

**COE 444 - Internetwork Design and Management  
Spring 2004 (Term 032)**

**Homework 7**

Date: Saturday, May 15, 2004

**Q1.** According to the OSI framework for network management, what are the principle functional areas of network management? Briefly describe some of the tasks that fall under each area.

**Q2.** Indicate the correct OSI functional network management area of each of the following tasks (**spell out the full name - do not use acronyms**):

<b>Characteristic</b>	<b>OSI functional NM area</b>
1. Elaborate disaster recovery procedures.	
2. Monitor network traffic and collect statistics.	
3. Maintain configuration scripts of network devices.	
4. Logging and resolution of network problems.	
5. Develop algorithms to prorate charges to users.	
6. Troubleshooting of network problems.	
7. Assign network addresses to computers.	
8. Management and distribution of authentication and encryption keys.	
9. Discovering network topology and mapping the network.	
10. Uses metrics such as throughput and response time.	

**Q3.** List and describe the 5 steps used in Fault Management.

**Q4.** List and describe the three main elements of an SNMP-based network management system.

**Q5.** List and describe the 5 SNMP messages and which application entity sends each one.

**Q6. Problems:** 1, 2, 4, 5, and 11 (from chapter 5: “Network Management - Principles and Practice” by Mani Subramanian, 2000)

**Q7.** Define the SNMP access policy in terms of the most basic components. Give one example of how it is used.

**Q8.** An SNMP manager sends a request for the values of the sysUpTime and sysServices in the System group and ifType in the interfaces group for ifIndex value of 5. Write the PDUs with the fields in for:

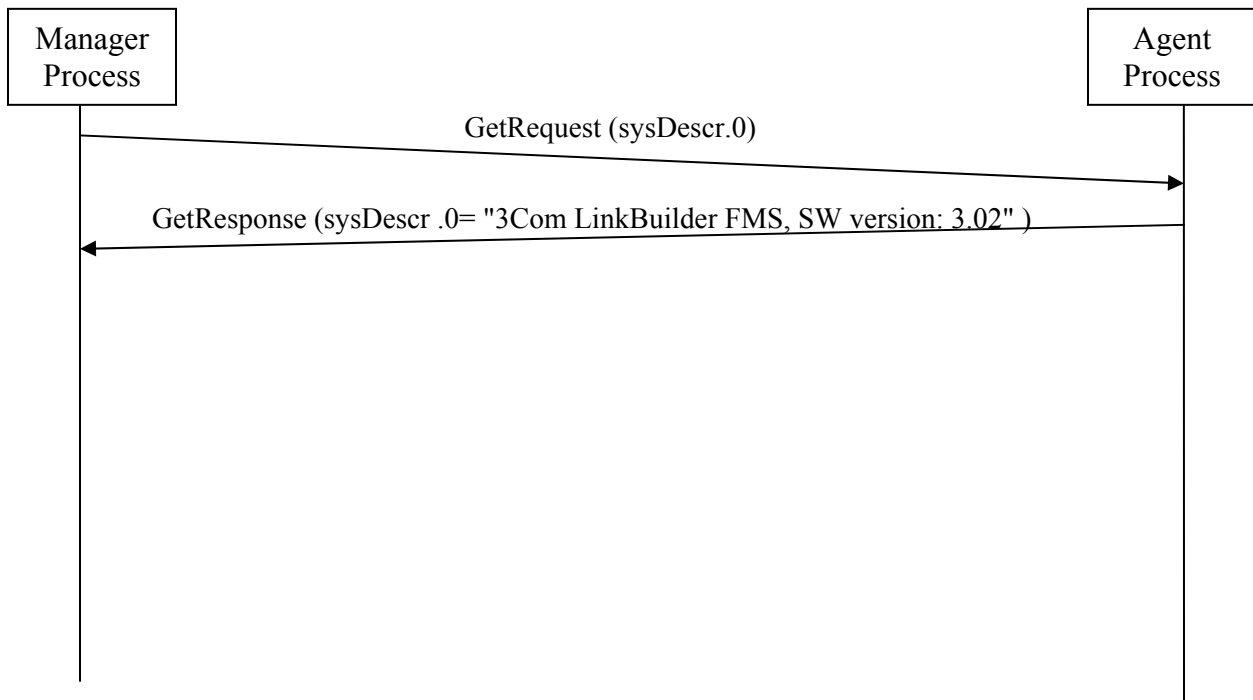
- The get-request PDU (with request id set to 100), and
- The get-response PDU where the interface type is Ethernet and the system offers layer 3, 4 and 7 services. The agent has been running for one hour.

**Q9.** The following is the system information on 172.16.46.2 Hub

Title: System Information: 3com\_hub1  
Name or IP Address : 172.16.46.2

System Name : 3com\_hub1  
System Description : 3Com LinkBuilder FMS, SW version: 3.02  
System Contact : Mr. Ahmad Mohammad  
System Location : Lab22-413  
System Object ID : .iso.org.dod.internet.private.enterprises.43.1.8.5  
System Up Time : (2475380437) 286 days, 12:03:24.37  
System Services : 6

An SNMP manager obtains information about this hub by sending queries to the hub’s SNMP agent to get the values of the objects under the MIB-II System group. Complete the following message sequence diagram using only GetNextRequest and GetResponse messages.



**Q10.** The following is an address translation table. The objects *atIfIndex* and *atNetAddress* are the indices that uniquely identify each row.

<b>atIfIndex</b>	<b>atPhysAddress</b>	<b>atNetAddress</b>
21	0000000C3920BA	192.168.3.1
1	0000000C3920AC	172.16.47.1
312	0000000C3920AF	172.16.43.1
20	0000000C3920BD	172.16.42.1

An SNMP manager collects information about this table by sending queries to an SNMP agent. Show the message exchanges by completing the entire following sequence diagram using only `GetNextRequest` and `GetResponse` messages until you get the values of all the rows in the table.

