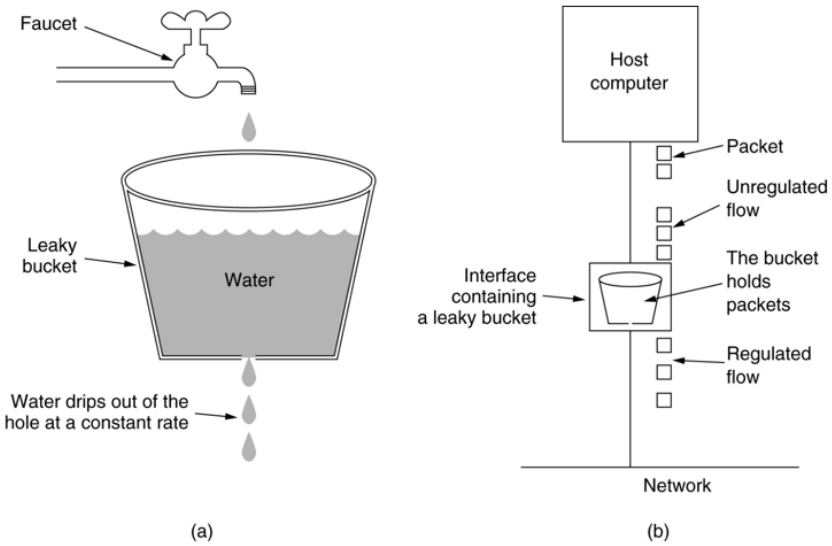
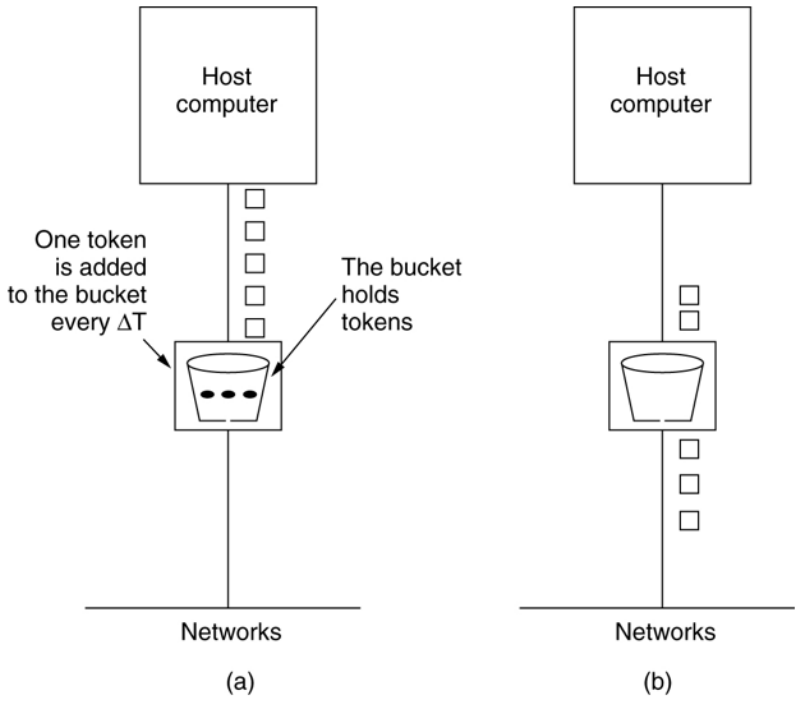
The Leaky Bucket Algorithm



(a) A leaky bucket with water. (b) a leaky bucket with packets.

The Token Bucket Algorithm



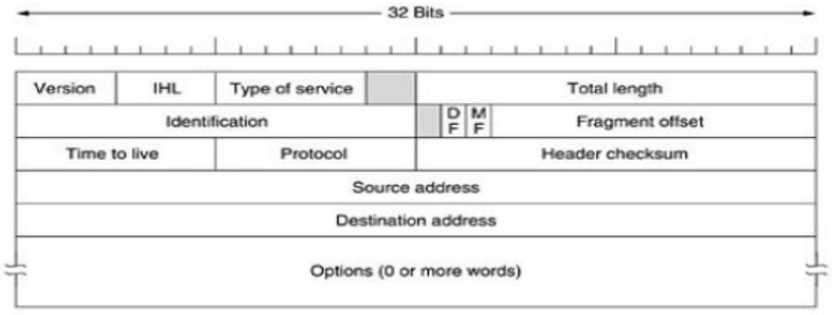
(a) Before. (b) After.

