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CS-351
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Cloud Computing Midterm

1) $L = 30\text{Mbit} = 30 \times 10^6 \text{ bit}$
$R = 10\text{Mbps} = 10 \times 10^6 \text{ bps} = 10^7 \text{ bits}$
$d = 2 \times 10^8 \text{ m/s}$
$s = 10{,}000\text{km} = 10{,}000{,}000\text{m}$

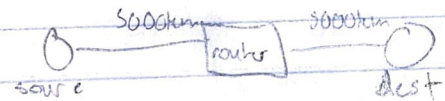
a. $d_{trans} = L/R = 30\text{mb}/10\text{mbs} = 3$ **C. 3 seconds**

b. $d_{prop} = d/s = \frac{10{,}000{,}000}{2 \cdot 10^8} = .05$ $d_{trans} + d_{prop} = 3.05$ **B 3.05s**

c. Time for 1 bit → $1/10^7 = 1 \cdot 10^{-7}$ s

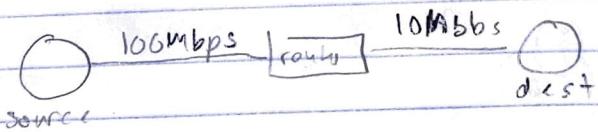
$(1 \cdot 10^{-7}\text{ s})(10^7 \frac{b}{s}) =$ **1 bit**

d.



$d_{trans} = \frac{30\text{mb}}{10\text{mbs}} + \frac{30\text{mb}}{10\text{mbs}} = 6$ seconds
$d_{prop} = \frac{10{,}000{,}000}{2 \times 10^8} + \frac{10{,}000{,}000}{2 \cdot 10^8} = .1$ seconds
$d_{trans} + d_{prop} = 6.1\text{s}$ **C 6.1 seconds**

e.



Throughput = min(100Mbps, 10Mbps) = 10 Mbps
D. 10 Mbps

f. **D loss-intolerant & time-insensitive**

g. **B. Cache resource records, but discard them after a period of time that is in the order of days**

h. D all of the above

i. B. 4 (only counts unique items)

j. C 'world!'

2. a. False
b. True
c. True
d. True

3. OSI/ISO

Application
Presentation
Session
Transport
Network
Link
Physical

} these aren't in internet stack

4) d_{prop} - propogation delay (d/s)
d_{trans} - transmission speed (L/R)
d_{queue} - queueing delay (depends on congestion)
d_{proc} - node processing delay (usually very small)

5) a. while (i < len(s)):
b i = i + 3

6. Packet switching revolves around sending packets of data from clients to server, it is good for 'bursty' data, but does not allow for guaranteed performance. The resources are shared between all, but may result in loss if network is overwhelmed

Circuit switching revolves around setting up streams (circuits or 'calls') between 2 machines. This gives the benefit of guaranteed performance, but resources may sit idle or, if the network is overwhelmed, some may not be able to establish connection at all.

7. 1. They must be scalable
2. They must have high degree of optimization
3. They must be readily available/accessable
4. They must be easily managable
5. They must be easily accessible and work across devices

8. Dynamic Provisioning is when you can scale your system up and down depending on the real (or anticipated) usage of the system. This allows for more efficient resource utilization because idle system resources may be picked up for use in another system.

9. IaaS - Infrastructure as a Service
   ↳ Example: Amazon EC2 (aws)
   PaaS - Platform as a Service
   ↳ Example: Google App engine, fore.com (NOT salesforce.com)
   SaaS - Software as a Service
   ↳ Example: Google's Gsuite (docs, sheets, gmail, etc)

10) a. $\min(40, 80, \frac{300}{4}) = \min(40, 80, 75)$

$= 40$

$$\begin{array}{r} 75 \\ 4\overline{)300} \\ \underline{28} \\ 20 \end{array}$$

b. The hop from the servers to the backbone (R_S) is the bottleneck here

c. $R_S = \frac{40}{40} = 100\%$

$R = 40/\frac{1}{4}(R) = 40/75 = 53.3\%$

$R_C = 40/80 = 50\%$