

Model ISO - OSI

application	Telnet	SMTP	FTP	DNS	NFS
presentation					XDR
session					RPC
transport	TCP			UDP	
network	IP				
data link					
physical	Ethernet	IEEE 802.3	X.25	SLIP	PPP

1

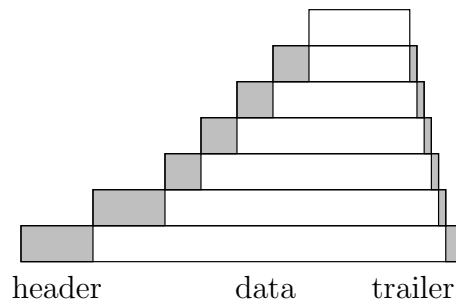
IP address classes

A	0	0.0.0.0	127.255.255.255
B	10	128.0.0.0	191.255.255.255
C	110	192.0.0.0	223.255.255.255
D	1110	224.0.0.0	239.255.255.255
E	1111	240.0.0.0	255.255.255.255

3

OSI packet encapsulation

application
presentation
session
transport
network
data link
physical



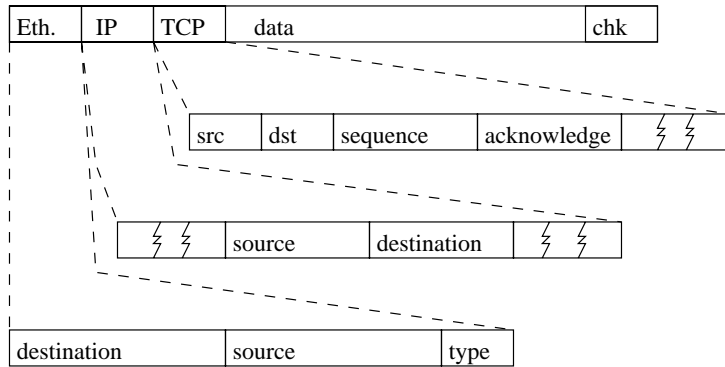
2

Subnetting

255.255.255.192	netmask	11 11 11 11 11 11 11 11 11 11 11 11 11 00 00 00
148.81.31.145	address	10 01 01 00 01 01 00 01 00 01 11 11 10 01 00 01
0.0.0.17	host	00 00 00 00 00 00 00 00 00 00 00 00 00 01 00 01
148.81.31.128	network	10 01 01 00 01 01 00 01 00 01 11 11 10 00 00 00
148.81.31.191	broadcast	10 01 01 00 01 01 00 01 00 01 11 11 10 11 11 11

4

TCP/IP



5

Command – ifconfig

```
ifconfig interface [address_family] [address] [up] [down]
                [netmask mask] [broadcast address]
```

address family – typically INET

address – interface IP address

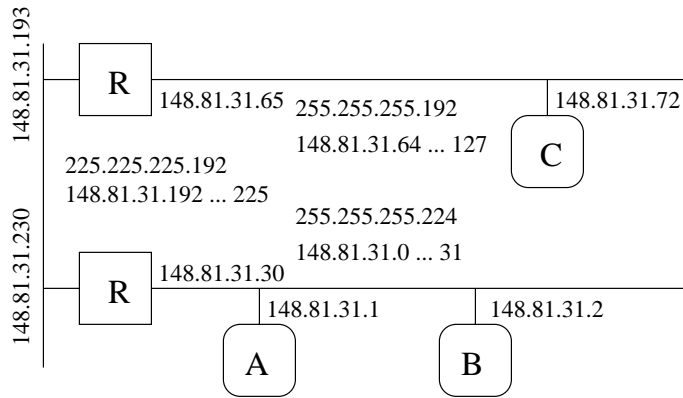
up down – interface state

netmask – subnet mask

broadcast – broadcast address

7

Routers



6

Command – route

```
route [-fn] add | delete [host | net] destination
                [gateway[metric] ]
```

-f – flush routing table

-n – display numbers (not names)

destination – IP destination address

gateway – IP address of nearest router

metric – cost

8

Command – netstat

```
netstat [-rnpsv]
```

- r** – display routing table
- n** – display number (not names)
- s** – display statistics
- v** – verbose mode

9

```
default          148.81.63.250      UG          0 39701
```

11

Routing table

Routing Table:

Destination	Gateway	Flags	Ref	Use	Interface
127.0.0.1	127.0.0.1	UH	0	9790	lo0
148.81.64.64	148.81.63.248	UGH	0	0	
148.81.65.64	148.81.63.243	UGH	0	0	
148.81.31.0	148.81.63.249	UGH	0	0	
148.81.63.32	148.81.63.250	UGH	0	0	
148.81.64.96	148.81.63.248	UGH	0	0	
148.81.31.224	148.81.63.249	UGH	0	0	
148.81.63.224	148.81.63.254	U	3	21336	le0
224.0.0.0	148.81.63.254	U	3	0	le0

10

Command – arp

```
arp [-v] [-d host] [-s host addr]
```

- a** – display all entries
- d** – delete row
- s** – create new row
- v** – verbose mode

12

ARP table

Net to Media Table

Device	IP Address	Mask	Flags	Phys Addr
le0	ia-elka	255.255.255.255		00:00:c0:7d:81:30
le0	dss4	255.255.255.255		08:00:20:04:dd:2b
le0	dss6	255.255.255.255		08:00:20:22:31:f7
le0	triton	255.255.255.255		08:00:20:22:92:65
le0	csd7	255.255.255.255		08:00:20:0d:33:f2
le0	csd6	255.255.255.255		08:00:20:0d:3f:82
le0	csd5	255.255.255.255		08:00:20:0a:d7:3f
le0	csd4	255.255.255.255		08:00:20:0c:31:b1
le0	csd3	255.255.255.255		08:00:20:0b:82:7e

13

le0	csd2	255.255.255.255		08:00:20:0b:81:f3
le0	csd1	255.255.255.255		08:00:20:0b:06:df
le0	csd	255.255.255.255		08:00:20:0e:d6:4c
le0	dss	255.255.255.255	SP	08:00:20:22:e2:25

14