DIFFERENCE BETWEEN UDP & TCP

TCP	UDP
It is a connection-oriented protocol.	It is a connectionless protocol.
TCP reads data as streams of bytes, and the message is transmitted to segment boundaries.	UDP messages contain packets that were sent one by one. It also checks for integrity at the arrival time
TCP messages make their way across the internet from one computer to another.	It is not connection-based, so one program can send lots of packets to another.
TCP rearranges data packets in the specific order.	UDP protocol has no fixed order because all packets are independent of each other.
The speed for TCP is slower.	UDP is faster as error recovery is not attempted.
Header size is 20 bytes	Header size is 8 bytes.
TCP is heavy-weight. TCP needs three packets to set up a socket connection before any user data can be sent.	UDP is lightweight. There are no tracking connections, ordering of messages, etc.
TCP does error checking and also makes error recovery.	UDP performs error checking, but it discards erroneous packets.
Acknowledgment segments	No Acknowledgment segments
Using handshake protocol like SYN, SYN-ACK, ACK	No handshake (so connectionless protocol)
TCP is reliable as it guarantees delivery of data to the destination router.	The delivery of data to the destination can't be guaranteed in UDP.

The Network Layer in the Internet – IPv4

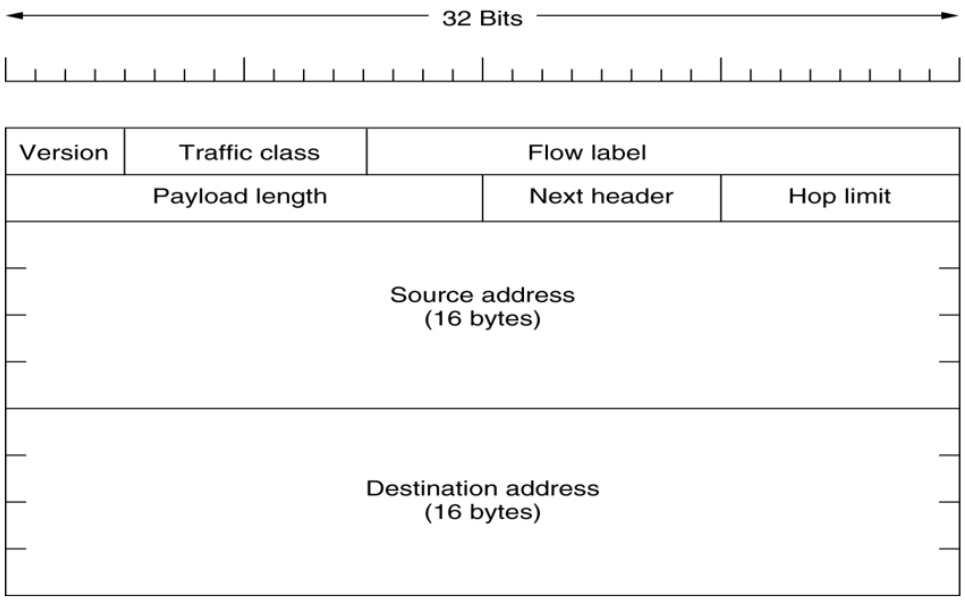
- An appropriate place to start our study of the network layer in the Internet is the format of the IP datagrams themselves.
- **Version number (4-bits):**
  - The Version field keeps track of which version of the protocol the datagram belongs to.
  - By including the version in each datagram, it becomes possible to have the transition between versions take years, with some machines running the old version and others running the new one.



IPV6

- 128-bit address
- Internet protocol version 6 next generation
- All the internet protocols were slightly modified
- Advantages:
  - Larger address space (128 bit long)
  - Better header format
  - New options
  - Allowance for extension
  - Support for resource allocation
  - Support for more security

IPV6 HEADER



CLASSFUL ADDRESSING PROBLEMS

Classful Addressi

Problems

1. Find the class of each address:

   a. 00000001 00001011 00001011 11101111

   b. 11000001 10000011 00011011 11111111

   c. 10100111 11011011 10001011 01101111

   d. 11110011 10011011 11111011 00001111

2. Find the class of each address:

   a. 227.12.14.87

   b. 193.14.56.22

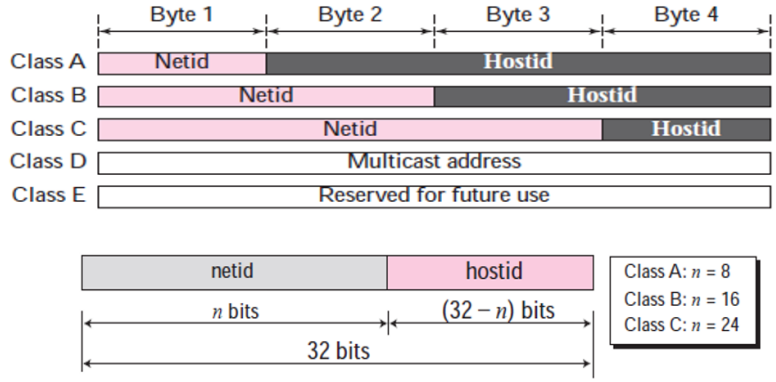
   c. 14.23.120.8

   d. 252.5.15.111

Classful Addressing

Two Level Addressing: Netid and Hostid

- IP address in classes A, B, and C is divided into **netid and hostid.**
- These parts are of varying lengths, depending on the class of the address.
- Classes D and E are not divided into netid and hostid



