

Lesson 2.3:

Application Layer

CSC450 – COMPUTER NETWORKS | WINTER 2019-20

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OUTLINE

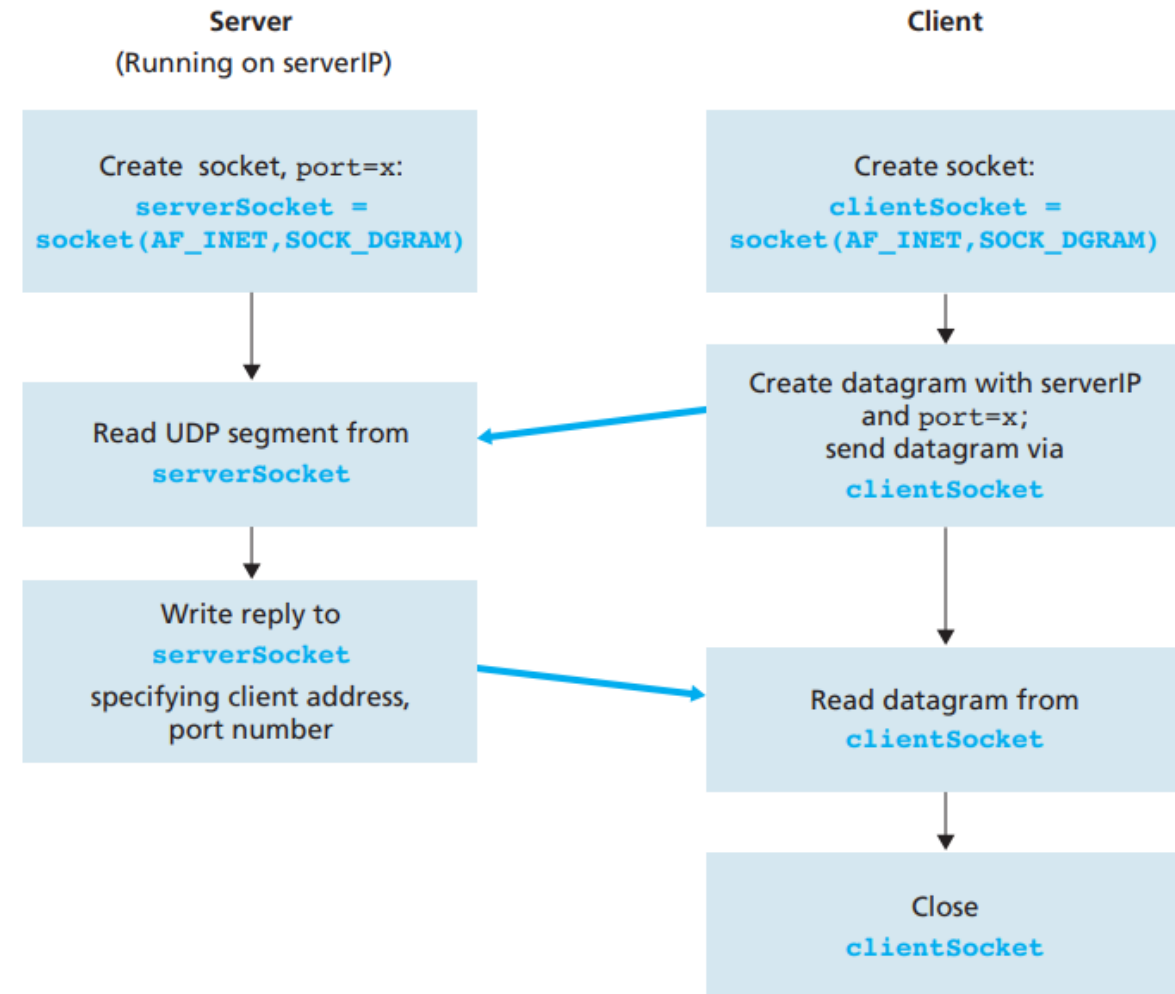
- Socket programming.
- UDP client / server.
- TCP client / server.

SOCKET PROGRAMMING: OVERVIEW

- Typical network **application** consists of **two programs** (residing on different systems).
 - **Client** program.
 - **Server** program.
- When programs are **executed** a **client process** and a **server process** are created.
 - These processes **communicate** with each other by **reading from** and **writing to sockets**.
- Initial **design decision** is which transport-layer protocol to choose: **TCP** or **UDP**.

