Informal Quiz #11
SOLUTIONS

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QoS (Slide set #12):
Informal Quiz SOLUTIONS
QoS

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☐ √ A flat priced, undifferentiated best-effort service offering is a solid long-term non-commodity business

√ ☐ Better-than-best-effort services would help spur new performance-hungry applications to be deployed on the Internet

√ ☐ QoS, broadly speaking, is a spectrum of performance capabilities (specified or measured) ranging from best-effort to that of a leased line.

☐ √ A metric is specified “a priori” and “parameters” are measured “a posteriori” in a QoS system

☐ √ QoS is considered to be better if fewer parameters are specified at coarse granularity

☐ √ A FIFO service discipline can provide isolation between flows.

√ ☐ Given a constant set of resources, the bandwidth and delay allocations is a zero-sum game irrespective of the scheduling approaches chosen

☐ √ Signaling is an example of a data-plane QoS mechanism

√ ☐ An SLA is a control plane building block used to specify the service performance level, and may have other economic and legal agreements specified.

√ ☐ Scheduling refers to the choice of packet to transmit, whereas buffer management refers to the decision to enqueue or drop a particular packet

☐ √ RTP is an example of a network-level QOS mechanism that raises the performance offered to applications.
QoS (contd)

√  ☐ A token bucket bounds the characteristics of inbound traffic into a QoS network (I.e. creates a predictable traffic envelope)
√  ☐ An arrival curve and service curves are cumulative functions of the number of bits arrived or serviced at a network element respectively.
√  ☐ Arrival and service curves are useful to understand QoS performance parameters such as the worst case delay, buffer reqts, average service rates etc
√  ☐ Priority queuing provides service isolation only for the highest priority flow, whereas round robin provides isolation for every flow.
☐  √ A delay guarantee can be provided by only using WFQ at the routers
√  ☐ Service isolation and differentiation still does not guarantee avoidance of congestion collapse (which is an end-to-end problem)
☐  √ RED (the buffer management scheme) can provide service isolation between a mix of TCP and UDP flows
√  ☐ Virtual time refers to the service that backlogged flow with weight = 1 would receive in a GPS scheduler.
√  ☐ In a work-conserving GPS scheduler, every flow receives the same normalized service (service normalized by weights), which is also equal to the normalized average service (total service normalized by sum of weights).
√  ☐ GPS scheduler provides weighted max-min fair allocations to competing flows
QoS ...

- FQ and WFQ transmit packets in the order of their finish times in an ideal bit-by-bit round robin or GPS scheduler.
- FQ isolates/protects a flow against a misbehaving flow when RED would not.
- Int-serv is an example of a stateless QoS architecture.
- Diffserv is an example of a stateless QoS architecture.
- Admission control is a function performed in the data-plane.
- RSVP provides QoS routing capabilities.
- RSVP PATH messages are used to identify the reverse path from receivers to any sender.
- RSVP provides signaling for both unicast and multicast flows.
- In the differentiated services model, interior routers must handle fine-grained signaling and policy functionality.
- Differentiated services would provide better-than-best-effort service in a scalable manner.
- Differentiated services architecture fully specifies the service semantics in a manner similar to int-serv’s guaranteed and controlled load services.
- The expedited forwarding PHB in diff-serv can be used to create a guaranteed bandwidth, low jitter service.
The DPS approach moves state from the edge to the core of the network.

The DPS approach or edge-based closed-loop building blocks can be used to compose QoS services over multiple autonomous systems.

One reason TCP is not best suited for video is because it can’t handle multicast.

RTP provides useful transport functions for multimedia applications, but the network services are provided by RSVP, integrated services and differentiated services.

H.323 provides call control and codecs in addition to RTP.

A content delivery network is like a reverse web cache, paid for by the content provider to bring content close to the user, and hence impact performance.