Co:-04

RSA PROBLEMS :-

1. Select primes p=11, q=3.

2. n = pq = 11.3 = 33
phi = (p-1)(q-1) = 10.2 = 20

3. Choose e=3
Check gcd(e, p-1) = gcd(3, 10) = 1 (i.e. 3 and 10 have no common factors except 1),and check gcd(e, q-1) = gcd(3, 2) = 1 therefore gcd(e, phi) = gcd(e, (p-1)(q-1)) = gcd(3, 20) = 1

4. Compute d such that ed = 1 (mod phi)

i.e. compute d = e-1 mod phi = 3-1 mod 20

i.e. find a value for d such that phi divides (ed-1)

i.e. find d such that 20 divides 3d-1.

Simple testing (d = 1, 2, ...) gives d = 7

Check: ed-1 = 3.7 - 1 = 20, which is divisible by phi.

5. Public key = (n, e) = (33, 3)

Private key = (n, d) = (33, 7).

DNS :-

DNS

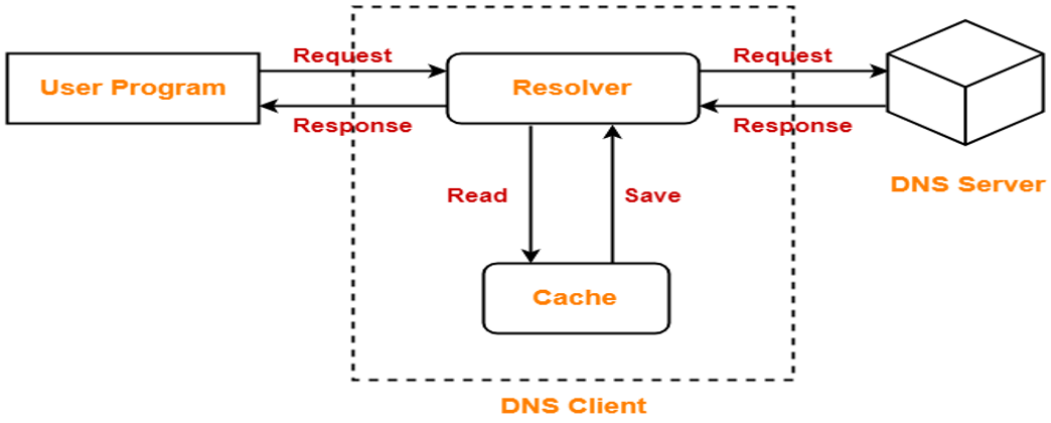
- DNS is short for Domain Name Service or Domain Name System.
- It is an application layer protocol.

Purpose:-

- DNS is a host name to IP Address translation service.
- It converts the names we type in our web browser address bar to the IP Address of web servers hosting those sites.

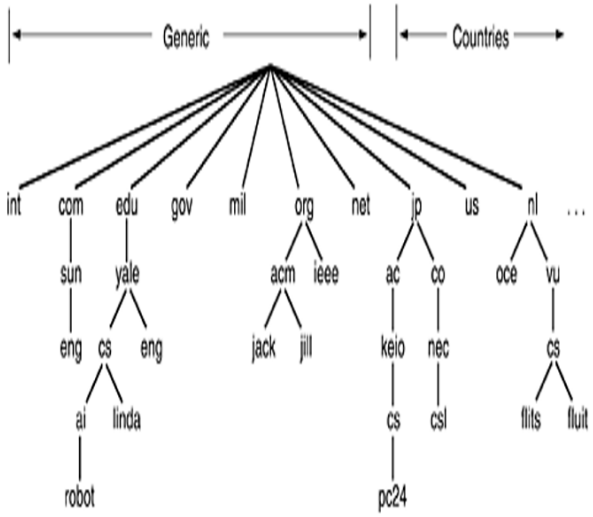
DNS

- DNS Resolution is a process of resolving a domain name onto an IP Address.
- The following diagram illustrates the process of DNS resolution:



The DNS Name Space

- The Internet is divided into over 200 top-level domains, where each domain covers many hosts.
- Each domain is partitioned into subdomains, and these are further partitioned, and so on.
- All these domains can be represented by a tree, as shown in Figure.



DES BLOCK DIAGRAM