Network Viva Prep.

TCP Header

source port #

dest port #

sequence #

next expected seq.# → ack #

urgent | ACK | PSH | RST | SYN | FIN

recieve window ← see next page

checksum

urgent data pointer

options

application data

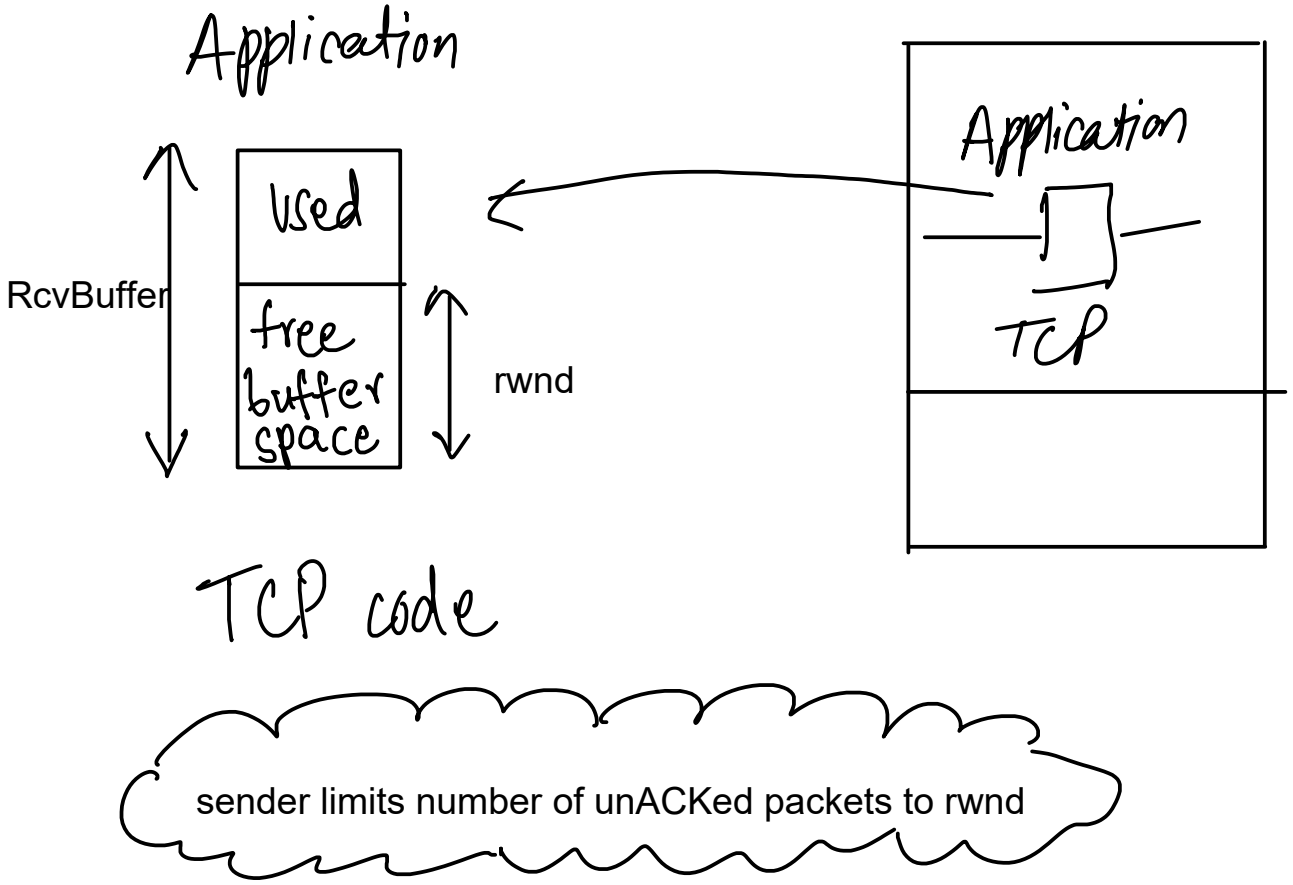
TCP ACK Generation

inorder arrival; everything ACKed	--> wait 500 ms for next seg
in orderone segment has ACK pending	--> send cum ACK
out of order, higher than expected seq#	--> send dup ACK
segment that fills the gap (partial or complete)	--> send ACK

