Berkeley Sockets

Primitive	Meaning
SOCKET	Create a new communication end point
BIND	Attach a local address to a socket
LISTEN	Announce willingness to accept connections; give queue size
ACCEPT	Block the caller until a connection attempt arrives
CONNECT	Actively attempt to establish a connection
SEND	Send some data over the connection
RECEIVE	Receive some data from the connection
CLOSE	Release the connection

The socket primitives for TCP.

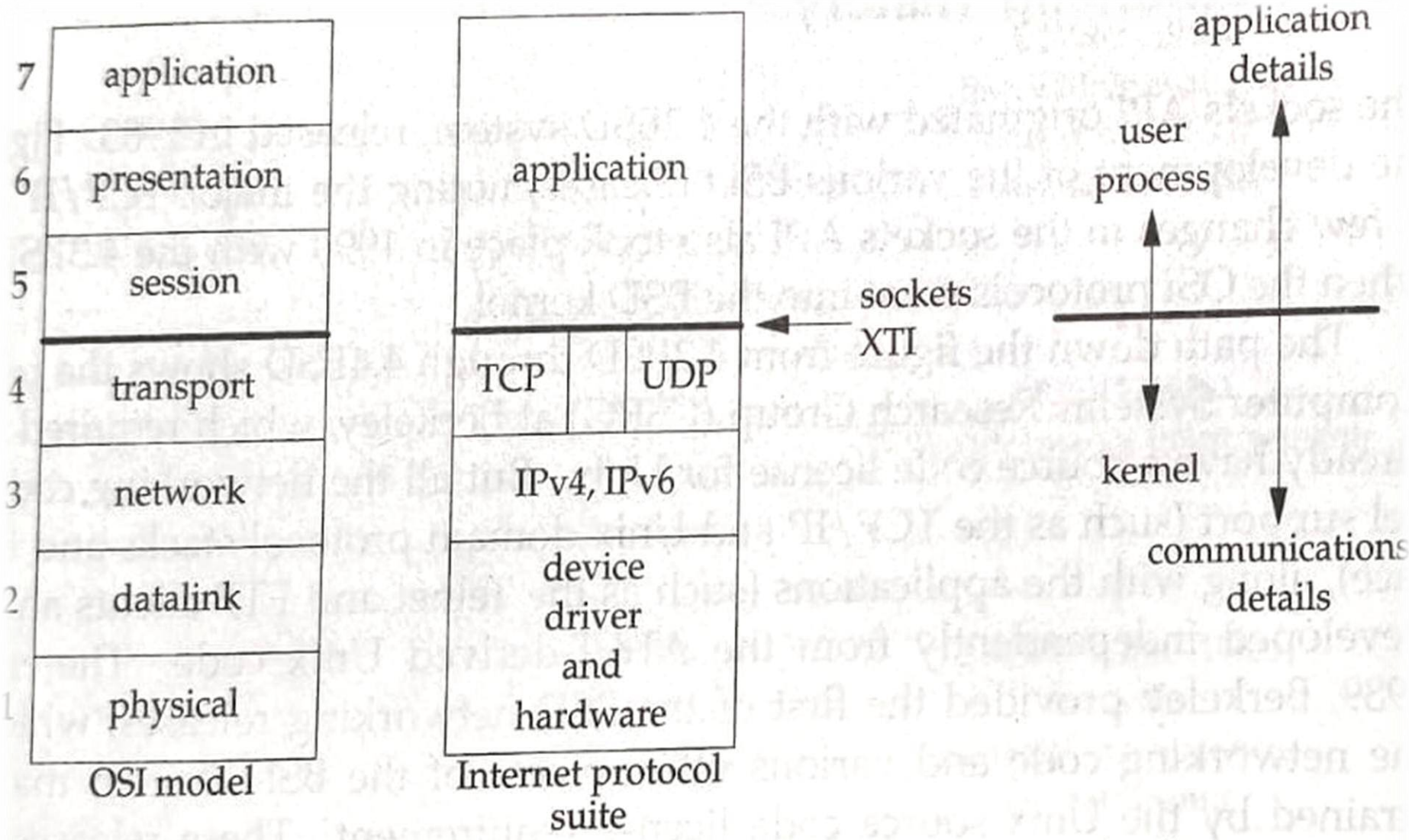

Figure 1.14 Layers in OSI model and Internet protocol suite.

family	Description
AF_INET	IPv4 protocols
AF_INET6	IPv6 protocols
AF_LOCAL	Unix domain protocols (Chapter 15)
AF_ROUTE	Routing sockets (Chapter 18)
AF_KEY	Key socket (Chapter 19)

Figure 4.2 Protocol *family* constants for socket function.

type	Description
SOCK_STREAM	stream socket
SOCK_DGRAM	datagram socket
SOCK_SEQPACKET	sequenced packet socket
SOCK_RAW	raw socket

Figure 4.3 *type* of socket for socket function.

