

Chapter 10: Hints & Answers

10.1 Hint: Does the burstiness of the traffic affect the answer?

10.4 Total number of request messages, is $2^{n+1} - 1$.

10.8 Integrated services IP provides QoS packet delivery between the source and destination pair. The QoS parameters are dependent on the source requirements, for example, bandwidth requirement and delay-bound requirement. To provide integrated services, it is necessary for the routing protocol (network layer) to provide QoS routing. QoS routing provides for the selection of paths with specific attributes that can support specified QoS requirements. RSVP provides the means for reserving resources along paths identified by QoS routing.

10.12 You can download a packet capture file containing RSVP messages from <http://www.ethereal.com/sample/>

10.16 A local node should be able to tolerate losses of the refresh signal as long as at least one out of K consecutive messages gets through. In the worst case this message could be the last one in a window of K messages. Therefore L must be larger than K times the refresh period. The refresh period is randomized number with a uniform distribution in the range of $[0.5R, 1.5R]$. In the worst case the refresh period could be $1.5R$. As a result to tolerate the worst-case scenario, L must be larger than $K*1.5*R$.

10.18 Do a web search for “Diffserv router” and cisco, juniper, or another major router vendor and you will find good examples of DiffServ equipment.

10.24 What is the role of the edge routers in DiffServ?

10.29 MPOA requires flow detection to set up a VCC

- Advantage: quick adaptivity to flow patterns
- Disadvantages: time delay on VCC establishment, processing load due to churn in VCC setup and teardown

MPLS relies on routing topology to set up a VCC

- Advantage: less processing load than MPOA, traffic engineering capability
- Disadvantage: more complex and requires link state distribution or similar protocol to update the network topology

10.32 (c) Destination network – the network’s IP address and the AS number (if available)

10.36 (a) Topology-driven label assignment – The label assignment for this approach basically follows the shortest-path algorithms used in the IP network. As a result, label assignment is based on the shortest path found by the IP layer and the computational load is minimal.

10.44 The notion of label merging cannot be applied to GMPLS at all levels in a similar way it is applied to MPLS. In the wavelength level for instance, multiple wavelengths cannot be merged into a new wavelength.

10.49 RTP can operate over AAL5 by mapping RTP PDUs directly onto AAL5 PDU’s in point-to-point applications. RTP is designed for multicast scenarios, which is not readily handled by ATM.

10.52 The following provides an example of the setup portion of a Microsoft NetMeeting session:

Setup Capture:

No. Time	Source	Destination	Protocol Info
6 18.904189	192.168.0.149	192.168.0.143	TCP 1748 > 1720 [SYN] Seq=1739645016 Ack=0 Win=16384 Len=0
7 18.905196	192.168.0.143	192.168.0.149	TCP 1720 > 1748 [SYN, ACK] Seq=4252100644 Ack=1739645017 Win=17520 Len=0
8 18.905366	192.168.0.149	192.168.0.143	TCP 1748 > 1720 [ACK] Seq=1739645017 Ack=4252100645 Win=17520 Len=0
11 19.497846	192.168.0.149	192.168.0.143	H.225.0 CS: Setup-UUIE
12 19.769449	192.168.0.143	192.168.0.149	TCP [Desegmented TCP]
13 20.099818	192.168.0.149	192.168.0.143	TCP 1748 > 1720 [ACK] Seq=1739645217 Ack=4252100649 Win=17516 Len=0
14 20.101044	192.168.0.143	192.168.0.149	H.225.0 CS: Alerting-UUIE
16 20.501086	192.168.0.149	192.168.0.143	TCP 1748 > 1720 [ACK] Seq=1739645217 Ack=4252100688 Win=17477 Len=0
20 29.091030	192.168.0.143	192.168.0.149	TCP [Desegmented TCP]
21 29.329256	192.168.0.149	192.168.0.143	TCP 1748 > 1720 [ACK] Seq=1739645217 Ack=4252100692 Win=17473 Len=0
22 29.330385	192.168.0.143	192.168.0.149	H.225.0 CS: Connect-UUIE
23 29.400799	192.168.0.149	192.168.0.143	TCP 1749 > 1862 [SYN] Seq=1740980379 Ack=0 Win=16384 Len=0
24 29.401781	192.168.0.143	192.168.0.149	TCP 1862 > 1749 [SYN, ACK] Seq=4253464033 Ack=1740980380 Win=17520 Len=0
25 29.401944	192.168.0.149	192.168.0.143	TCP 1749 > 1862 [ACK] Seq=1740980380 Ack=4253464034 Win=17520 Len=0
26 29.405685	192.168.0.149	192.168.0.143	TCP [Desegmented TCP]
27 29.453530	192.168.0.143	192.168.0.149	TCP [Desegmented TCP]
28 29.453752	192.168.0.149	192.168.0.143	H.245 TerminalCapabilitySet MasterSlaveDetermination
29 29.455958	192.168.0.143	192.168.0.149	H.245 TerminalCapabilitySet MasterSlaveDetermination
30 29.465312	192.168.0.149	192.168.0.143	TCP [Desegmented TCP]
31 29.471165	192.168.0.143	192.168.0.149	TCP [Desegmented TCP]
32 29.471402	192.168.0.149	192.168.0.143	H.245 TerminalCapabilitySetAck MasterSlaveDeterminationAck
33 29.472271	192.168.0.143	192.168.0.149	H.245 TerminalCapabilitySetAck MasterSlaveDeterminationAck
34 29.678682	192.168.0.149	192.168.0.143	TCP [Desegmented TCP]
35 29.679868	192.168.0.143	192.168.0.149	H.245 OpenLogicalChannel OpenLogicalChannel OpenLogicalChannel
43 30.532924	192.168.0.149	192.168.0.143	TCP 1749 > 1862 [ACK] Seq=1740980892 Ack=4253464654 Win=16900 Len=0
45 35.545028	192.168.0.143	192.168.0.149	RTCP Receiver Report
48 35.546773	192.168.0.149	192.168.0.143	RTCP Receiver Report
50 1239.290373	192.168.0.149	192.168.0.143	RSVP PATH Message. SESSION: IPv4, Destination 192.168.0.143, Protocol 17, Port 49608.
SENDER TEMPLATE: IPv4, Sender 192.168.0.149, Port 49608.			
51 1239.322672	192.168.0.143	192.168.0.149	RSVP RESV Message. SESSION: IPv4, Destination 192.168.0.143, Protocol 17, Port 49608.

TCP control packets

H.225.0

Alerting

Connecting

Negotiating channel usage

Requesting bandwidth

10.58 (c) The calls placed at the startup cannot reach him at the office or lab until the proxy server locates him in one of the new locations unless the call forwarding method described in (a) is in use.