TCP Fast retransmit

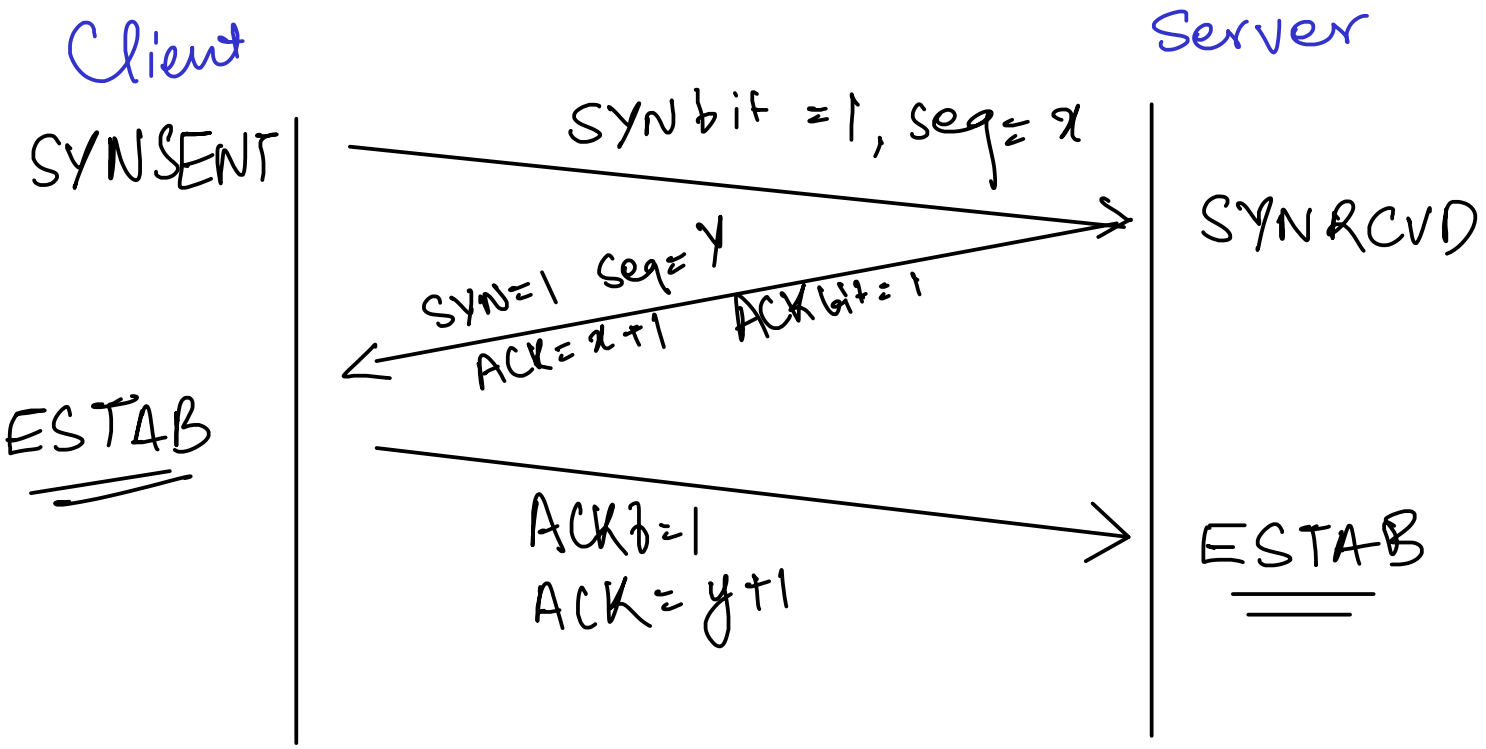
Don't wait for timeout if 3 ACKs for same data is received

