

# Linux Networking: socket programming, basis for services

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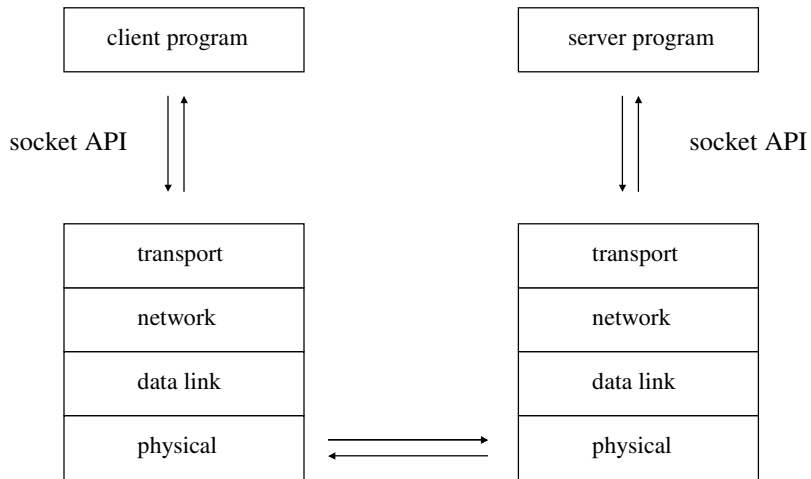
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## Sockets

- a communications interface/mechanism
- like IPC (inter-process communications)
- but generalized to span machines  
(*inter-machine* inter-process)
- coded like file handles

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# Socket API



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## Server socket operations

- create a socket
- name it
- listen/queue incoming connections
- make another socket per queued connection
- use the socket(s) (send & receive)

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## Client socket operations

- create a socket
- connect it to a (presumed) server's socket
- use the socket (send & receive)

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## Socket system calls - servers

- `socket( )` – to create
- `bind( )` – to name
- `listen( )` – to detect incoming connections
- `accept( )` – to make a separate socket for each
- `read( )`, `recv( )` ; `write( )`, `send( )` – to use

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## Socket system calls - clients

- `socket( )` – to create
- `connect( )` – to reach out to a server's socket somewhere
- `read( )`, `recv( )` ; `write( )`, `send( )` – to use

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## Server program template

```
socket( )
bind( identifier to socket )

listen( )
while {
    accept( )

    recv( )
    send( )
}
```

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## Client program template

```
socket()  
connect( to presumed server socket )  
send()  
recv()
```

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## Socket naming

- uses a C structure
- primary elements: an IP addr & port number

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## Sockets produced on server

- server's named socket for connection setup
- separate individual unnamed sockets spawned per conversation thereafter

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## Socket references

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Beginning Linux Programming, Neil Matthew and Richard Stones, Wrox Press, 1996, Chapter 13, "Sockets."

Linux Programming Unleashed, Wall, Watson, and Whitis, SAMS, 1999, Chapter 19, "TCP/IP and Socket Programming"

<http://world.std.com/~jimf/papers/sockets/sockets.html>

<http://www.ods.com.ua/win/eng/rfc/socket/>

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