Teacher’s Notes

Chapter 1: Welcome to the Cloud

# Role in the Course

In Chapter 1, your students will learn core concepts and terminology that you will use throughout the course and in your career. They will learn about messaging, which is the heart of network operation. They will also learn the five-layer architecture for standards that we will see throughout the book.

# Material Covered

The chapter begins with basic networking, including why networks are drawn as clouds, hosts, addresses, the Internet, Internet service providers, transmission speed, and service level agreements. Much of this material is introduced in the context of how Netflix uses the cloud in order to make these concepts more concrete.

Messages lie at the heart of networking. Students will learn about fragmentation, multiplexing, frames, packets, and other central message concepts.

The chapter then discusses single networks, including point-to-point, switched, and wireless networks. There will be a strong focus on how switches forward frames. Having looked at single networks, they will see how to bring single networks together into large internets, including the global Internet. The focus will be on packets and routers.

Networks require standards, ranging from how electrical signals flow over a wire to how HTTP retrieves webpages. These standards appear in one of five layers.

# Hard Parts

Nothing in the chapter is technically difficult.

Some students struggle learning metric (SI) notation. It helps to teach them that to multiply by 1,000, they should move the decimal point right three places. Do the opposite to divide by 1,000.

It is important for students to ask themselves whether they are talking about single networks or internets when they learn concepts in the center of the chapter. It is also important to ask what single network technology they are dealing with if they are dealing with a single network. They need to get a framework in their minds, or it will all be a buzzing confusion.

Layered standards are challenging to everyone. The concept is simple, but it is novel and so slippery to learn and easy to unlearn. In learning layers—and afterward throughput the book—students should ask themselves what layer they are dealing with. Compounding things, they have to learn differences between OSI and ISO and between TCP, IP, and TCP/IP. Don’t rush. Give them a strong foundation here. Talk about the while, then look at pieces, then look at the whole again, and, well, you know.

# CEPTs

Central concepts are things that are central to the chapter or to the book. You are likely to see them a lot later. Among the CEPTs in this chapter are hosts, speed units, layers, and the difference between single networks and internets.

# Teaching Suggestions

I am in communication with my students before the semester begins. I use this to assign them homework due on the first day of class. I assign them selected letter parts of Test Your Understanding questions 1 through 10 from the large section on cloud computing with Netflix, Amazon, and Google. We then go over the questions in the first class. It’s a good way to learn names and get discussions started. By having them prepare and answer specific questions, they are more confident to talk.

I also like to ask them about cloud services they may be using, such as cloud versions of Office and drop box. Ask them what they like about it and what they don’t.

The rest of the chapter needs good lecture support. It is important to keep moving between framework and details.