



NPTEL ONLINE CERTIFICATION COURSES

COMMUNICATIONS NETWORK

Dr. Goutam Das

G. S. Sanyal School of Telecommunications, IIT KHARAGPUR

Module 12: Network and Transport Layer

Lecture 54: Internet Protocol

Concepts Covered

- IP Header
- IP Addressing
- ARP, DHCP
- Routing Protocols
- TCP Header
- NAT
- TCP Flow control

IP Header

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Conclusion

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References

Book:
Computer Networks – A. S. Tannenbaum

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Module 12: Network and Transport Layer

Lecture 55: Internet Protocol contd.

Concepts Covered

- IP Header
- IP Addressing
- ARP, DHCP
- Routing Protocols
- TCP Header
- NAT
- TCP Flow control

References

Book:
Computer Networks – A. S. Tannenbaum

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Module 12: Network and Transport Layer

Lecture 56: Subnet and ARP

Concepts Covered

- IP Header
- IP Addressing
- ARP, DHCP
- Routing Protocols
- TCP Header
- NAT
- TCP Flow control

References

Book:
Computer Networks – A. S. Tannenbaum

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Module 12: Network and Transport Layer

Lecture 57: ARP and DHCP

Concepts Covered

- IP Header
- IP Addressing
- ARP, DHCP
- Routing Protocols
- TCP Header
- NAT
- TCP Flow control

IP Header

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Conclusion

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Module 12: Network and Transport Layer

Lecture 58: DHCP and Routing

Concepts Covered

- IP Header
- IP Addressing
- ARP, DHCP
- Routing Protocols
- TCP Header
- NAT
- TCP Flow control

References

Book:
Computer Networks – A. S. Tannenbaum

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Module 12: Network and Transport Layer

Lecture 59: Distance Vector Routing

Concepts Covered

- IP Header
- IP Addressing
- ARP, DHCP
- Routing Protocols
- TCP Header
- NAT
- TCP Flow control

References

Book:
Computer Networks – A. S. Tannenbaum

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Module 12: Network and Transport Layer

