**Learning Tips for Chapter 10**

The first part of this chapter focuses on network design and the second part focuses on network management. Neither of these topics can be adequately understood or appreciated without awareness of what enterprise networks include. This is why these topics are considered in the tenth chapter of the book.

Enterprise networks are continually evolving in response to advancing technologies and communication requirements, but it is important for the evolution to take place in a systematic manner, rather than haphazardly. It is important to be aware of the factors that pressure enterprise networks to change as well as network design realities that serve as guardrails for changes that are made.

Network lifecycle models such as the PPDIOO illustrate the connections between network design and network management activities. Hence, it is important to be aware of what network lifecycle models encompass.

Network design usually involves a sequence of steps that begins with determining requirements for the “new” network and ends with an implementation plan. This chapter describes a five-step network design process, and it is important for you to have a general understanding of what each step involves. Modular enterprise architecture diagrams and the three-layer hierarchical model are often valuable to network designers.

Both business and technical requirements are important for enterprise network design projects because enterprise networks support business applications that support the business. Business and IT managers have important roles in determining network goals and requirements. Usually, availability, scalability, security, and manageability are identified as important network design goals, and it is important for you to understand their meanings. Usability, adaptability, affordability, and improved network performance are other common network design goals.

It is typically valuable for designers to rank/prioritize network design goals in consultation with business and IT managers and tradeoffs often to be made. An easy to remember tradeoff is one between security and affordability. Investing in security can make a network less affordable, while not investing in security can make the network more vulnerable to attacks.

It is important to remember that that network baseline measurements are taken when the current network is assessed. These are compared to network performance measures taken after the “new” network is implemented to verify whether network design goals have been achieved.

After network requirements and network goals are determined and after the current network has been assessed, designers develop logical and physical designs for the new network and determine what current infrastructure can continue to be used and what needs to be replaced or added. When the hardware, software, protocols, and services details are finalized, implementation plans can be developed.

Over time, several network design best practices have emerged, and it is valuable for you to understand what these are.

After the “new” network is implemented, it must be managed and maintained until the next iteration of network design takes place. It is important for you to have a general understanding of network management and to understand the differences between reactive, proactive, and predictive network management. It is also important for you to understand NMS and network architecture components, network management protocols, and their roles in monitoring and managing a network.

The FCAPS model is a convenient vehicle for categorizing network management activities and it is important for you to have a general understanding of what each category encompasses.

It is also important for you to have a general understanding of network audits, especially network security audits, and their role in network management.

SDN has emerged as an important aspect of network management in many organizations, and it is valuable for you to understand why. UEM and UES are other important network management tools that you need to be familiar with.

Do not ignore the Key Concepts in Chapter 10 Presentation.

You are also encouraged to leverage the supplement videos and readings for this chapter.

Use the Chapter 10 Problems and Exercises tips to assist with any problems and exercises that you may be assigned.

The appendices for Chapter 10 provide additional information on numerous topics in this chapter.

**Especially Important Sections**

Section 10.0 and 10.1

Section 10.2.2 and its subsections

Section 10.3 and each of its subsections

Sections 10.4 and 10.5

Section 10.5.1 and its first two subsections

Section 10.5.2

Section 10.5.3 and each of its subsections

Sections 10.6 through 10.8

**Especially Important Figures and Tables**

*Note:* It is important to read/study the discussion related to each figure and table that is identified.

Figure 10-1 and Table 10-1

Figure 10-4

Tables 10-3 and 10-4

Tables 10-5 and 10-6

Figure 10-6

Figure 10-7

Table 10-8

Figure 10-8 and Table 10-9

Figure 10-9 and Table 10-10

Table 10-12

Table 10-13

Table 10-14

Figure 10-11

Table 10-16

Table 10-17

**Especially Important Key Terms**

Manageability

Network auditing

Network management (NM)

Network management system (NMS)

Network utilization

Predictive network management

Proactive network management

Software-defined networking (SDN)

Unified endpoint management (UEM)

User management

**Especially Important Review Questions**

Questions 1-4, 9-18, 20-27, 31-35

**Especially Valuable Problems and Exercises**

Exercises 10-1, 10-3