

סיאסטה 2008 CSTA

מסיבת סוף השנה של בית הספר למדעי המחשב
באוניברסיטת תל אביב לדורותיו

הארוע יתקיים ביום שישי, 11 ביולי,
בגן הדקלים (מול הפסל של איינשטיין)
מהשעה 15:00 ועד כניסת השבת

סטודנטים, סגל ובוגרים
על טפס ובניאות זוגסן מוזמנים!
הכניסה חופשית!

ההרשמה לתכנית האמנותית נפתחה!
סטודנטים, אנשי סגל ובוגרים
מוזמנים לפנות ל nurit@cs.tau.ac.il



Operating Systems

Lesson 9



Plan

- Networking / OSI Model
- Windows Sockets
 - TCP connection
 - Client/Server
 - Listen vs. Data Socket
 - Flow
 - Messenger sample



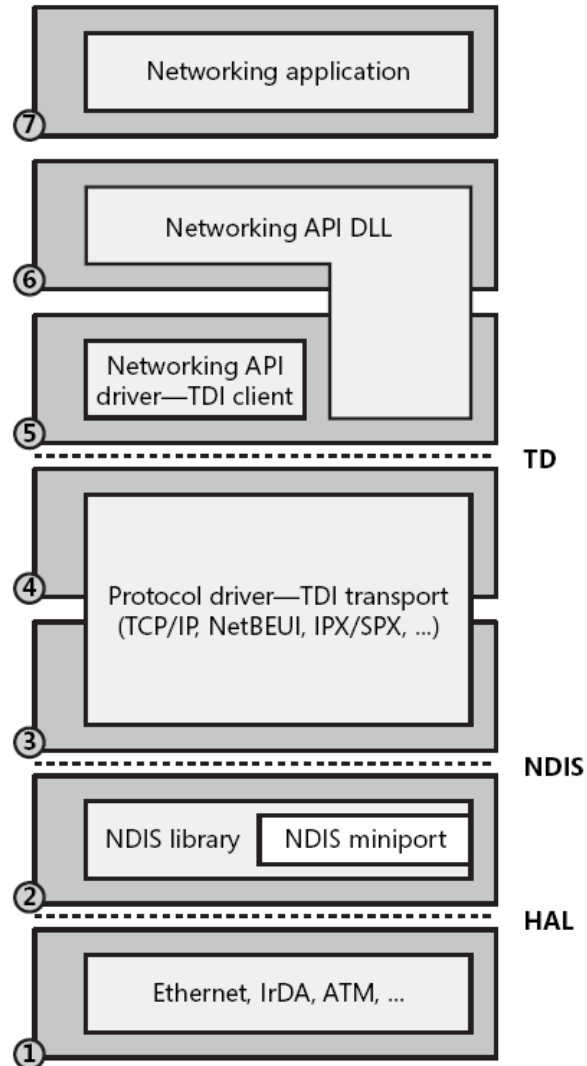
Networking

- **Communications protocol** is the set of standard rules for
 - Data representation
 - Signaling
 - Authentication
 - Error detection
- **Usually split into layers**
 - Higher layer protocols use services from low level
 - High layer protocols hide complexity
 - Low-level protocols are usually unaware of higher-layer payload content

OSI Model

OSI Model			
	Data unit	Layer	Function
Host layers	Data	7. Application	Network process to application
		6. Presentation	Data representation and encryption
		5. Session	Interhost communication
	Segment	4. Transport	End-to-end connections and reliability (TCP)
Media layers	Packet/Datagram	3. Network	Path determination and logical addressing (IP)
	Frame	2. Data link	Physical addressing (MAC & LLC)
	Bit	1. Physical	Media, signal and binary transmission

Windows and OSI





Windows Sockets

- IPC
 - Inter-Process Communication
- Windows Sockets (WinSock)
 - API/Library/Concept for IPC
- Allows IPC Across network
 - Over any transport protocol that provides socket service interface
 - Most common TCP/UDP