Lecture 60: Transport Control Protocol

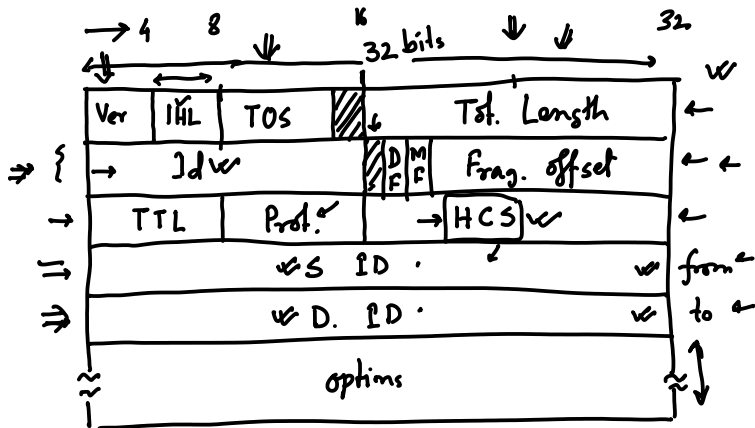
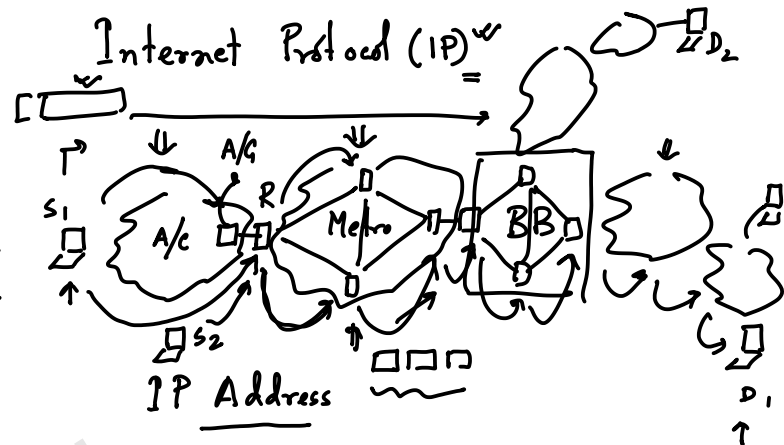
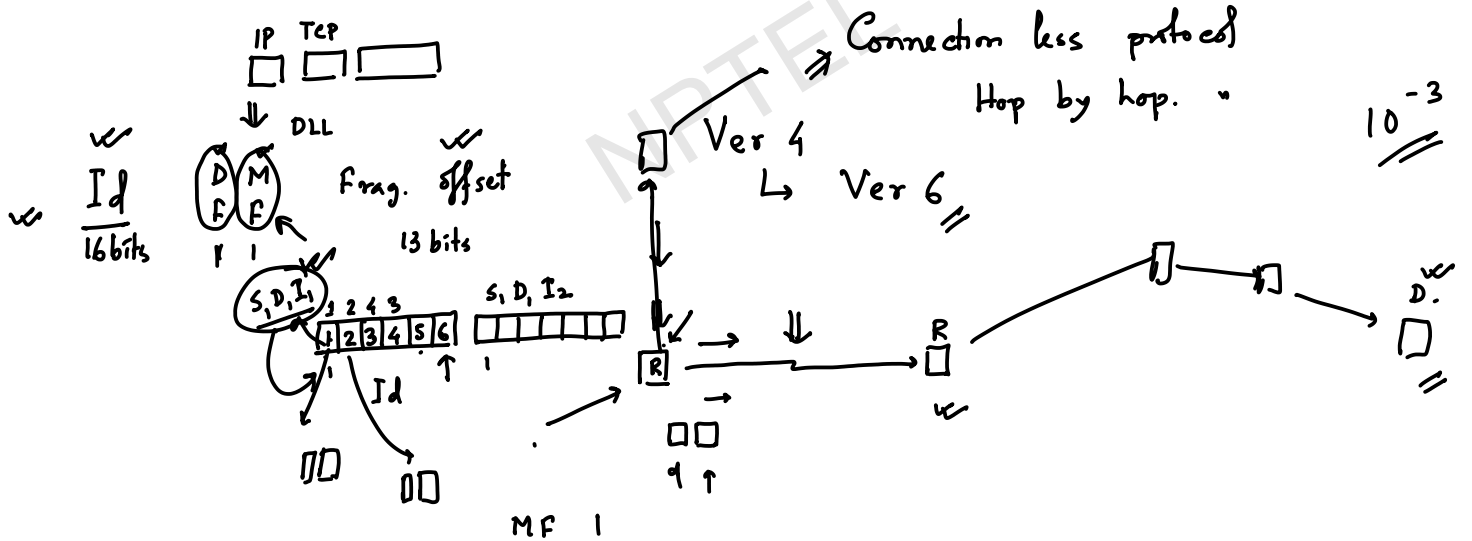
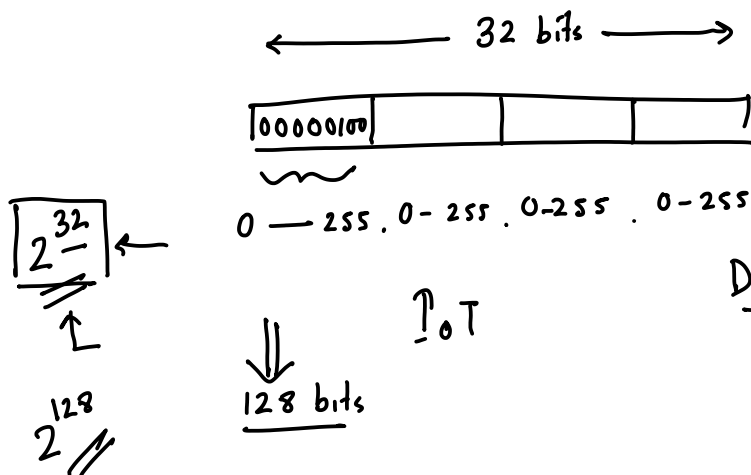
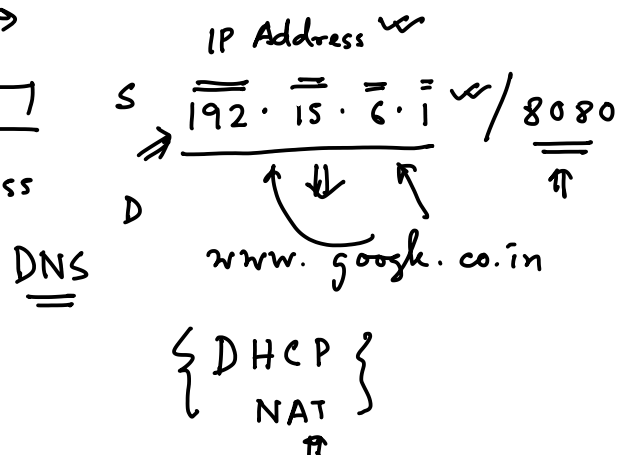
Concepts Covered

