Tut 01

CONTENTS

NETWORK

Circuit Switching (p34)

- Inefficient
- Fixed data rate
- Connection state maintenance

Packet Switching (p40)

- Data is sent as chunks of formatted bits
- Packets consist of a “header” and “payload”

Q:

What are the pros and cons of circuit switching?

Q:

In ____________ resources are allocated on demand

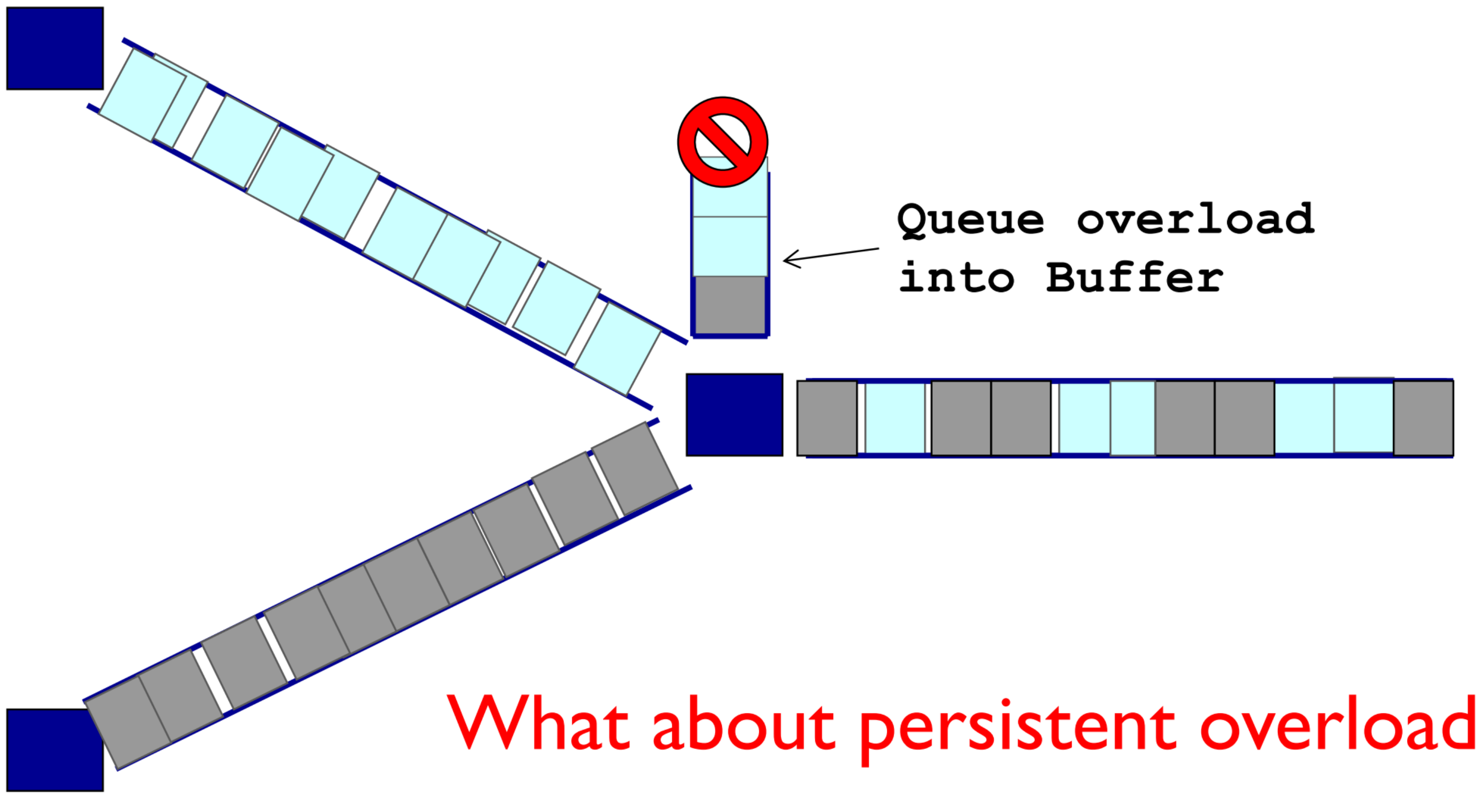
A. Packet switching
B. Circuit switching

