

CCENT Study Guide 1

Section 9.1 Troubleshooting Methodologies and Tools.

As you work through this troubleshooting chapter, you can review the material necessary to prepare you to obtain a CCENT certification. To obtain a CCENT certification, you must pass the 640-822 ICND1 examination. These study guides provide a method to organize your review based on the ICND1 exam objectives.

OSI and TCP/IP Models

Objective: Use the OSI and TCP/IP models and their associated protocols to explain how data flows in a network

Information and activities that will help you meet this objective are found in the following areas of the Discovery 1 and 2 Curriculum:

Discovery 1 Review Chapters:

Network Services: The use of models to visualize the operation of various devices and protocols is introduced in the **Network Services** chapter. Pay close attention to the **Layered Model and Protocols** section, especially the animations in the **Protocol Operation of Sending and Receiving a Message** topic.

Troubleshooting Your Network: The **Approaches to Troubleshooting** topic introduces the various troubleshooting methodologies that use the OSI and TCP/IP model as a basis.

Discovery 2 Review Chapters:

The Help Desk: Using the OSI and TCP/IP models as a framework for troubleshooting network problems is first introduced in the **Help Desk** Chapter. **The OSI Model** section reviews the functions that occur at each layer and describes troubleshooting scenarios at each layer. The various troubleshooting methods (top down, bottom up, and divide and conquer) are reviewed in the **Help Desk** Chapter.

Troubleshooting: This chapter further reviews the OSI Model functionality in the section **Troubleshooting Methodologies and Tools**. It also includes additional information about the three troubleshooting methodologies.

Objective: Describe the purpose and basic operation of the protocols in the OSI and TCP models

Information and activities that will help you meet this objective are found in the following areas of the Discovery 1 and 2 Curriculum:

Discovery 1 Review Chapters:

Connecting to the Network: The concept of protocols and their uses is first introduced in this chapter. The section **Communicating on a Local Wired Network** describes the Ethernet Layer 2 protocols and frame formats.

Network Services: The section titled **Clients/Servers and Their Interaction** describes the important protocols needed for client/server communications. This section introduces the concept of Transport Layer port numbers to identify different conversations. Review the port numbers that are commonly used by the different Application Layer services.

Discovery 2 Review Chapters:

ISP Services: The section ***Protocols That Support ISP Services*** contains critical information on the various protocols, the layers at which they operate, and how these protocols control and regulate the transmission of data between two hosts. Pay close attention to the differences in the operation of the Transport Layer protocols: TCP and UDP. Common Application Layer protocols are discussed in detail in this chapter, as well.

Practice Activities:

1. Create a chart of the various layers of each model. Include the primary functions and protocols commonly associated with each layer.
2. List the process of encapsulation, including the Protocol Data Unit (PDU) at each layer: Data, Segment, Packet, Frame, Bit.
3. List the addressing information added in each header during process of encapsulation, and at which layer of the OSI and TCP/IP models the address information is added.
4. Build an Ethernet Frame, labeling each encapsulated header.
5. Diagram the process of initiating a TCP session between two hosts.
6. List the OSI model layers that are commonly associated with different networking devices (routers, switches, hubs, NICs, cables, etc.).
7. Define the three troubleshooting methodologies and when you would use each one.
8. Make a chart of all of the common Application Layer services and which Transport Layer ports are associated with each.

Troubleshooting Tools

Objective: Interpret network diagrams

Information and activities that will help you meet this objective are found in the following areas of the Discovery 1 and 2 Curriculum:

Discovery 1 Review Chapters:

Connecting to the Network: Network diagrams are first introduced in the section *Introduction to Networking*. The difference between a logical and physical topology diagram is presented in the topic *Network Topologies*.

Discovery 2 Review Chapters:

Planning a Network Upgrade: The process of creating logical and physical network topology diagrams, and the different types of wiring topologies are discussed in the *Documenting the Existing Network* section.

Practice Activities:

1. Refer to the sample logical and physical diagrams from the curriculum and create a list of the information you can obtain from each type of diagram.
2. Using your classroom network, or a network at your school or place of employment, create a logical and physical diagram.
3. List the characteristics of the different types of physical wiring topologies: star, extended star, partial mesh and full mesh.