Objectives:

- Explain the advantages of using a layered model to describe network functionality.
- Describe the role of each layer in two recognized network models: The TCP/IP model and the OSI model.
- Describe the importance of addressing and naming schemes in network communications.

Intro: ACME Inc is a small company which sells a wide variety of all-purpose equipment. The company started in a small way, but has grown in the last few years.

Due to the growth in business, many ACME Inc. employees need to have access to vital internal information (product databases, customer profile, shipment information, etc) more often than in the past. Since the employees need a better way to access this information, ACME Inc. needs to get its computers connected to each other. In short, it needs a Computer Network!

You were hired to design the new ACME Inc. network project. After a quick talk and verification on the ACME Inc. site, you concluded a very simple network project is enough at this point. Since the company projects future growth, the network structure must focus on scalability. You also know that a simple but efficient project like the one you envisage will assure future contracts between you and ACME Inc.

Task 1: Because the number of people working on the projects are getting bigger within ACME Inc. a server must be setup to store the company's internal information (such as product databases, customer profile, shipment information, etc), allowing ACME's employees to have faster access to it.

At the moment ACME Inc Office has 11 computers and 1 server. Your first task is to design a network project (the physical topology) to provide access from any of the 11 ACME computers (named ACME01 to ACME11) to each other AND to the server (named ACME_Server1). Notice that NO internet access is needed at this point.

Hint: Scalability is vital! ACME Inc. is growing fast and because of that, their network will grow fast too. The more scalable your project is, the easier the network growth will be.

Obs: Don't worry about an address scheme for now, focus on the physical topology.

The topology should be similar to a hub and spoke topology, either with a switch or a hub as the central device.

Task 2: ACME Inc network is a very simple local network (LAN) since it has only one segment (only one broadcast domain). Based on your understand of the OSI layer model, is an *OSI-network-level* (layer 3 of the OSI protocol stack) addressing scheme necessary? Explain.

It is not necessary. Since the topology has only one segment, only one addressing scheme is necessary because no packets will be sent out of the segment.

Task 3: Eight months has passed since your last project on ACME Inc. and now the company is contacting you again. Your project is fine and has been implemented but, as expected, ACME Inc's growth made Internet access necessary. Since you are their first option to make that happen, your new task is to update ACME's network project and connect the company to the internet. Because of your previous focus on network scalability, this task will be accomplished quickly.

If a hub-and-spoke structure was used, simply add a router (or another layer 3 device) to one of the ports of the switch/hub. After configuring the router on the external link and the clients to use the new router as the default gateway, internet access will be achieved.