other party

EXAMPLE


Client
s = new Socket
("server", 9080);
s.getInputStream()
s.getOutputStream()
example
port numbers
example
port numbers
2037
9080
2037
1583
2037
1583
Server ("server")
ServerSocket ss =
new ServerSocket(9080);
...
Socket s = ss.accept();
s.getOutputStream()
s.getInputStream()

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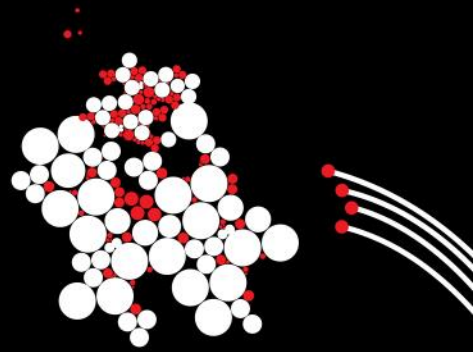

Java Sockets

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