Protocol	Description
IPPROTO_TCP	TCP transport protocol
IPPROTO_UDP	UDP transport protocol
IPPROTO_SCTP	SCTP transport protocol

Figure 4.4 *protocol* of sockets for AF_INET or AF_INET6.

	AF_INET	AF_INET6	AF_LOCAL	AF_ROUTE	AF_KEY
SOCK_STREAM	TCP | SCTP	TCP | SCTP	Yes		
SOCK_DGRAM	UDP	UDP	Yes		
SOCK_SEQPACKET	SCTP	SCTP	Yes		
SOCK_RAW	IPv4	IPv6		Yes	Yes

Figure 4.5 Combinations of *family* and *type* for the socket function.

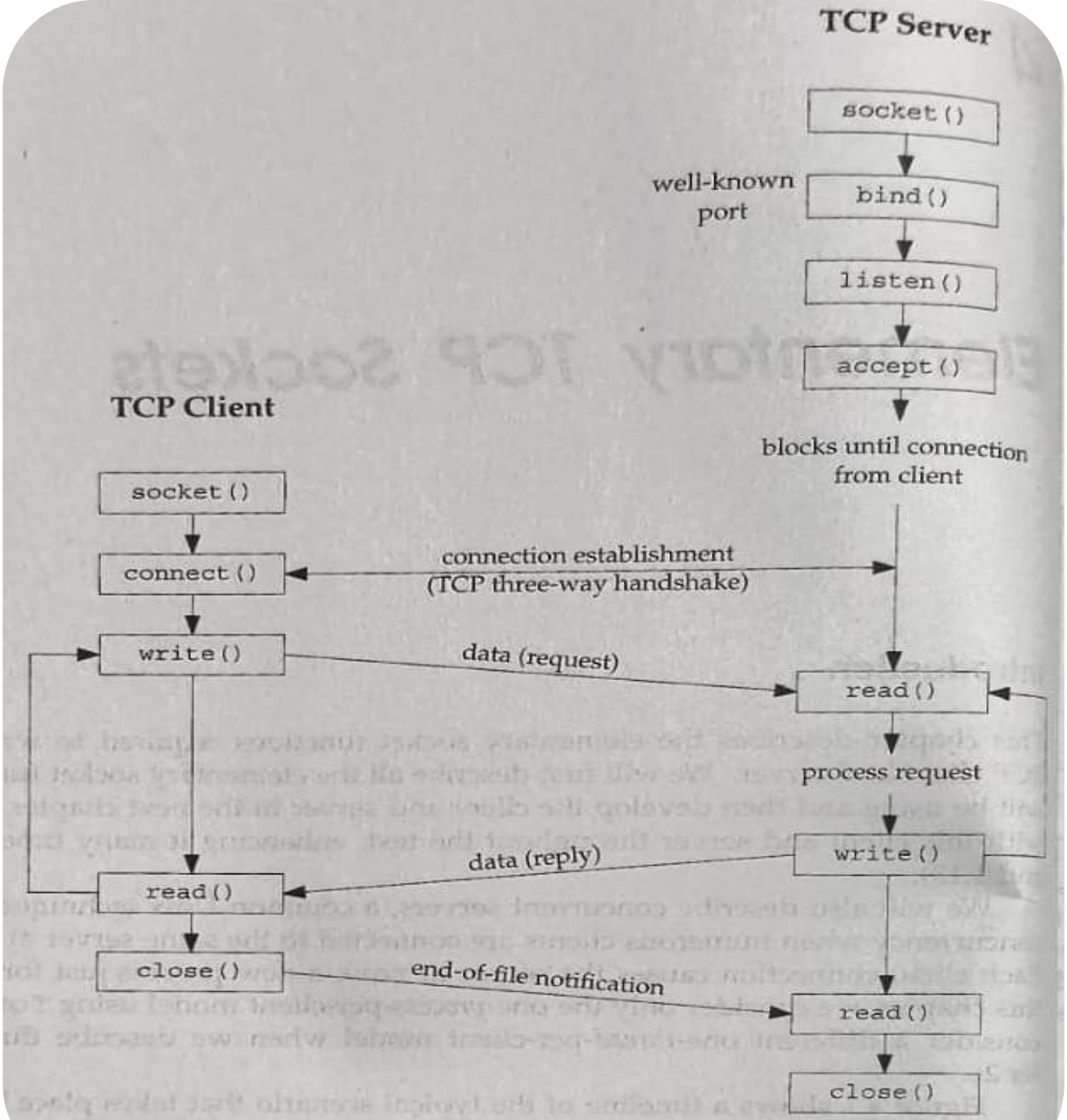

Figure 4.1 Socket functions for elementary TCP client/server.

