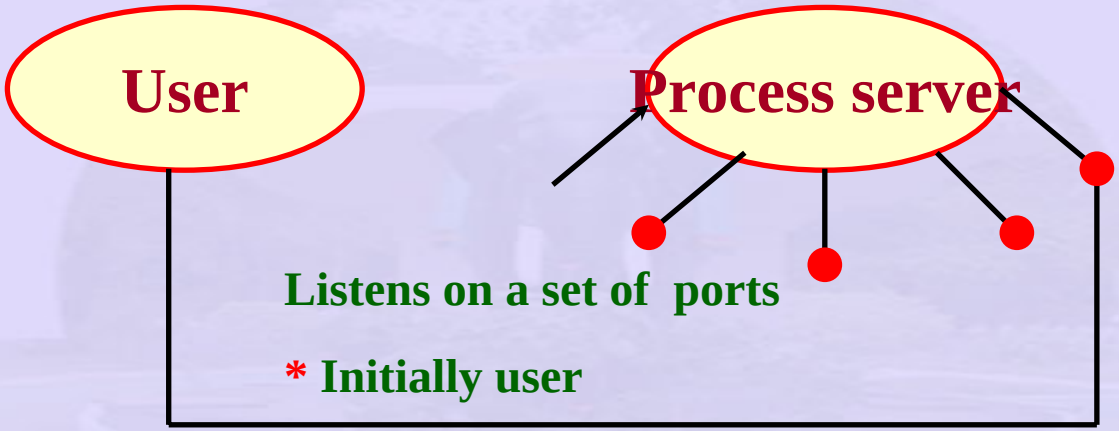
Process Servers



- Initially user asks for a specific server port
- If server not running connect to process server, which spawns server process.
- This process inherits connection

Process Servers

- Other Applications
  - When a file server cannot be spawned when requested
    - name server
    - directory server
  - User sets up connection to name server, get TSAP address and then disconnect.
  - Next connect to the requested TSAP

TCP - Flow Control

- Similar to DLL
  - Since pt-pt connection oriented
  - Some sliding window scheme representation
- Differences
  - Large number of connection
  - Buffers for each different connection
    - impractical

TCP Flow Control (contd.)

- Maintain Pool of buffers
- Buffer size
  - All TPDUs same size than identical size
  - Variable buffer size
    - Complicated buffer management
    - Dynamic buffer allocate agreement between sender and receiver is required.

TCP/IP Reference Model

- Model used in ARPANET and the Internet
- ARPANET
  - Research network by DoD
  - Connect large number of government installations and universities leased telephone lines

TCP/IP Reference Model

- The IP Layer:
  - Packet – switching network based on a connectionless
  - Internetwork Layer
    - Holds the whole architecture together
    - Hosts injects packets into any network and each packet travels independently to their destination

TCP/IP Reference Model

- Main criteria:
  - DoD wanted connections to remain intact even if subnet hardware lost, I.e, if existing conversation lost
  - connection must be established as long as source and destination machines function
  - Flexible architecture to suit divergent requirement

TCP/IP Reference Model

- Example: Drop a set of letters in a mail box
  - Mail delivered to address anywhere
  - Transparency in the sense of networks

- Internet layer
  - Specific packet format and protocol
  - Major issue packet routing

TCP/IP Reference Model

- Transport Layer:
  - Allows peer entries to carry a conversation
- Two protocols:
  - TCP and UDP
  - TCP – Allows a byte stream originating on one machine
    - delivered without error on the other machine in the internet

TCP/IP Reference Model

- Splits incoming stream to packets and pass to internet layer
- On reception reassemble packets in the right order
- Handle flow control

TCP/IP Reference Model (UDP)

- Unreliable connectionless
  - No sequencing or flow control
    - Useful for one – shot client – server requests
    - Prompt delivery more important than accurate delivery
    - Example: Speech / video

TCP/IP Reference Model(UDP)

- Why is accurate delivery not important?
- What are the issues here?
- Dropping of packets in speech
  - Packets out of order?

Comparison of TCP/IP and OSI

- OSI – Protocol is better hidden
- OSI – Devised before protocols
- Originally only ppp but on line went by broadcast – did not match
- TCP/ IP: Protocols first
- Model – Just a description of protocols

Comparison TCP/IP and OSI

- In OSI:
  - Network – Connectionless/ Connection oriented
  - Transport – Only Connection oriented
- In TCP:
  - Connectionless/ Connection oriented
    - Very useful for simple request reply

Comparison TCP/IP and OSI

- OSI: Service, Interfaces and protocols
- Layers Interface: How layer above it access it, what parameter and results to expect
- Peer protocols: Used in a layer are the layer's business
  - Layer is equivalent to an Object
    - Set of methods

Comparison TCP/IP and OSI

- TCP/ IP – no distinction between protocol and service –
  - later retrofitted
- IP –
  - Send IP packet
  - Receive IP packet

Comparison TCP/IP and OSI

- Host to network (TCP/IP)
  - Not really a layer. Interface between network and data link laye
  - No distinction between physical and data link layer
  - Adhoc application layer protocols
  - TELNET: Virtual terminal designed for a character terminal
    - no more than a UI

Comparison TCP/IP and OSI

- Hybrid Model
  - Application
  - Transport
  - Network
  - Data link
  - Physical
- OSI:
  - Difficult to Implement

ARPANET - Packet Switched Network