Chapter 3: Transportation/Application Layers

Outcome

1. You'll be able to have deep understanding in Transport and Application Layer.

2. You'll be able to describe TCP ports and sockets and identify the different components of a TCP header.

3. You'll also be able to show the difference between connection oriented, and connection lists protocols, and explain how TCP is used to ensure data integrity.

4. You should be able to describe what multiplexing and demultiplexing are, and how they work.

5. You'll be able to identify the differences between TCP and UDP, explain the three way handshake, and understand how TCP flags are used in this process.

6. You'll be able to describe the basics of how firewalls keep networks safe.

3.1 Transport/Application Layers - Intro

- In the previous layers, we were able to understand how nodes are able to communicate each other in a network.
- We now , want to understand how applications or programs installed on the network nodes communicate with each other.
- This is where Transport and Application Layers come into play.
- Transport layer allows traffic to be directed to specific network applications.
- Application layer allows these applications to communicate in a way they understand.

3.2 The Transport Layer

- Responsible for lots of important functions of reliable computer networking.
- The transport layer has the ability to multiplex and demultiplex.
- Multiplexing means that nodes on the network have the ability to direct traffic towards many different receiving services.
- Demultiplexing is the same concept, just at the receiving end, it's taking traffic that's all aimed at the same node and delivering it to the proper receiving service.
- A port is a 16-bit number that's used to direct traffic to specific services running on a networked computer.
- Full IP and port in this scenario could be described as 10.1.1.100:80 . When written this way, it's known as a socket address or socket number.

Quiz Time

Network security students, accessing the ftp site whole at the same time without any access issue. What process in transport layer is at play in making sure all students are able to access the ftp site without issues?

A. Multiplex Process

B. Demultiplex Process

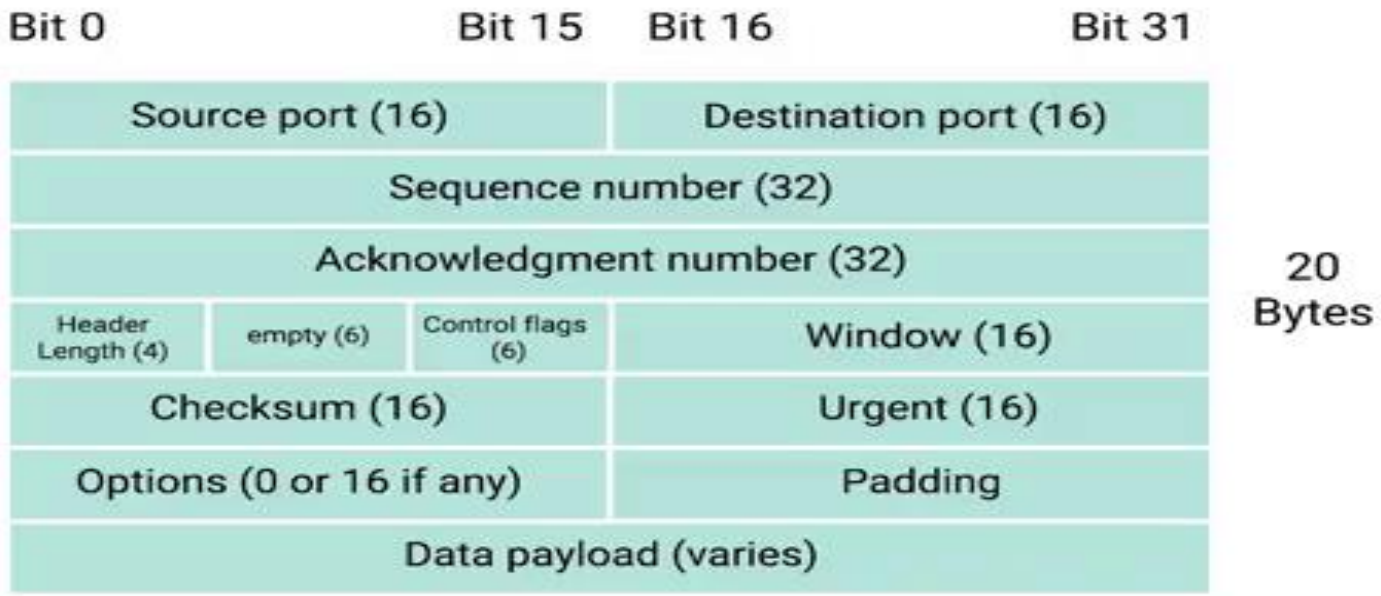
C. Both A and B

D. None of the above

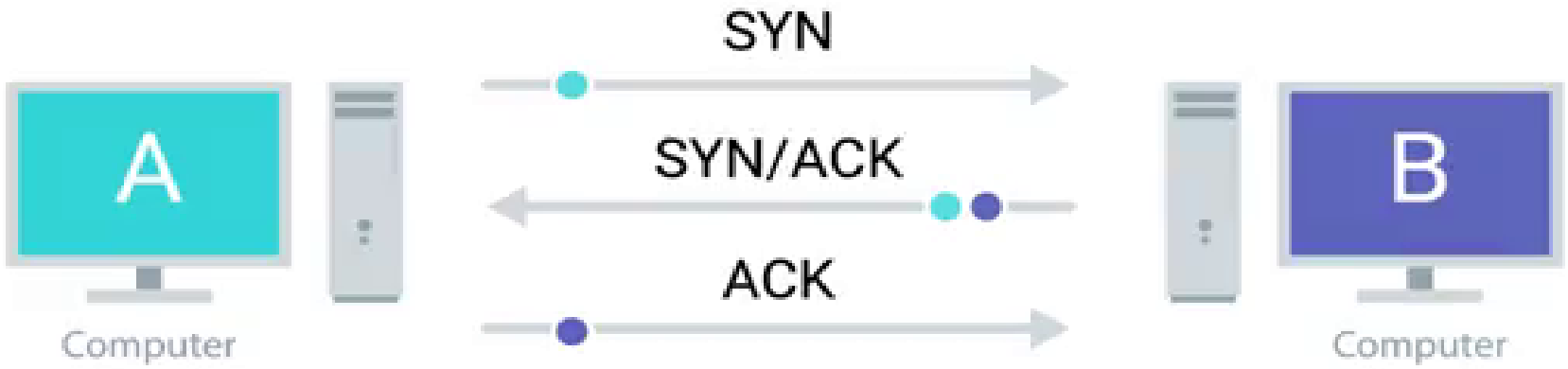
Correct Answer: B

3.3 Dissection of a TCP Segment

A TCP segment is made up of a TCP header and a data section.



3.4 TCP Control Flags and the Three-way Handshake



3.5 Firewalls

- A firewall is just a device that blocks traffic that meets certain criteria
- You can implement a **firewall** in either hardware or software form.
- Firewalls are commonly used at the transportation layer.
- Firewalls that operate at the transportation layer will generally have a configuration that enables them to block traffic to certain ports while allowing traffic to other ports.

Questions ???

Now, we can finally describe about how those actual applications send and receive data using the application layer.