Quality of Service
QoS tools

Date: Spring
Duration: 15 min.

- There is only one correct answer for each multiple choice question.
- Each correct answer adds 1 point.
- Each incorrect answer has a penalty of $\frac{1}{3}$ points.
- No score is awarded for unanswered questions, neither positive nor negative.
- Mark out your answers with an "X". Make sure that the "X" reaches the corners of the rectangle. ⊠
- No score is awarded if you mark more than one answer.
- Pad your NIA with 0s on the left to complete the NIA field.

Write your personal data clearly.

Last name:	
First name:	
Group:	

Permutation: A

NIA:

	A	B	C	D		A	B	C	D
1					11				
2					12				
3					13				
4					14				
5					15				
6					16				
7					17				
8					18				
9					19				
10									

1.- What is the preferred OSI layer to implement end-to-end QoS?

(a) Layer 1.
(b) Layer 7.
(c) Layer 4.
(d) Layer 3.

2.- How are the PIR and CIR defined?

(a) With a leaky bucket.
(b) With a maximum packet loss.
(c) With a token bucket.
(d) With a maximum delay.

3.- Why is it not possible to offer per IP flow granularity in many data networks?

(a) Because it is not possible for a router to identify an IP flow.
(b) Because it would increase the queueing time.
(c) A core router may handle millions of IP flows and it cannot keep the state of them all and treat them differently.
(d) Because a router only pays attention to layer 4 information.

4.- Which of the following can be placed in an inbound interface?

(a) A shaper.
(b) Neither a traffic policer nor a shaper.
(c) A traffic policer and a shaper.
(d) A policer.

5.- When is it appropriate to police the traffic?

(a) When the traffic is in contract and we want to increase the delay.
(b) When it is exceeding the agreed profile and we want to avoid delay and jitter.
(c) When it is desired to prevent packet loss.
(d) When we want to absorb a burst and temparily store the additional traffic.

6.- Which of the following techniques can be used to implement a traffic shaper.

(a) Neither a leaky bucket nor a token bucket can be used to implement a traffic shaper.
(b) Only the leacky bucket is a candidate for the implementation of a traffic shaper.
(c) Both a leaky bucket and a token bucket are candidates for a traffic shaper implementation.
(d) Only a token bucket is a candidate for the implementation of a traffic shaper.

7.- What is not a downside of bandwidth overprovisioning?

(a) Lack of protection from the extra bandwidth consumption by virus/worms and other security attacks.
(b) Network usage may increase in pair with extra network provisioning.
(c) The need to pay for the extra bandwidth.
(d) Higher complexity.

8.- Where is computationally expensive classification and marking done?

(a) In the network core, where the routers are more powerful.
(b) At the outgoing interface of core routers.
(c) At the incoming interface of core routers.
(d) At the edge of the network where traffic is less aggregated.

9.- What is the name defined by the IETF to refer to the treatment that a router offers to a class of traffic?

(a) Synchronous Optical Networking (SONET).
(b) Per Hop Behaviour (PHB).
(c) Hierarchical replication code (HRC).
(d) Binary Exponential Backoff (BEB).

10.- Where can we find a TX-ring

(a) Between the scheduler and the transmission line.
(b) Between the policer and the shaper.
(c) Between the marker and the meter.
(d) Between the classifier and the queues.

11.- Which techniques would you use to identify and classify P2P traffic?

(a) Incoming interface and source IP address.
(b) Source port classification and layer 4 protocol.
(c) Metering.
(d) Deep packet inspection and stateful inspection.

12.- What is a Class of Service (CoS)?

(a) It is the maximum delay of a token bucket.
(b) Is the QoS tool that marks the packets.
(c) It is the router that receives high priority traffic.
(d) It is one of the different service categories in a QoS-enabled network.

13.- What is the usual behaviour in a service with an SLA that includes a PIR and CIR?

(a) To mark all packets above the PIR.
(b) To mark the packets above the PIR and discard the packets above the CIR.
(c) To mark the packets above the CIR and discard the packets above the PIR.
(d) To mark and discard the packets above the CIR.

14.- Where is a chain of QoS tools applied?

(a) In the router ports.
(b) In the router switching fabric. A tool (e.g. a policer) that is configured in a router, will apply to all interfaces and directions.
(c) In the routing tables.
(d) In the router interfaces, taking into account the direction of traffic (incoming/outgoing).

15.- Which of the following is not a typical element in a queue system?

(a) A buffer.
(b) A scheduler.
(c) A dropper.
(d) An IP address.

16.- Why is QoS more important in case of equipment failure or scheduled downtime?

(a) Because the scheduled downtime is usually at night or during the weekend.
(b) Because QoS simplifies the configuration and reduces the length of the downtime.
(c) Because there might be not enough resources to satisfy all traffic, and it is important to prioritize.
(d) Because QoS increases the available bandwidth, making sure that there is plenty of resources even during failure conditions.

17.- Which tool smoothes bursty traffic without dropping packets?

(a) A classifier.
(b) A marker.
(c) A meter.
(d) A shaper.

18.- Which of the following classification methods has the lowest computational cost?

(a) IP and port source and destination pairs.
(b) QoS markings.
(c) Stateful inspection.
(d) Deep packet inspection.

19.- How many bits are available in the headers for QoS packet marking.

(a) 6 in MPLS, 3 in Ethernet and a total of 8 in IP (6 for DSCP and 2 for ECN).

(b) 3 in MPLS, 3 in Ethernet and 3 in IP.

(c) 8 in MPLS, 8 in Ethernet and 8 in IP.

(d) 3 in MPLS, 3 in Ethernet and a total of 8 in IP (6 for DSCP and 2 for ECN).