CpE/NIS 654 - Design and Analysis of Network Systems
Homework 05 – Fall 2017

In answering these problems, please use your arguments liberally in support of your answers. Discussions in justification of your answers is often more important than an answer itself.

Problem 1. Your boss has asked you to budget money for designing a network for your enterprise. You have allocated 30% of the budget for Network Management. Your boss needs your justification for this line item. Please write a memo to your boss justifying your request.

Hint:
This is an open-ended question, primarily to help you develop an appreciation for NM and to study how it is implemented. Before doing this exercise, please read Chapter 7 of Text on Network Management Architectures to better grasp the importance of NM in the design of a network, and to learn the mechanisms available to you to implement it. Your memo may include some the following:

- Why do you necessarily need NM, pros and cons if you didn't have NM.
- What mechanisms, protocols, product enhancements (e.g., MIBs, NM protocol support) you would need to have an effective network management system for your network.

Problem 2 (Exercise 1, Chapter 7)*: What are the layers of Network Management? Give an example of management at each layer, i.e., what is managed by that layer and how it is managed.

Hint: please try to use this exercise to get an appreciation for how the layering architecture in NM helps with the management the networks, as OSI layering helps with the design and development on networks.

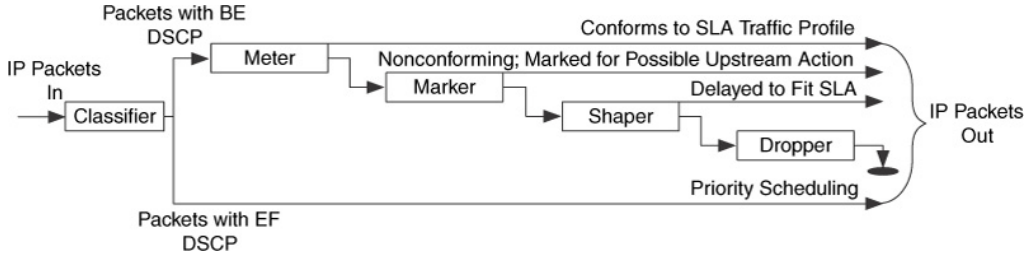
Problem 3: DiffServ and **IntServ** are two mechanisms often used to provide QoS in IP networks. Please briefly describe these two mechanisms. Also, what may be issues, pros and cons, in deploying these mechanisms for customer traffic consisting of both voice and data under the following situations:

1. The network consists of a single autonomous system under client's control.
2. The network consists of several LANs interconnected by a backbone WAN where the LANs are under the clients administrative control but the WAN is managed by an ISP.

Problem 4. Based on **Exercise 4, Chapter 8 (page 356)*:**
Figure 8.5 in text, as below, shows the five traffic conditioning functions: *classification, marking, metering, shaping, and dropping.* For a network carrying voice and data traffic (only two traffic types here), outline how the process of traffic conditioning, using above five conditioning functions

*Chapters refer to the text book for the course: James D. McCabe, "Network Analysis, Architecture and Design", Third Edition, Morgan Kaufmann Publishers.

with DiffServ would be applied to this requirement. Assign a DiffServ Code Point (DSCP) to each traffic type.



Problem 5: For this Problem, Exercises 2, Chapter 9 from the text, pages 382*, refer to Figure 9.16 as below:

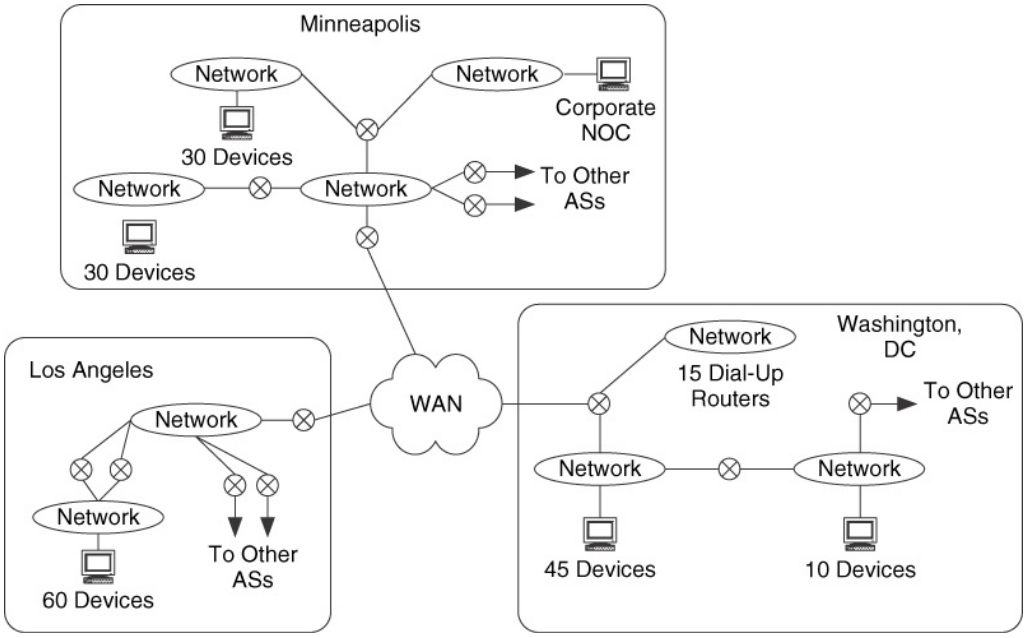


Figure 9.16

Apply the security mechanisms from this chapter to support the following requirements. Show where each mechanism might be applied.

a. An intranet between each of the routers connected to the WAN.
b. Remote access security for each of the 15 dial up routers connected to the LAN in Washington, DC.
c. All traffic flows between Los Angeles and Minneapolis must be encrypted.

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