

What is the OSI (**O**pen **S**ystems **I**nterconnection) Model?

OSI Model				
	Layer	Data unit	Function <sup>[3]</sup>	Examples
Host layers	7. Application	Data	High-level APIs, including resource sharing, remote file access, <a href="#">directory services</a> and <a href="#">virtual terminals</a>	<a href="#">HTTP</a> , <a href="#">FTP</a> , <a href="#">SMTP</a>
	6. Presentation		Translation of data between a networking service and an application; including <a href="#">character encoding</a> , <a href="#">data compression</a> and <a href="#">encryption/decryption</a>	<a href="#">ASCII</a> , <a href="#">EBCDIC</a> , <a href="#">JPEG</a>
	5. Session		Managing communication <a href="#">sessions</a> , i.e. continuous exchange of information in the form of multiple back-and-forth transmissions between two nodes	<a href="#">RPC</a> , <a href="#">PAP</a>
	4. Transport	Segments	Reliable transmission of data segments between points on a network, including <a href="#">segmentation</a> , <a href="#">acknowledgement</a> and <a href="#">multiplexing</a>	<a href="#">TCP</a> , <a href="#">UDP</a>
Media layers	3. Network	Packet/Datagram	Structuring and managing a multi-node network, including <a href="#">addressing</a> , <a href="#">routing</a> and <a href="#">traffic control</a>	<a href="#">IPv4</a> , <a href="#">IPv6</a> , <a href="#">IPsec</a> , <a href="#">AppleTalk</a>
	2. Data link	Bit/Frame	Reliable transmission of data frames between two nodes connected by a physical layer	<a href="#">PPP</a> , <a href="#">IEEE 802.2</a> , <a href="#">L2TP</a>
	1. Physical	Bit	Transmission and reception of raw bit streams over a physical medium	<a href="#">DSL</a> , <a href="#">USB</a>

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What is "U.D.P." and what are its main characteristics?

What is T.C.P. and what are its main characteristics?

Which one uses handshaking?

Which one requires more system resources?

Which one can be used with **read** and **write** system calls?

Which one encrypts the data payload?

If your application preferred to handle missing packets over late packets, which one would you use?

What is HTTP? Does it run over TCP or UDP?

Is HTTP version 1.0 and version 1.1 a text or binary protocol?

How do you make a TCP connection to a server

What is the purpose of getaddrinfo ?

struct addrinfo?

Why memset?

AF\_INET; ?

SOCK\_STREAM; ?

connect?

```
struct addrinfo {  
    int             ai_flags;  
    int             ai_family;  
    int             ai_socktype;  
    int             ai_protocol;  
    socklen_t       ai_addrlen;  
    struct sockaddr *ai_addr;  
    char            *ai_canonname;  
    struct addrinfo *ai_next;  
};
```

```
struct addrinfo hints, *result;
```

```
memset(&hints, 0, sizeof(struct addrinfo) );
```

```
hints.ai_family = AF_INET;
```

```
hints.ai_socktype = SOCK_STREAM;
```

```
s = getaddrinfo("www.illinois.edu", "80", &hints, &result);
```

```
if (s != 0) {
```

```
    fprintf(stderr, "getaddrinfo: %s\n", gai_strerror(s));
```

```
    exit(1);
```

```
}
```

```
int sock_fd = socket(hints.ai_family, hints.ai_socktype, 0);
```

```
connect(sock_fd, result->ai_addr, result->ai_addrlen);
```

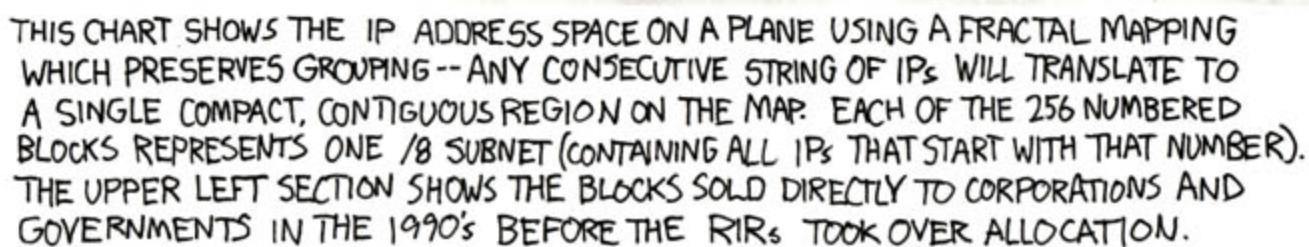
IPv4 Header Format

Offsets	Octet	0								1								2								3							
Octet	Bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
0	0	Version				IHL				DSCP				ECN				Total Length															
4	32	Identification																Flags				Fragment Offset											
8	64	Time To Live								Protocol								Header Checksum															
12	96	Source IP Address																															
16	128	Destination IP Address																															
20	160	Options (if IHL > 5)																															

TCP header:

Offsets	Octet	0								1								2								3							
Octet	Bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
0	0	Source port																Destination port															
4	32	Sequence number																															
8	64	Acknowledgment number (if ACK set)																															
12	96	Data offset				Reserved 0 0 0			N S	C W R	E C R	U R G	A C K	P C S	R C S	S S Y	F I N	Window Size															
16	128	Checksum																Urgent pointer (if URG set)															
20	160	Options (if <i>data offset</i> > 5. Padded at the end with "0" bytes if necessary.)																															
...	...	...																															

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Exhaustion of IPv4 for each of the 5 regional authorities.  
ARIN exhausted 24 September 2015  
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