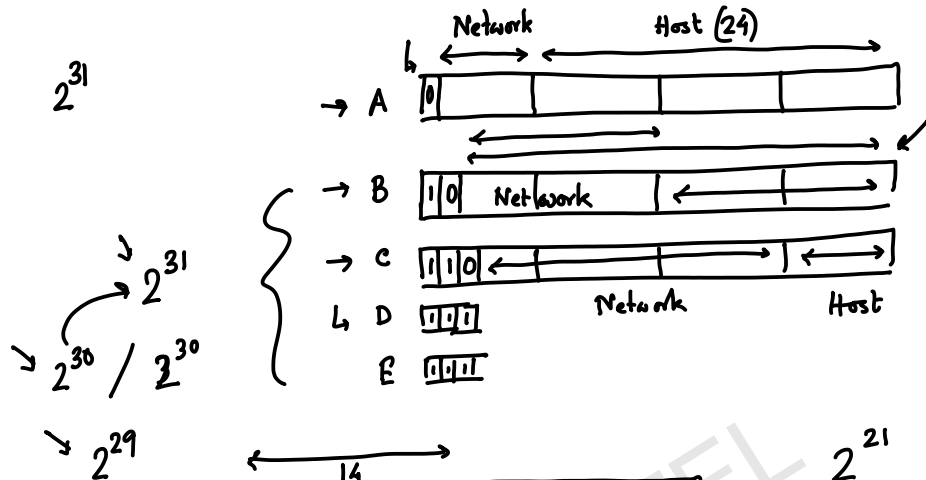
- IP Header
- IP Addressing
- ARP, DHCP
- Routing Protocols
- TCP Header
- NAT
- TCP Flow control

References

Book:
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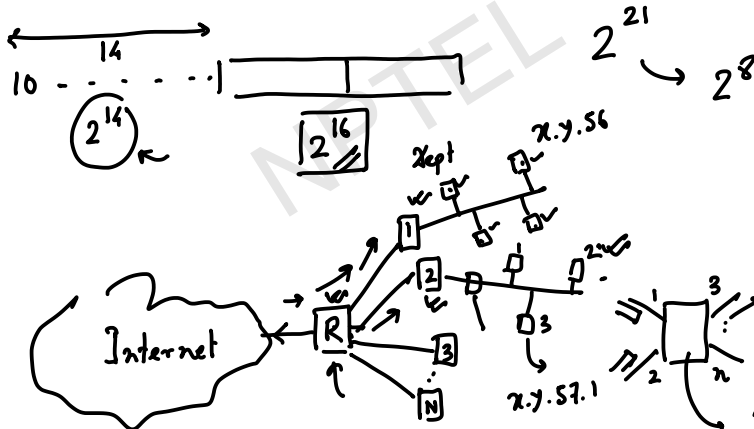
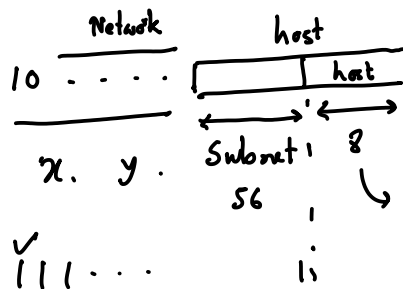