RWND (Receive Window)



sender limits number of unACKed packets to rwnd

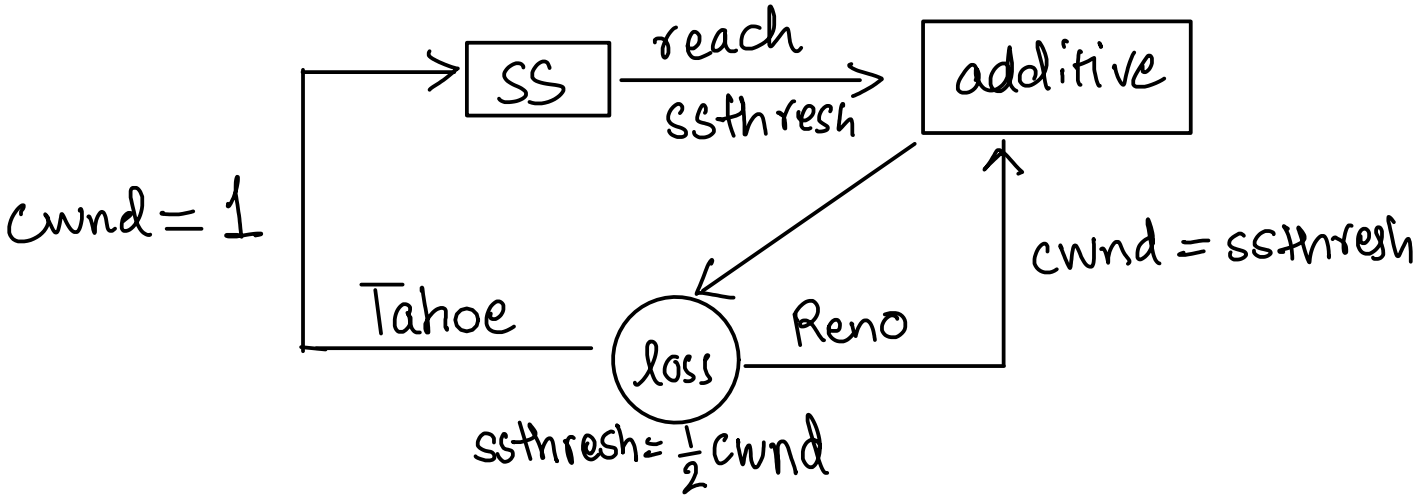
Connection Management



TODO: Connection Close

TCP Congestion Control

cwnd -> congestion window size
Slow Start -> exponential increase in cwnd
loss -> 3 dup ACKs



Network Layer

Virtual Circuit (ATM)

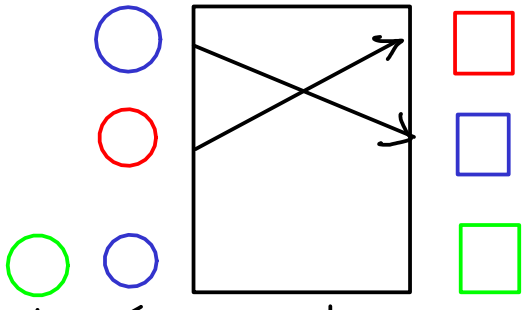
in interface	in VC#	out interface	out VC#