Q:

A message from device A to B consists of packet X and packet Y. In a circuit switched network, packet Y’s path ________________ packet X’s path

A. is the same
B. is independent
C. is always different from

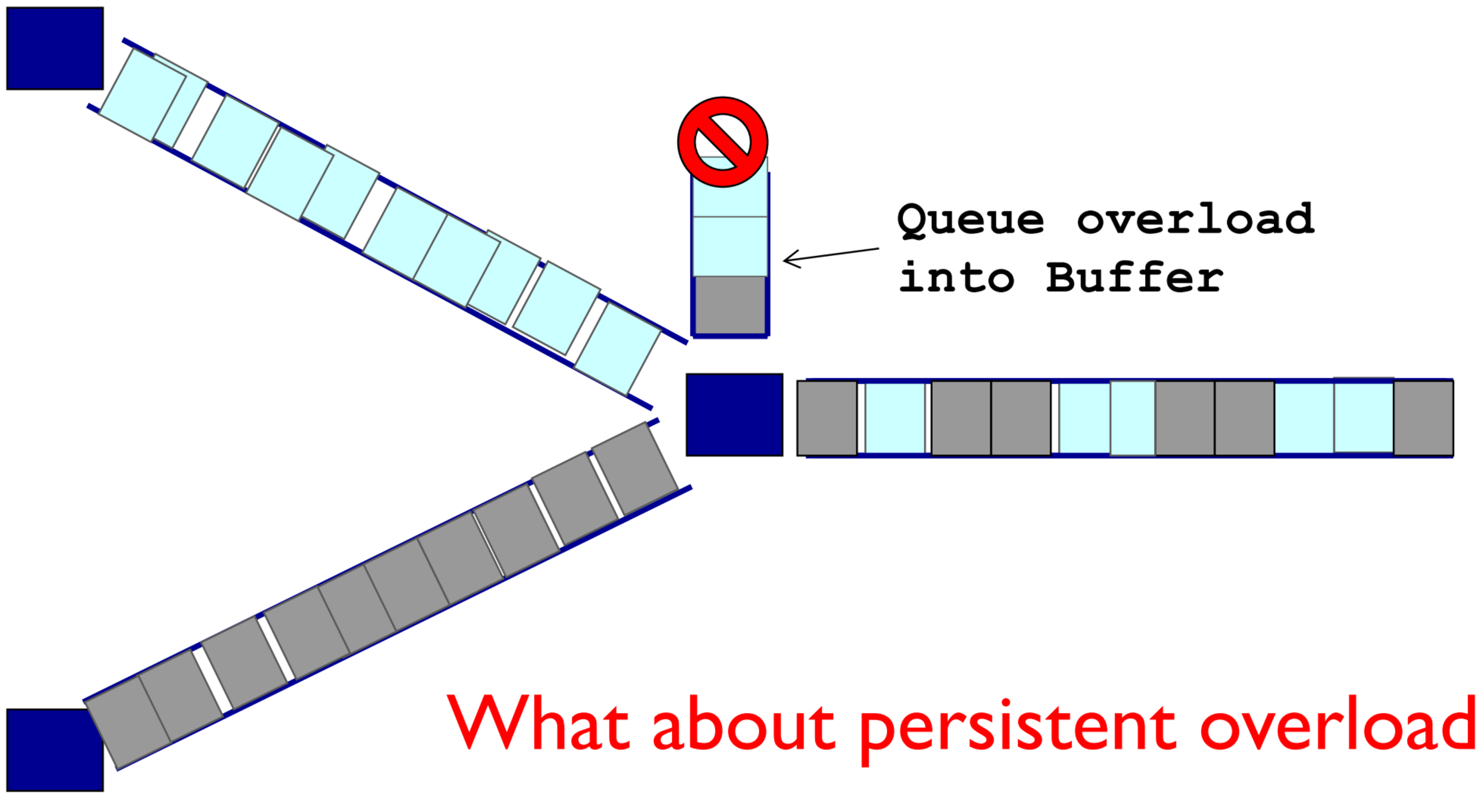
Statistical multiplexing: pipe view (p59)



What about persistent overload?

