

Assignment 1



NET 3006 – Enterprise Network Management

Carleton University
School of Information Technology
Ammar Alhosainy

Due date: February 4th, 2016 (at 11:55 pm)

Question 1 – Review questions (20 marks)

- a) Describe the differences between connectionless service and connection-oriented service. (4)
- b) Describe the differences between circuit-switching and packet-switching networks. (4)
- c) Describe the differences between TCP and UDP transport protocols and states which one SNMP uses and explain why? (3)
- d) Describe why an application developer might choose to run an application over UDP rather than TCP. (3)
- e) Find the RFC number for the following protocols: IPv4, Mobile IP for IPv4 (MIPv4), SNMP, TCP (3)
- f) Look in the SNMP RFC and find what language is used to communicate management information by operation of the SNMP. (3)

Question 2 – Ping & Traceroute (10 marks)

- a) Use PING and Traceroute tools for probing two local hosts and 2 remote hosts (international). Explain your findings and list all the limitations of both tools. (5)
- b) Traceroute www.csit.carleton.ca (or any other host) and compute the average time a packet takes to travel from your host to the remote host. Repeat the experiment using the same remote host and compare the new average travel time with the old one. Explain your results. (5)

Question 3 – Network management (20 marks)

- a) Consider the two ways in which communication occurs between a managing entity and a managed device: request-response mode and trapping mode. What are the advantages and disadvantages of these two approaches, in terms of (i) overhead, (ii) notification time when exceptional events occur, and (iii) robustness with respect to lost messages between the managing entity and the device? (5)
- b) Define the following terms: managing system, managed device, management agent, MIB, network management protocol. (5)
- c) Describe and define the 5 areas of network management (5)
- d) Name and describe each of the 5 network management standards (5)

Question 4 – Problem: Circuit and packet switching (20 marks)

Compute the required time to send a file from source to destination if

- a) Circuit switching is used (10)
- b) Packet switching is used (assume a store and forward mechanism is used) (10)

Assume the following about the network:

- The source and destination are separated by 5 intermediate routers
- The distance between each node is 5km
- The signal propagation is 10^6 m/s.
- The file size is 50,000,000 bytes.
- The maximum size of each packet is 100,000 bytes (please ignore the header size).
- The transmission speed of each link is 100 Mbps.
- The time required to establish the circuit is 10^{-2} seconds
- You can neglect the processing time used for routing.

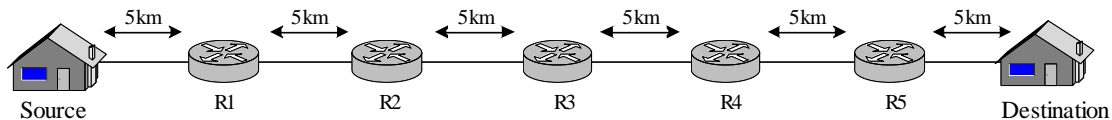


Figure 1 : Question 4

Question 5 – ASN.1 (15 marks)

The following is the informal record structure of John P. Smith's address

Name	John P. Smith
Address	1125 Colonel By Dr.
City	Ottawa
Province	Ontario
Zip Code	K1S 5B6

Write for your record the following:

- a) The informal record structure (5)
- b) An ASN.1 description of the record structure (6)
- c) The record value for your home address (4)

Question 6 – Encoding (10 marks)

An object identifier consists of a sequence of integers. The BER encoding packs the first two integers into a single sub-identifier. Thus, an identifier consisting of N integers has $N-1$ sub-identifiers. The first two integers can be combined because the first integer always takes on the value 0,1, or 2, and the second integer must be less than 40 if the first integer is 0 or 1. The packing formula is:

$$Z = (X*40) + Y$$

where X is the first integer, Y is the second integer, and Z is the resulting sub-identifier value.

Use this definition to encode the object identifier internet {1 3 6 1} using the TLV method (give your result in binary format).

NOTE: OBJECT IDENTIFIER is UNIVERSAL class and its tag number is 6.

Question 7 – Encoding (5 marks)

Encode the IP address 10.20.30.40 in TLV format