a . b . c . d
 0 - 255

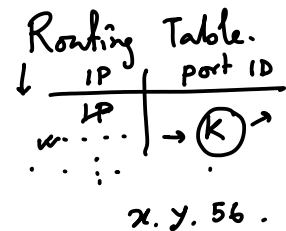
Network / Host

$2^7 = 128$
 2^{24} Host
 2^{14} 2^{16} Hosts

$k = \{1, 2, \dots, n\}$

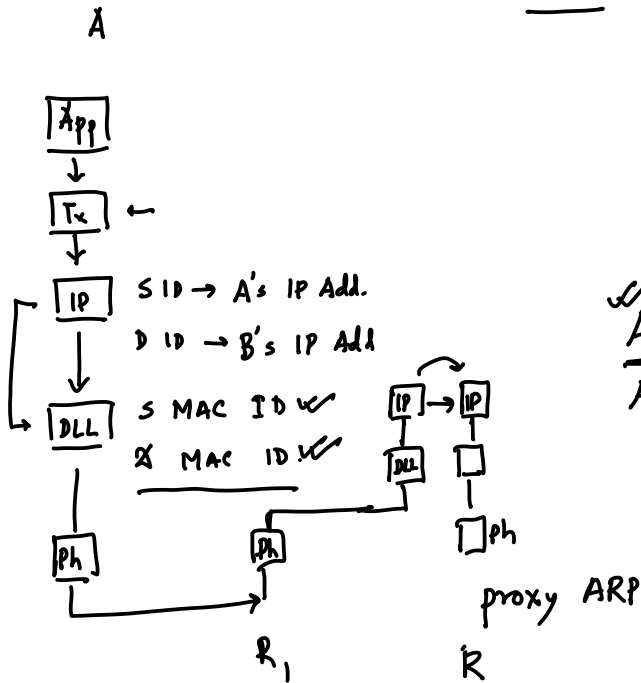


$2^8 = 256$
 256 hosts.

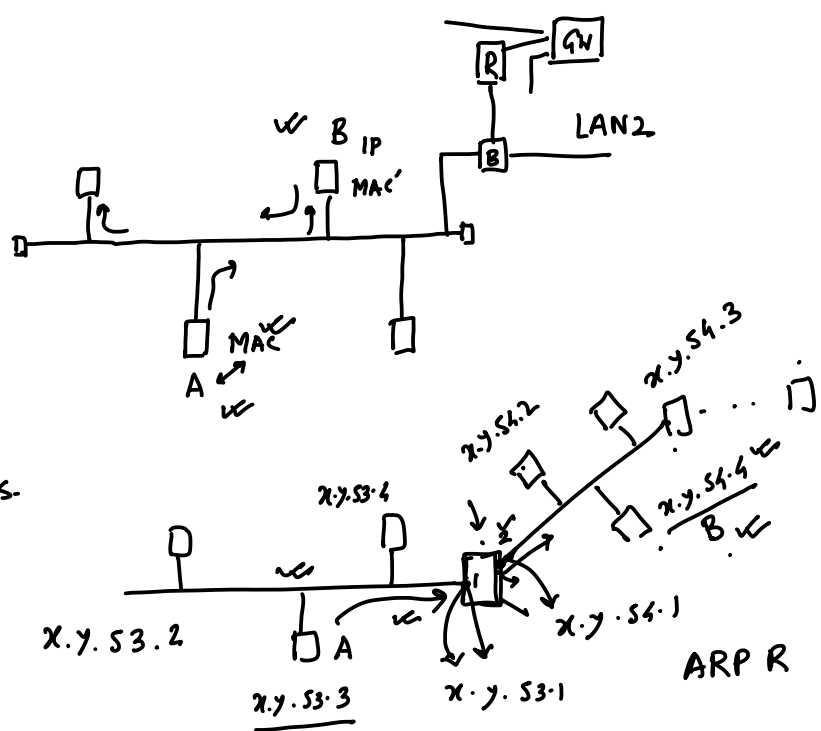
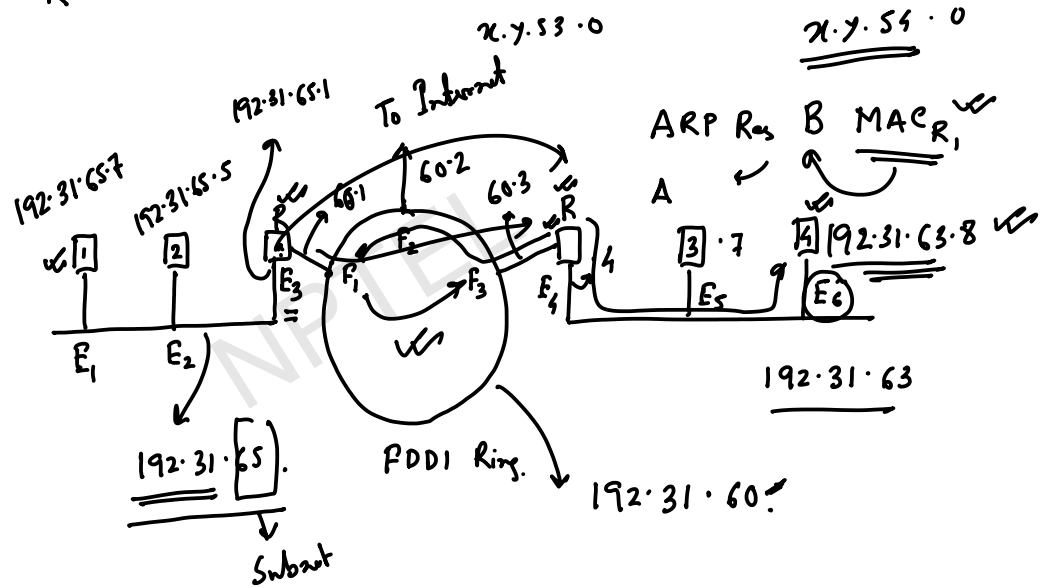


