CISC 3320 MW3
Communication in Client-Server Systems

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Acknowledgement

- These slides are a revision of the slides by the authors of the textbook

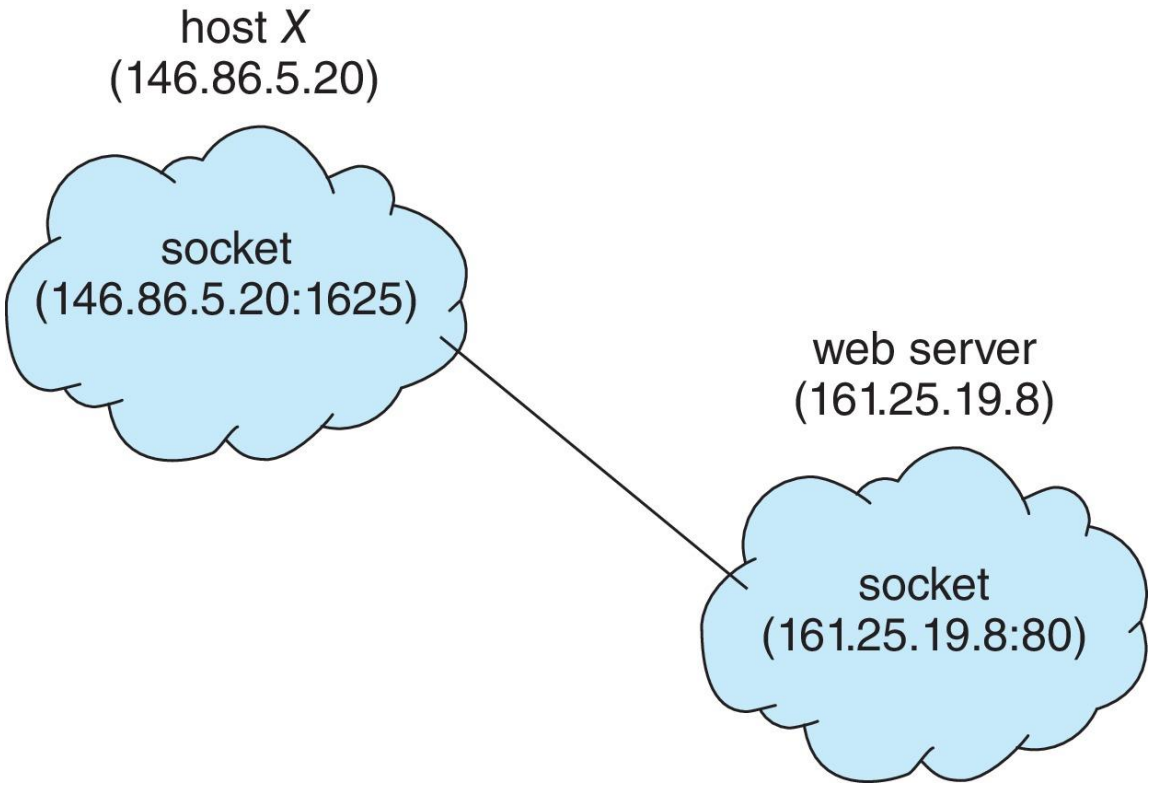
Outline

- Sockets
- Remote procedure call (RPC)

Sockets

- A socket is defined as an endpoint for communication
- Concatenation of IP address and port
  - IP address: a number to identify a host on an IP network
  - Port: a number included at start of message packet to differentiate network services on a host
  - The socket **161.25.19.8:1625** refers to port **1625** on host **161.25.19.8**
- Communication consists between a pair of sockets
- All ports below 1024 are ***well known***, used for standard services
- Special IP address 127.0.0.1 (loopback) to refer to system on which process is running

Socket Communication



Remote Procedure Call

- Remote procedure call (RPC) abstracts procedure calls between processes on networked systems
  - Again uses ports for service differentiation
- OS typically provides a rendezvous (or **matchmaker**) service to connect client and server