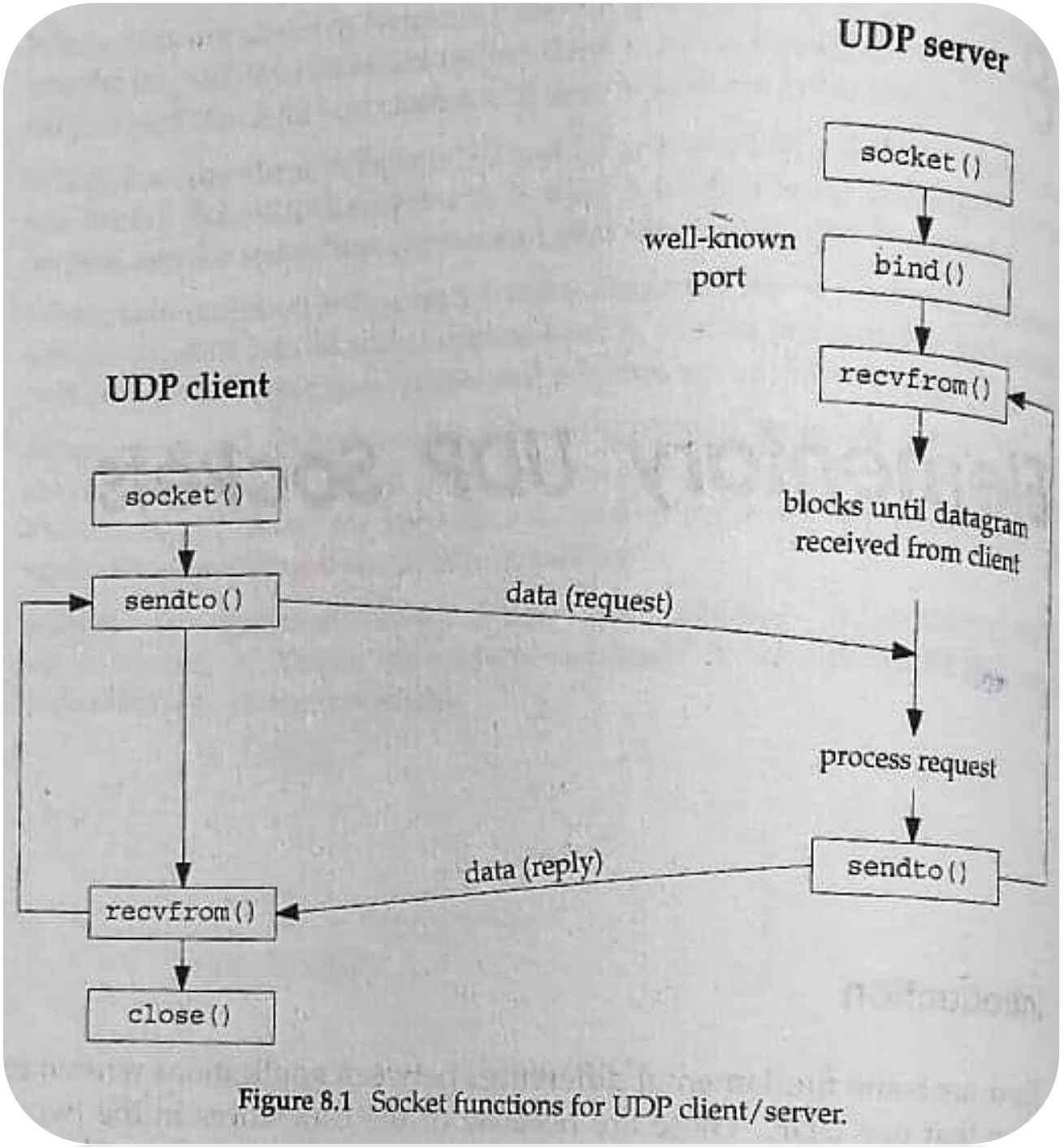

Figure 8.1 Socket functions for UDP client/server.

Socket Programming Syntax in C

1. SOCKET

int sockfd = socket(domain, type, protocol);

- domain: AF_INET (IPv4), AF_INET6 (IPv6)
- type: SOCK_STREAM (TCP), SOCK_DGRAM (UDP)
- protocol: Usually 0 to choose default

2. BIND

int bind(sockfd, (struct sockaddr *)&address, sizeof(address));

- Binds the socket to an IP and port

3. LISTEN

int listen(sockfd, backlog);

- backlog: Number of pending connections queue

4. ACCEPT

int new_sockfd = accept(sockfd, (struct sockaddr *)&client_addr, &addrlen);

- Blocks until a client connects

Socket Programming Syntax in C

5. CONNECT

int connect(sockfd, (struct sockaddr *)&server_addr, sizeof(server_addr));

- Used by clients to connect to server

6. SEND

int send(sockfd, buffer, length, flags);

- buffer: Data to send
- length: Size of data
- flags: Usually 0

7. RECEIVE

int recv(sockfd, buffer, length, flags);

- buffer: Where received data is stored

8. CLOSE

close(sockfd);

- Closes the socket and releases resources