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Question #1 Topic 1

Which three conditions can occur when metering traffic using a dual token bucket traffic policing QoS mechanism on Cisco routers? (Choose three.)

- A. conform
- B. pass
- C. violate
- D. exceed
- E. burst
- F. matched

Correct Answer: ACD

Question #2 Topic 1

What is the correct formula for determining the CIR?

- A. $CIR = Bc/Tc$
- B. $CIR = Bc \times Tc$
- C. $CIR = Tc/Bc$
- D. $CIR = Bc + Be$
- E. $CIR = Tc/(Bc+Be)$
- F. $CIR = (Bc+Be)/Tc$

Correct Answer: A

Committed Information Rate (CIR) the rate the device will send at (on average) over a one second period.

The default CIR when traffic-shaping is enabled on the interface is 56K. CIR is also referred to as the "target rate". Since the device is forced to send at the AR, it does not send all of the time (within one second) in order to send an average amount of data that equals the CIR.

Minimum CIR (mincir) the rate the service provider guarantees to accept. Theoretically, the provider will set the DE bit for all traffic above this rate. Mincir is designed to be used in conjunction with adaptive shaping. With adaptive shaping, the router will throttle down in the event of congestion. The router will not throttle down below this value.

Committed Burst (Bc) the number of committed bits allows to be sent during a given interval. The device sends an average amount of traffic to achieve the CIR.

The Bc value defaults to 1/8 of the configured CIR for speeds below 650K. For speeds above that, it is roughly 1/16 of CIR.

Excess Burst (Be) - the number of non-committed bits the router is allowed to send above Bc during the first interval (Tc). The amount of Be "credits" is derived

from unused Bc credits in previous intervals. There is no limit to how long Be can "store" unused Bc credits. It is a common misconception that Be can only store credits from the previous interval or the previous second. There is no default Be value. Committed Rate Measurement Interval (Tc) the time interval over which Bc or Bc+Be can be transmitted. The max value is 125 ms and the minimum value is 10 ms.

The Formula

CIR, Tc, and Bc are related mathematically by the following formula:

$CIR = Bc / (Tc / 1000)$ Notice the division of Tc by 1000 is used to convert milliseconds into seconds the common measurement of CIR and Bc.

Question #3 Topic 1

DS-TE implementations on Cisco routers support which bandwidth pool(s) and class type(s)? (Choose two.)

- A. global pool only
- B. subpool only
- C. global pool and subpool
- D. class-type 0 only
- E. class-type 1 only
- F. class-type 0 and class-type 1

Correct Answer: CF

Differential Service Tunnels

Differential Service Traffic Engineering (TE) is an extension of the regular MPLS Traffic Engineering (MPLSTE) feature. Regular TE does not provide bandwidth guarantees to different traffic classes. A single bandwidth pool (global pool) is used in regular TE that is shared by all traffic. In order to support various class of service (CoS), the ability to provide multiple bandwidth pools is required. These bandwidth pools then can be treated differently based on the requirement for the traffic class using that pool.

In RSVP global and subpools reservable bandwidths are configured on a per interface basis to accommodate TE tunnels on the node. Available bandwidth from all configured bandwidth pools is advertised using Interior Gateway Protocol (IGP). RSVP is used to signal the TE tunnel with appropriate bandwidth pool requirements.

Question #4 Topic 1

Which field in the MPLS shim header is used to support different QoS markings?

- A. IP precedence
- B. DSCP
- C. EXP
- D. ToS

- E. S
- F. Label

Correct Answer: C

MPLS EXP Marking

The three MPLS EXP (experimental) bits in the shim header of an input or output MPLS packet header may be set or changed by a user configured value

Question #5 Topic 1

On a Cisco IOS XR router, which mechanism protects the router resources by filtering and policing the packets flows that are destined to the router that is based on defined flow-type rates?

- A. LLQ
- B. LPTS
- C. Committed Access Rate
- D. Control Plane Policing
- E. Management Plane Protection
- F. NetFlow
- G. ACL

Correct Answer: B

Question #6 Topic 1

When configuring LLQ (strict priority queue) on a traffic class using the Cisco IOS XR priority command on a Cisco ASR9K router, which additional QoS command is required for this traffic class?

