Real World Scenario & Lesson Companion

Real World Scenario

OSI Model

Read the scenario. Then, use this guide as you work through the lesson. Answer the questions to help you connect your learning to the scenario.

Scenario:

The Integration Equation

You are an IT network administrator at a large logistics company, Luminary Logistics. The company has recently acquired a new subsidiary that specializes in the transportation of perishable goods. The subsidiary has its own network infrastructure, which is incompatible with the existing network infrastructure of the parent company.

Your task is to design a new network infrastructure for Luminary Logistics that can integrate the subsidiary's network with the parent company's network, ensuring that all devices are able to communicate with each other seamlessly and securely.

In order to do this, you will need to identify the devices and protocols required for each layer of the OSI model, determine the devices needed for each layer, and select the appropriate protocols to be used at each layer. You will also need to consider how the OSI model compares to the TCP/IP model, and determine which model will be best suited for the company's network infrastructure.

Your goal is to create a network infrastructure that meets Luminary Logistics' requirements and supports its operations. Apply the knowledge you have learned in this lesson to address the scenario and provide an implementation plan for the company.

–ASSESS WHAT WE HAVE AND WHAT NEED TO INTEGRATE INTO THE NEW SYSTEM

Task 1: Define the Dependencies

What skills or knowledge must be acquired before tackling the scenario?
Who are the stakeholders that may be impacted by the scenario and how?
What ethical considerations must be taken into account when dealing with the scenario?

Task 2: Assess the Needs

What is the purpose of the scenario and what needs does it aim to address?

What ethical considerations must be taken into account when addressing the needs of the scenario?
How can the scenario be evaluated to determine whether the identified needs have been effectively addressed?

Task 3: Create an Implementation Plan

What stakeholders (e.g., customers, employees, shareholders, regulators) must be considered when implementing the solution and how can their needs be addressed?
What is the timeline for implementing the solution and why should you stick to this timeline?
What ethical considerations must be taken into account when implementing the solution?
How can the implementation plan be evaluated to determine whether the solution was effective in addressing the scenario?**Lesson Companion**

OSI Model

Use this lesson companion to help you retain and synthesize the information that is integral to your progress. As you engage with the lesson material alongside your instructor, take note of key points and extract pertinent details.

Seven Layers

What is the Open System Interconnection (OSI) model?
Fill in the chart about the 7 layers of the OSI Model.

Layer Number and Name	**Description**
7: Application	Browsers, Word Processors, SSH, FTP
6: Presentation	Translation Data from Application to Network
5: Session	Responsible for creating a session between devices
4: Transport	TCP & UDP – Coordinates the connection
3: Network	Routes, IP’s, VLAN
2: Data Link	MAC address & Logical Links
1: Physical	Ethernet Wireless Fiber

Data moving downward gets encapsulated and data moving back up the stack gets decapsulated.

Real World Scenario Connection
At which layer of the OSI model should Luminary Logistics' routers be configured to ensure that data is transmitted to the correct destination? What layer of the OSI model is responsible for creating and managing sessions between devices and how can this layer be utilized to improve network performance and efficiency for Luminary Logistics' operations?

Write your favorite acronym to memorize the OSI layers.
What is data encapsulation and what real world example can you use to understand this process?

Devices Per layer

Fill in the chart about devices at each layer.

Layer	**Devices**
Application	DNS, DHCP, HTTP, HTTPS – Servers Firewalls
Presentation	Data Translation & Encryption Decryption – Load Balancers
Session	Establish Manage Terminate Comms between ^ – Load Balancers Computers Firewalls
Transport	TCP UDP devices to provide reliable end-end comms. VOIP – Gateways
Network	Routers / Packets
Data Link	MACs / Switches / Frames
Physical	Cables, Lines, NICs, Data in Transit

North – Into internet
South – From Internet
East - West – inside systems (HR -> Finance)

Real World Scenario Connection

What upper layer devices would you recommend for Luminary Logistics to ensure reliable communication between the parent company and the newly acquired subsidiary? Gateway & Routers on both ends

Which types of transport layer devices should be used to ensure that all devices on both networks are able to communicate with each other seamlessly and securely? Firewalls

Which network layer devices would you recommend for Luminary Logistics to ensure that the data packets are routed correctly between the parent company and the subsidiary? Routers

Protocols Per Level

Define Transmission Control Protocol (TCP).
Definite User Datagram Protocol (UDP).
List six differences between TCP and UDP.

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Which protocol, TCP or UDP, will be best to integrate for Luminary Logistics' new network? Why?

Describe the three-way handshake.
List the four steps that comprise the session termination stage of a TCP connection.
What are logical ports?
Fill in the chart about logical port groups.

Logical Port Group	Description
Well-Known Port	
Dynamic & Private Port	

ICMP – PING – TRACERT – Echo Responses

What command should be used to inspect open ports?

Real World Scenario Connection

What are some common protocols and ports that should be allowed through the Luminary Logistics Firewall to ensure communication between the subsidiary and parent company networks? Ssh smtp

As part of your network security plan, you want to view open ports on the Luminary Logistics network. What tool or command can you use to view open ports and associated processes on a Windows server? netstat

OSI vs. TCP/IP Model

Fill in the chart to describe the differences between the OSI and TCP/IP models.

Model	**Description**
OSI	7 layers
TCP/IP	4 layers – darpa 1982

Fill in the chart about TCP/IP model layers.

Layer	**Description**
4: Application	Condenses the OSI top layers into
3: Transport	Flow control, how much data send, rate, destination
2. Internet	Network Layer on OSI 2&3
1: Network Access	Physical Layer MACs NIC

Real World Scenario Connection

Which applications would be required at the application layer to enable communication between the parent company and the subsidiary's network?

Which devices and protocols would be necessary at the network access layer to ensure seamless communication between the devices on the two networks?

Should you implement an OSI or a TCP/IP model for Luminary Logistics' new network? Why?