Every router has this table

Datagram forwarding table

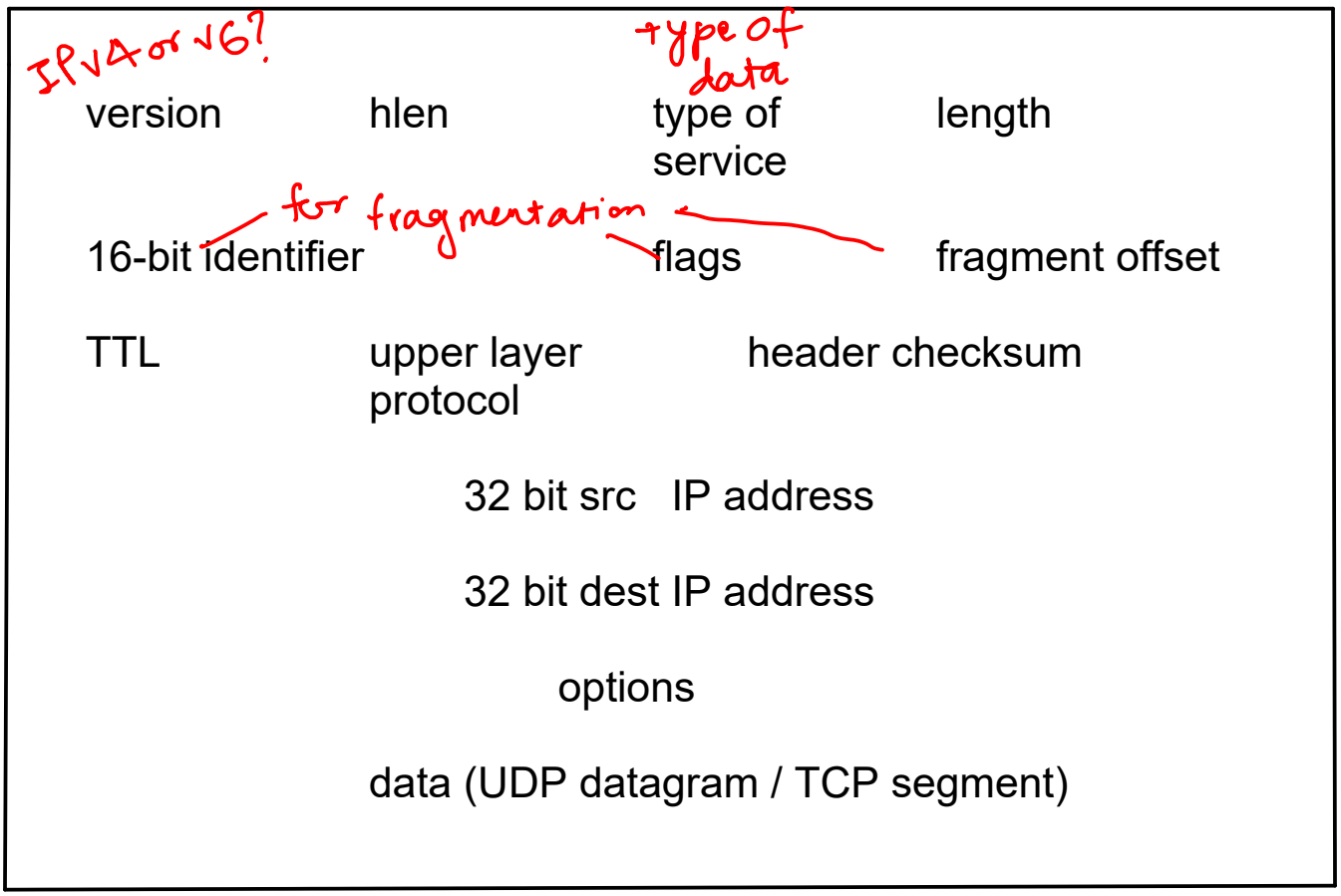
Dest Addr.	Link interface

Longest prefix matching



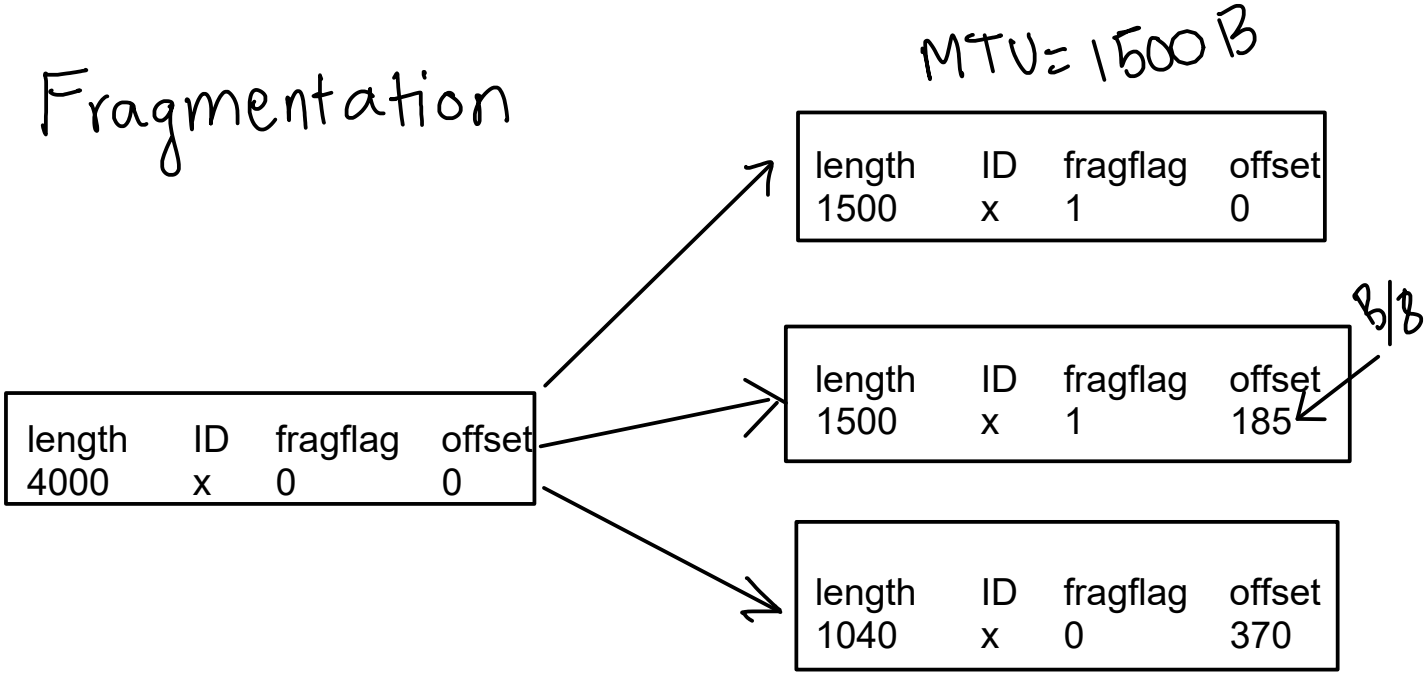
= Head of Line Blocking

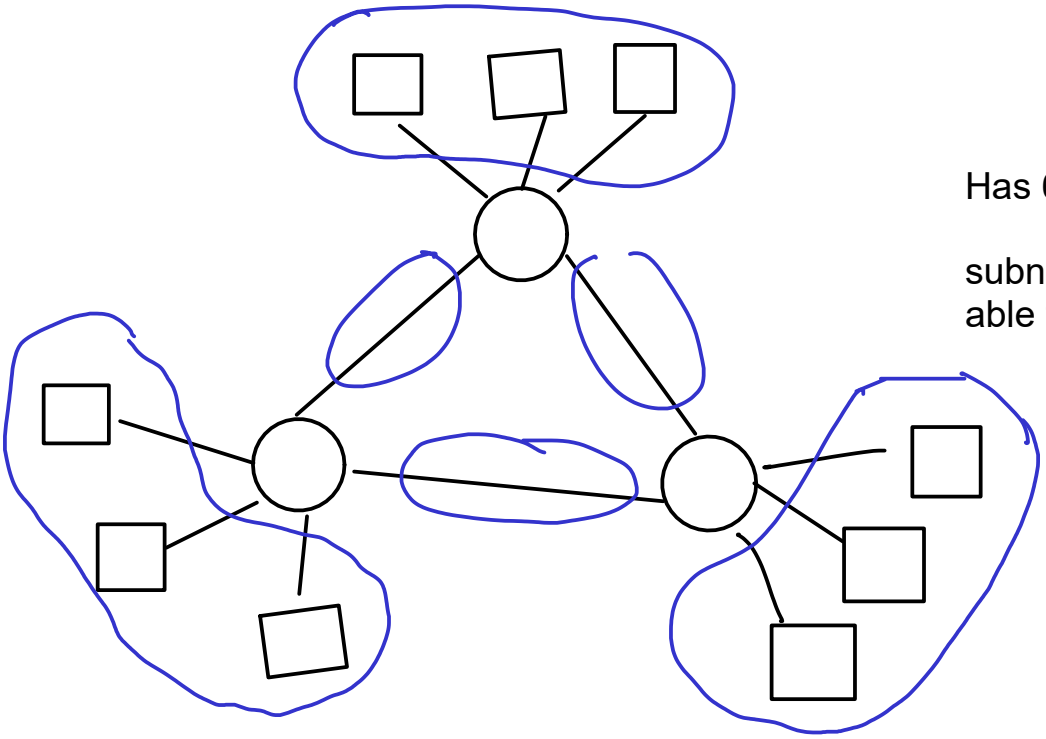
IPv4 packet



Fragmentation

MTU = 1500 B



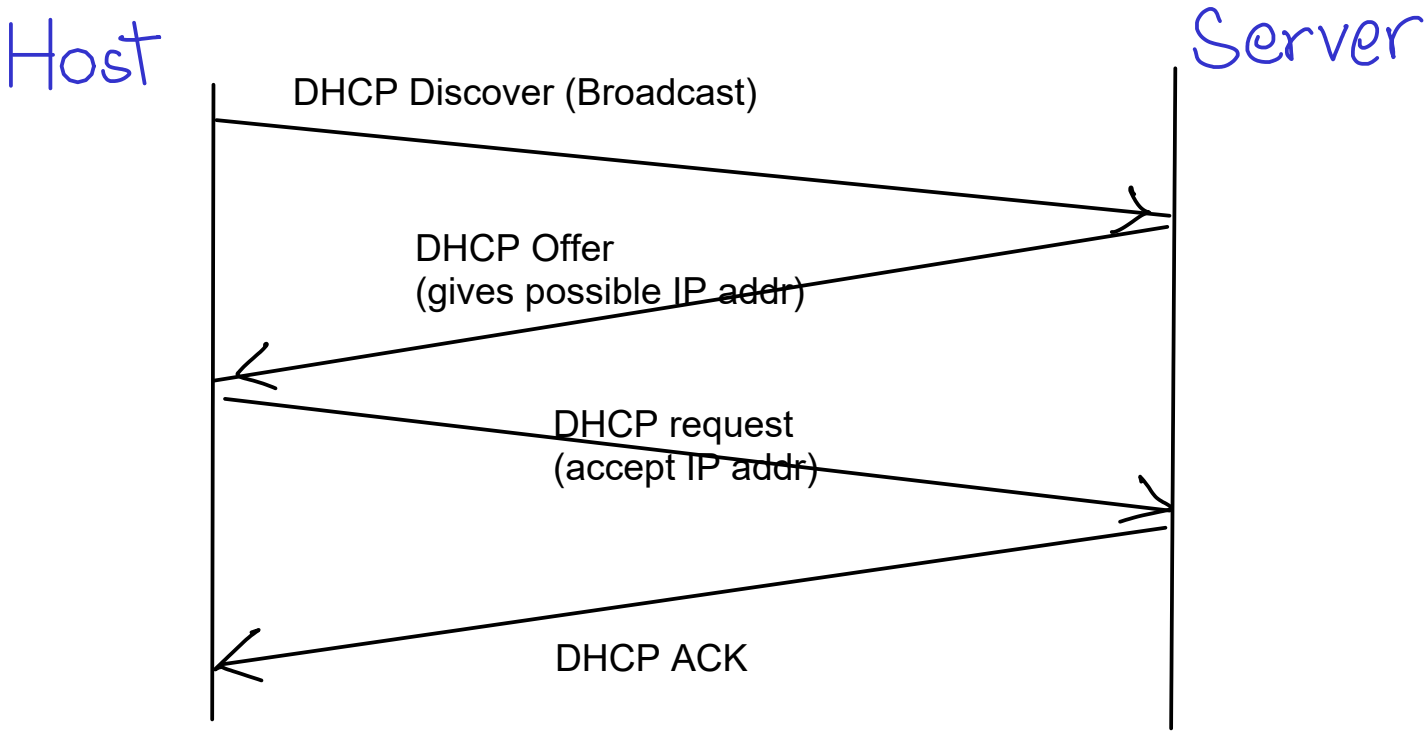


Has 6 subnets

subnets can be thought like