Will eventually drop packets

Statistical multiplexing: pipe view (p59)

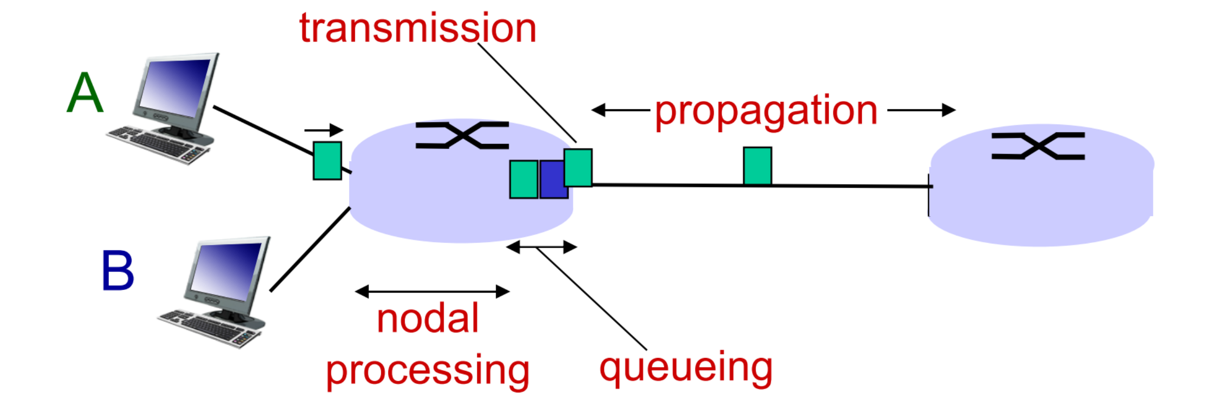


What about persistent overload?

Will eventually drop packets

Delays (p85)

- Nodal processing dPROC
- Queuing delay dQUEUE
- Transmission delay dTRANS
- Propagation delay dPROP



$$\boxed{d_{nodal} = d_{proc} + d_{queue} + d_{trans} + d_{prop}}$$

Q:

Propagation delay depends on the size of the packet

A. True

B. False

Examples

Consider a packet that has just arrived at a router. What is the correct order of the delays encountered by the packet until it reaches the next-hop router?

A. Transmission, processing, propagation, queuing
B. Propagation, processing, transmission, queuing
C. Processing, queuing, transmission, propagation
D. Queuing, processing, propagation, transmission

Q

Consider a circuit-switched network with N=100 users where each user is independently active with probability p=0.2 and when active, sends data at a rate of R=1Mbps. How much capacity must the network be provisioned with to guarantee service to all users?

A. 100 Mbps
B. 20 Mbps
C. 200 Mbps
D. 50 Mbps
E. 500 Mbps

Q

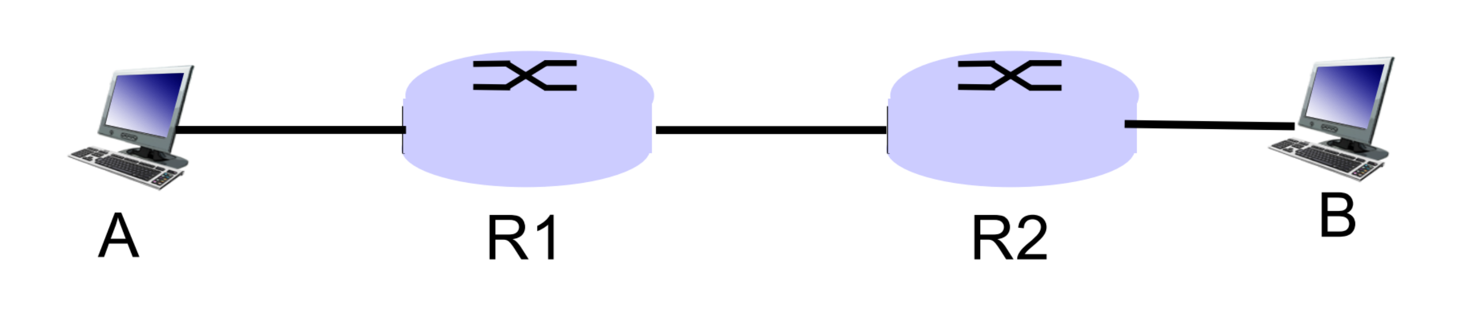
Consider a packet-switched network with N=100 users where each user is independently active with probability p=0.2 and when active, sends data at a rate of R=1Mbps. What is the expected aggregate traffic sent by the users?