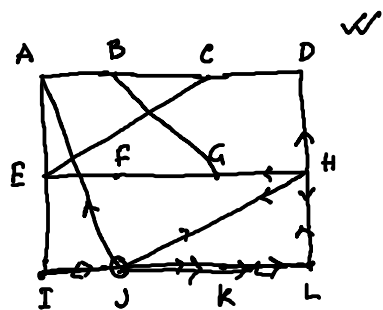
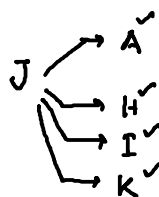
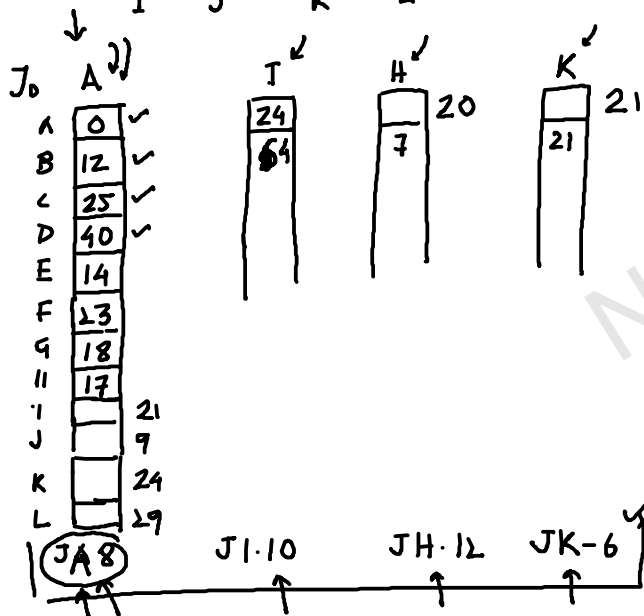
Subnet mask: $255.255.255.0$
 $x.y.(56).0$

ARP

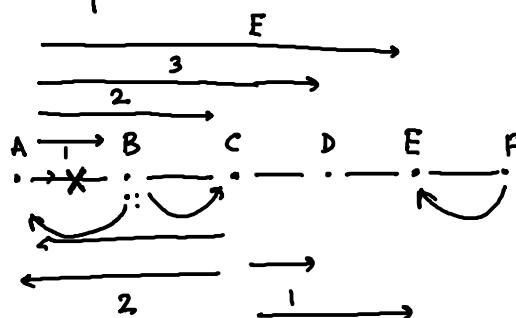


ARP R
ARP Res.





	Via A	Via T	Via H	Via
A	8 ✓	34 ✓	32 ✓	27 ✓
B	20	14	21	27
	33			



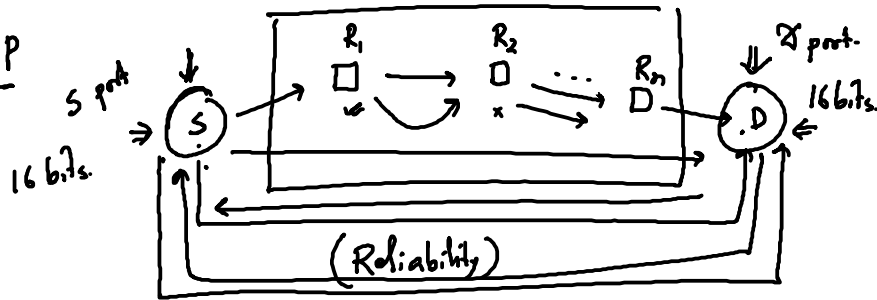
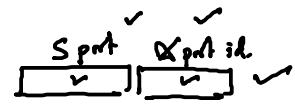
A	2
B	1
C	0
D	1
E	2