UDP CLIENT / SERVER

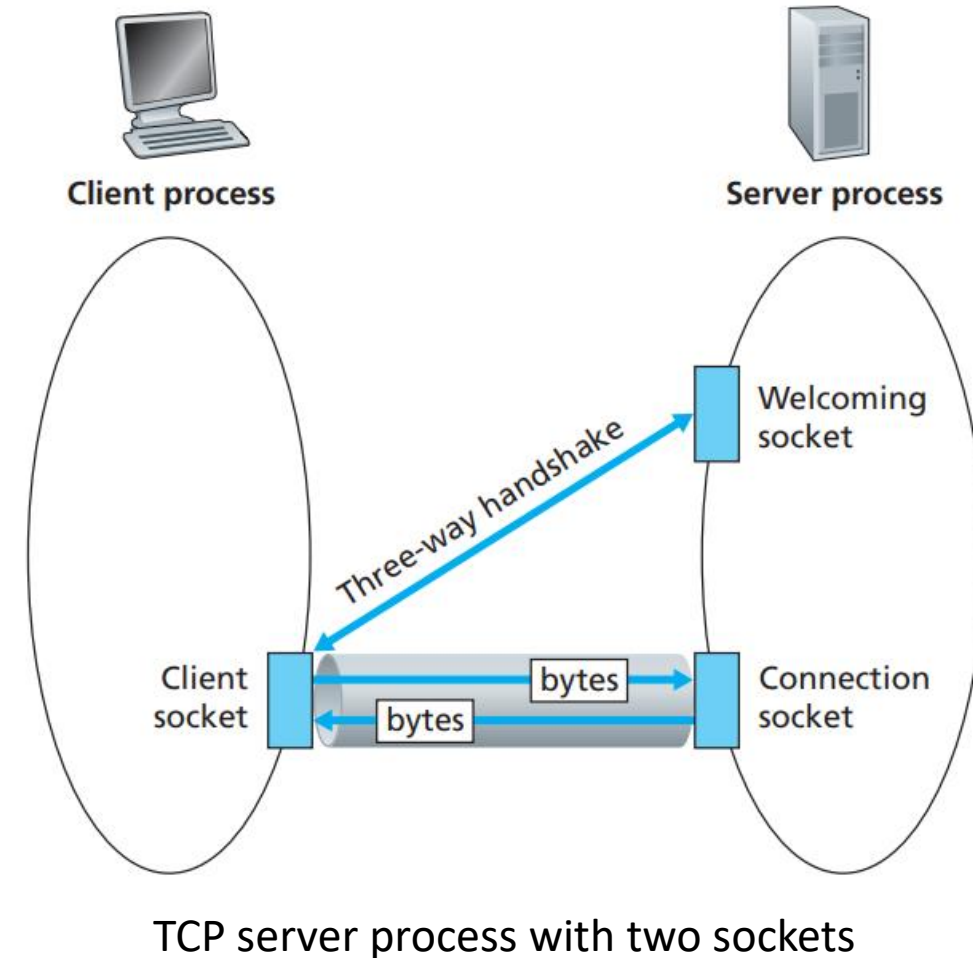
- The client-server application using **UDP**.
 - **No “connection”** between client and server.
 - No **handshaking** before sending data.
 - Sender explicitly attaches **destination IP address** and **port number** to each packet.
 - Receiver extracts **sender IP address** and **port number** from received packet to send packets back.
 - UDP provides **unreliable transfer** of groups of datagrams **between client** and **server**.



Client-server communication over UDP

TCP CLIENT / SERVER (1)

- The client-server application using **TCP**.
 - Client must **contact** server.
 - Server **process** must be **running**.
 - Server must have created **socket** that **welcomes** client's contact.
 - Client **contacts** server by:
 - Creating **TCP socket**, and
 - Specifying **IP address** and **port number** of server process.
 - When client **creates socket**, client TCP can establish **connection** with server TCP.
 - When server is **contacted** by client, TCP creates **new socket** for server process to **communicate** with that particular client.



TCP CLIENT / SERVER (2)

- The client-server application using **TCP**.