TCP Connection

- IP address identifies host (computer)
- Port number identifies application
- Connection between 2 applications is identified by 2 IP addresses and 2 port numbers
- Connection is two connected sockets (one per application)



Socket Client/Server

- **Server**
 - Wait for client to connect
 - Accept a connection
 - Send/Receive bytes
 - Disconnect
- **Client**
 - Connect to a server
 - Send/Receive bytes
 - Disconnect

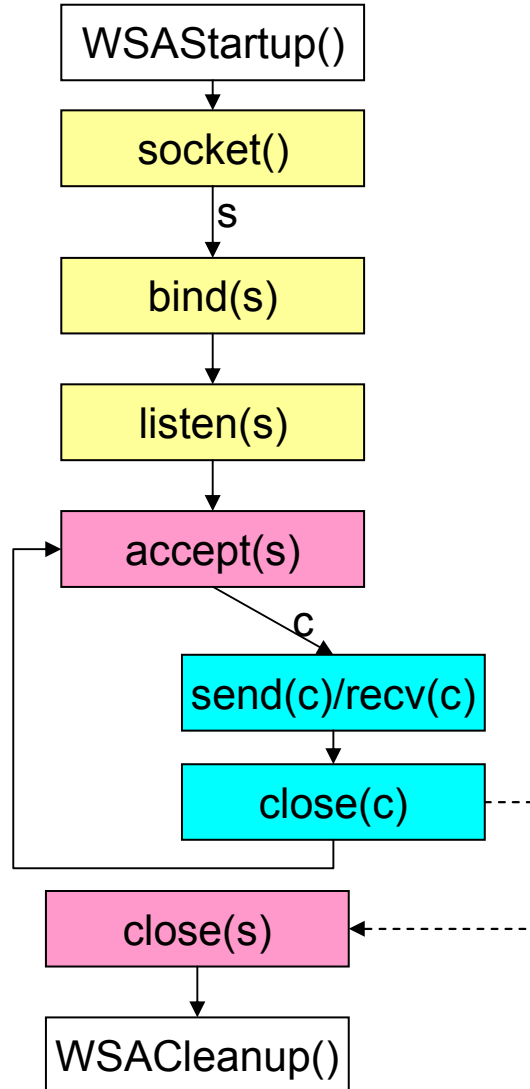


Listen vs. Data socket

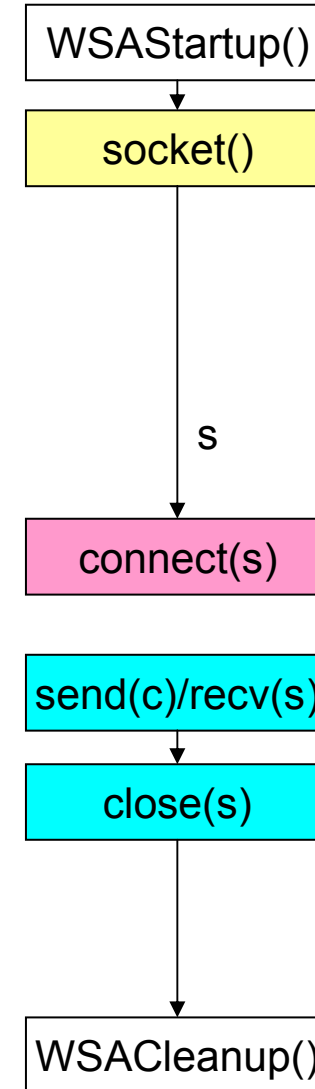
- Socket is a concept
- Data and control packets are represented in a server by 2 sockets
 - “Listen socket”: handles connection establishment
 - “Data socket”: handles data receive/send
- Client handles connection and data using the same socket

Function Flow - Server

Server:



Client:





‘Messenger’ sample



Windows Networking Tools

- IPCONFIG
 - IP configuration
- ARP -a
 - ARP table
- ROUTE PRINT
 - IP routing table
- PING
 - Ping host and DNS resolve
- TRACERT
 - Routing path to host
- NSLOOKUP
 - DNS lookup
- NETSTAT
 - Open TCP/UDP ports