Stubs

- **Stubs** – client-side proxy for the actual procedure on the server
- The client-side stub locates the server and **marshalls** the parameters
- The server-side stub receives this message, unpacks the marshalled parameters, and performs the procedure on the server
- On Windows, stub code compile from specification written in **Microsoft Interface Definition Language** (**MIDL**)

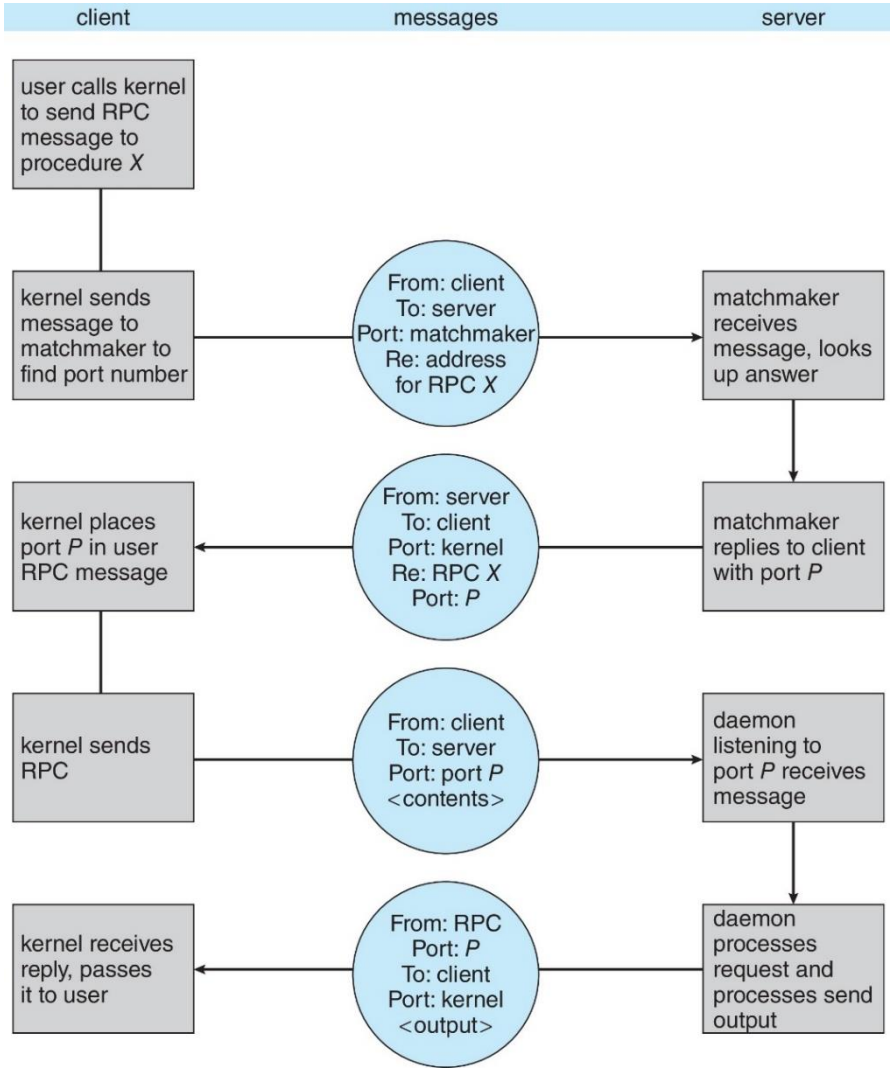
Data Representation

- Data representation handled via **External Data Representation** (**XDL**) format to account for different architectures
  - **Big-endian** and **little-endian**

Failure Scenarios

- Remote communication has more failure scenarios than local
  - Messages can be delivered ***exactly once*** rather than ***at most once***

Execution of RPC



Client-Server: Example Applications

- Socket
- RPC

Questions?

- Socket?
- RPC?