able to communicate directly

IP CIDR ----> Classless InterDomain Routing
subnet has arbitrary length

DHCP (Dynamic Host Config Protocol)

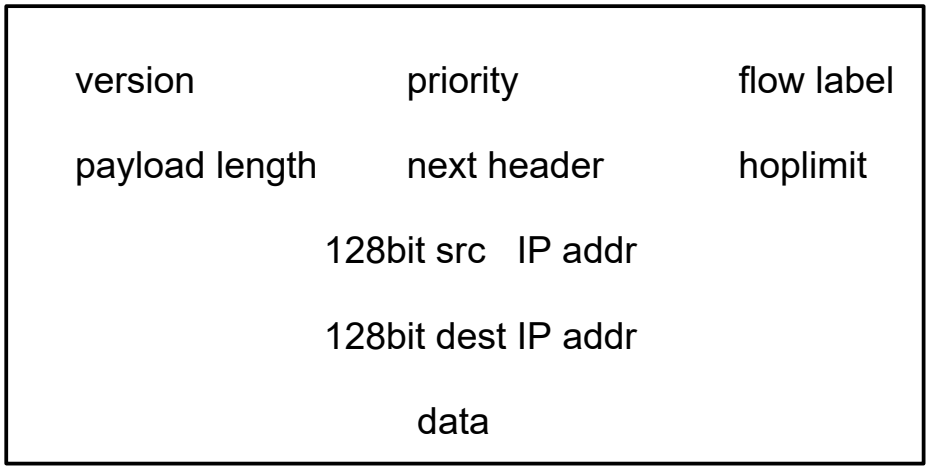


Network Address translator (NAT)

WAN side	LAN side
ip addr, port	ip addr, port

ICMP: Carried in IP packets, above network layer

IPv6 packet format



Tunnelling: transmit IPv6 packets on IPv4 routers by putting v6 packets inside the payload of IPv4 packets. dest set to nearest IPv6 router

LinkState, Djikstra (LS) - O(n^2) algo, O(nE) messages

DistVector, Bellman-Ford (DV): Good new fast, poisoned reverse/ count to infinity

AS : Autonomous system
Inter AS routing : every router keeps # hops to that AS

Intra AS routing:
- RIP - Router Information Protocol (uses DV algorithm)
- OSPF - Open Shortest Path First (uses LS algorithm)

BGP: Border Gateway Protocol
eBGP: gets subnet reachibility from neighbour AS
iBGP: propagates reachibility info to internal AS routers

More on BGP todo

Hot Potato: Try to take traffic out of your internal network as fast as possible
Cold Potato: Try to keep it in the internal network until you've found the best possible way to transmit