A. 100 Mbps
B. 20 Mbps
C. 200 Mbps
D. 50 Mbps
E. 500 Mbps

Q

Consider a network connecting hosts A and B through two routers R1 and R2 like this: A--------R1----------R2----------B. Does whether a packet sent by A destined to B experiences queuing at R1 depend on the length of the link R1-R2?

A. Yes, it does
B. No, it doesn’ t



Application Layer

Layering & Encapsulation (p123-126)

1. application
2. transport
3. network
4. link
5. physical

Q:
What are two benefits of using a layered network model ? (Choose two)

A. It makes it easy to introduce new protocols
B. It speeds up packet delivery
C. It allows us to have many different packet headers
D. It prevents technology in one layer from affecting other layers
E. It creates many acronyms

Q:
Pick the true statement

A. TCP provides reliability and guarantees a minimum bandwidth

B. TCP provides reliability while UDP provides bandwidth guarantees

C. TCP provides reliability while UDP does not

D. Neither TCP nor UDP provides reliability

Application with TCP&UDP (p143)

application	application layer protocol	underlying transport protocol
e-mail	SMTP [RFC 2821]	TCP
remote terminal access	Telnet [RFC 854]	TCP
Web	HTTP [RFC 2616]	TCP
file transfer	FTP [RFC 959]	TCP
streaming multimedia	HTTP (e.g., YouTube), RTP [RFC 1889]	TCP or UDP
Internet telephony	SIP, RTP, proprietary (e.g., Skype)	TCP or UDP

HTTP (p150)

1. What is that?
2. How it works
3. Status code?
4. Methods?
5. HTTP/1.0 (Non-persistent)
6. HTTP 1.1
7. pipelining
8. Caching

RTT

time for a small packet to travel from client to server and back

Q:
Pick the true statement

A. TCP provides reliability and guarantees a minimum bandwidth

B. TCP provides reliability while UDP provides bandwidth guarantees

C. TCP provides reliability while UDP does not

D. Neither TCP nor UDP provides reliability

Q:

Consider an HTML page with a base file of size S0 bits and N inline objects each of size S bits. Assume a client fetching the page across a link of capacity C bits/s and RTT of D. How long does it take to download the page using non-persistent HTTP (without parallelism)?

A. D + (S0 + NS)/C
B. 2D + (S0 + NS)/C
C. N(D + S/C)
D. 2D + S0/C + N(2D + S/C)
E. 2D + S0/C + N(D + S/C)

Q:

Consider an HTML page with a base file of size S0 bits and N inline objects each of size S bits. Assume a client fetching the page across a link of capacity C bits/s and RTT of D. How long does it take to download the page using persistent HTTP (without parallelism or pipelining)?

A. $2D + (S0 + NS)/C$
B. $3D + (S0 + NS)/C$
C. $N(D + S/C)$
D. $2D + S0/C + N(2D + S/C)$
E. $2D + S0/C + N(D + S/C)$

Q:

Consider an HTML page with a base file of size S0 bits and N inline objects each of size S bits. Assume a client fetching the page across a link of capacity C bits/s and RTT of D. How long does it take to download the page using persistent HTTP with pipelining?