count to infinity

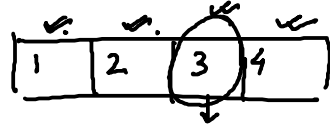
TCP =

(3)

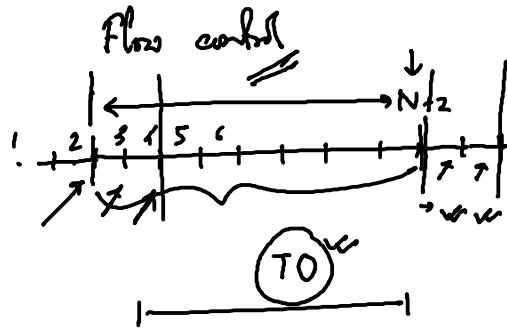
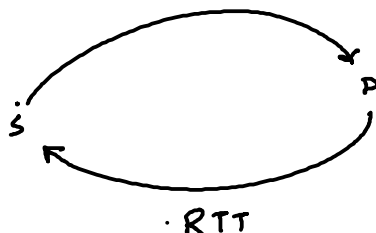
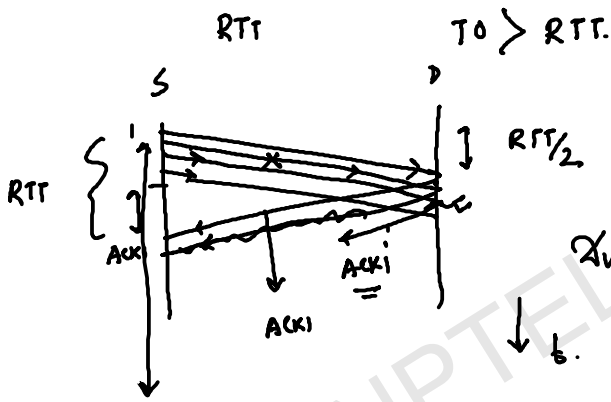
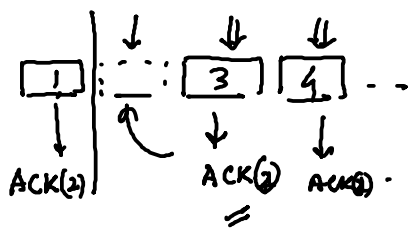
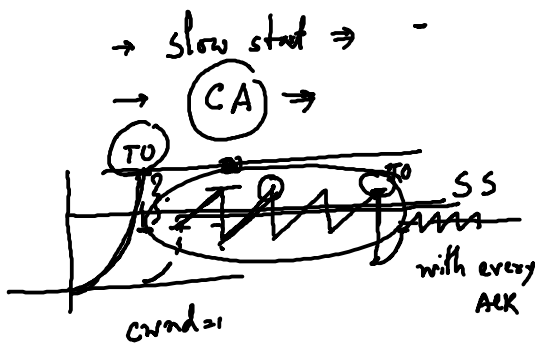
TCP



seq no. 32 bits ✓
Ack. 32 bits ✓

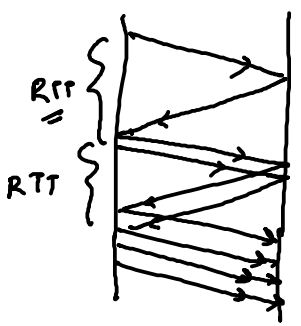


flow = $\frac{N}{RTT}$



SS threshold
 $cwnd = 1$

$cwnd = 1$
 $cwnd = cwnd + 1$
 $cwnd = ss_threshold$



$cwnd = cwnd + 1$ in every RTT

CA
[AIMD]

3DA

cwnd

AT $cwnd = cwnd + 1$ (in RTT)
MD $cwnd = \frac{cwnd}{2}$