- A. shape
- B. police
- C. random-detect
- D. bandwidth

Correct Answer: B

The Low Latency Queuing feature brings strict priority queueing to Class-Based Weighted Fair Queueing (CBWFQ).

Question #7 Topic 1

On the Cisco ASR9K router, when using the bandwidth command to specify the minimum guaranteed bandwidth to be allocated for a specific class of traffic, what will be used as the queuing algorithm?

- A. custom queuing
- B. CBWFQ

- C. WFQ
- D. FIFO
- E. priority queuing

Correct Answer: B

Class based weighted fair queuing (CB-WFQ) was initially released without the support of a priority queuing system, thus it could not guarantee the delay and jitter (delay variation) requirements of real-time, interactive voice and video conversations. Since for CBWFQ, the weight for a packet belonging to a specific class is derived from the bandwidth assigned to the class, which in turn determines the order in which packets are sent.

All packets are serviced fairly based on weight and no class of packets may be granted strict priority. This scheme poses problems for voice traffic that is largely intolerant of delay, especially variation in delay

Question #8 Topic 1

When implementing MPLS DS-TE on Cisco IOS XR routers, all aggregate Cisco MPLS TE traffic is mapped to which class type by default?

- A. class-type 0 (bandwidth global pool)
- B. class-type 1 (bandwidth subpool)
- C. class-type 2 (bandwidth priority)
- D. class type class-default (bandwidth best-effort)

Correct Answer: A

Differentiated Services Traffic Engineering

MPLS Differentiated Services (Diff-Serv) Aware Traffic Engineering (DS-TE) is an extension of the regular MPLS-TE feature. Regular traffic engineering does not provide bandwidth guarantees to different traffic classes. A single bandwidth constraint is used in regular TE that is shared by all traffic. To support various classes of service (CoS), users can configure multiple bandwidth constraints. These bandwidth constraints can be treated differently based on the requirement for the traffic class using that constraint.

MPLS diff-serv traffic engineering provides the ability to configure multiple bandwidth constraints on an MPLS-enabled interface. Available bandwidths from all configured bandwidth constraints are advertised using IGP.

TE tunnel is configured with bandwidth value and class-type requirements. Path calculation and admission control take the bandwidth and class-type into consideration. RSVP is used to signal the TE tunnel with bandwidth and class-type requirements. Diff-Serv TE can be deployed with either Russian Doll Model (RDM) or Maximum Allocation Model (MAM) for bandwidth calculations.

TE Class Mapping

Each of the eight available bandwidth values advertised in the IGP corresponds to a TE Class. Because the IGP advertises only eight bandwidth values, there can

be a maximum of only eight TE classes supported in an IETF DS-TE network.

TE class mapping must be exactly the same on all routers in a DS-TE domain. It is the responsibility of the operator configure these settings properly as there is no way to automatically check or enforce consistency.

The operator must configure TE tunnel class types and priority levels to form a valid TE class.

When the TE class map configuration is changed, tunnels already

up are brought down. Tunnels in the down state, can be set up if a valid TE class map is found.

Table 4 TE Classes and Priority

The default mapping includes four classes types.

Question #9 Topic 1

On the Cisco IOS XR, which MQC configuration is different than on the Cisco IOS and IOS XE?

- A. On the Cisco IOS XR, WRED can only be applied in the output direction.
- B. On the Cisco IOS XR, marking can only be applied in the input direction.
- C. On the Cisco IOS XR, LLQ can be applied in the input or output direction.
- D. On the Cisco IOS XR, LLQ can use up to four priority queues: level 1, level 2, level 3, and level 4.

Correct Answer: C

Question #10 Topic 1

On Cisco routers, how is hierarchical QoS implemented?

- A. Within the parent policy, reference another child policy using the policy-map command.
- B. Within the child policy, reference another parent policy using the policy-map command.
- C. Use the policy-map command within a service-policy to implement nested policy-maps.
- D. Within the parent policy-map, reference another child policy-map using the service-policy command.

Correct Answer: D

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