A. 2D + (S0 + NS)/C
B. 4D + (S0 + NS)/C
C. N(D + S/C)
D. 3D + S0/C + NS/C
E. 2D + S0/C + N(D + S/C)

DNS (p215)

1. What/Why
2. HOW
3. Hierarchy
4. DNS name
5. DNS Cache Poisoning (P241)

If a local DNS server has no clue about where to find the address for a hostname then the

a) Server starts crying
b) Server asks the root DNS server
c) Server asks its neighbouring DNS server
d) Request is not processed

Which of the following are respectively maintained by the client-side ISP and the domain name owner?

a) Root DNS server, Top-level domain DNS server
b) Root DNS server, Local DNS server
c) Local DNS server, Authoritative DNS server
d) Top-level domain DNS server, Authoritative DNS server
e) Authoritative DNS server, Top-level domain DNS server

Suppose you open your email program and send an email to salil@unsw.edu.au, your email program will trigger which type of DNS query?

a) A
b) NS
c) CNAME
d) MX
e) All of the above

You open your browser and type www.zeetings.com. The minimum number of DNS requests sent by your local DNS server to obtain the corresponding IP address is:

A. 0
B. 1
C. 2
D. 3
E. 42

P2P (p249)

1. What
2. How
3. .torrent files
4. Tit-for-tat
5. DHT(Distributed Hash Table)

BitTorrent uses tit-for-tat in each round to

a) Determine which chunks to download

b) Determine from which peers to download chunks

c) Determine to which peers to upload chunks

d) Determine which peers to report to the tracker as uncooperative

e) Determine whether or how long it should stay after completing download

Suppose Todd joins a BitTorrent torrent, but he does not want to upload any data to any other peers. Todd claims that he can receive a complete copy of the file that is shared by the swarm. Is Todd’ s claim possible? Why or Why not (one short sentences)?

Content Distribution Networks (p280)

1. What is this?
2. What for?

Transport Layer

Reliable Data Transfer (RDT)

VERSION

- 1.0 - Transfer over a perfectly reliable channel (not a realistic model)
- 2.0 - Transfer over a channel with bit errors (more realistic model)
- 2.1 - Protocol includes sequence numbers #0 #1 to track expected packets
- 2.2 - NAK-free protocol
- 3.0 - Transfer over a channel with bit errors and loss

PIPELINED PROTOCOLS

- Go-Back-N (GBN)
- Selective Repeat (SR)

TCP

- **Establishment:**

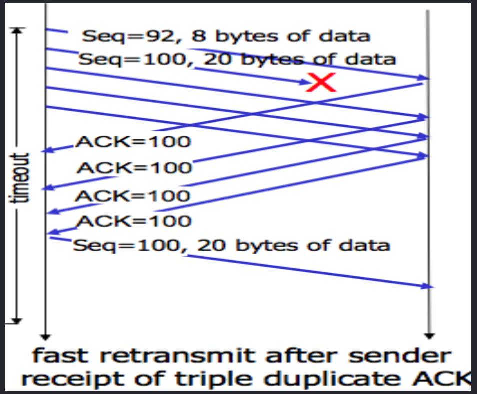
  (1) SYN -> (2) SYN-ACK -> (3) ACK + DATA -> Data exchange

- **Teardown:**

  Data exchange -> (1) FIN -> (2) ACK-FIN -> (3) ACK -> (4) WAIT / Retransmit ACK -> (4) CLOSE

CH.3 Transport Layer

- **Fast Retransmission**



- **If sender receives 3 duplicate ACKs for the same data, resend the un-ACK'd data with the smallest sequence #.**

- **Timeout periods are often long, so there is a long delay before resending lost packets. No need to wait for timeout.**

- **EstimatedRTT**

  EstimatedRTTCURR = (1 – a) * EstimatedRTTPREV + a * SampleRTTRECENT

TCP – Congestion Control

- CWND
- SSThresh

- Flavors
  Tahoe: CWND = 1 on DupACK and Timeout
  Reno: Same as above.
  New-Reno: TCP Reno + improved fast recovery

谢谢观看

DueApe – 让你 的 海 外 学 习 更 简 单