

## Module Practice and Quiz

15.6.1

### What did I learn in this module?



#### Application, Presentation, and Session

In the OSI and the TCP/IP models, the application layer is the closest layer to the end user. Application layer protocols are used to exchange data between programs running on the source and destination hosts. The presentation layer has three primary functions: formatting, or presenting, data at the source device into a compatible form for receipt by the destination device, compressing data in a way that can be decompressed by the destination device, and encrypting data for transmission and decrypting data upon receipt. The session layer creates and maintains dialogs between source and destination applications. The session layer handles the exchange of information to initiate dialogs, keep them active, and to restart sessions that are disrupted or idle for a long period of time. TCP/IP application layer protocols specify the format and control information necessary for many common internet communication functions. These protocols are used by both the source and destination devices during a session. The protocols implemented on both the source and destination host must be compatible.

#### Peer-to-Peer

In the client/server model, the device requesting the information is called a client and the device responding to the request is called a server. The client begins the exchange by requesting data from the server, which responds by sending one or more streams of data to the client. In a P2P network, two or more computers are connected via a network and can share resources without having a dedicated server. Every peer can function as both a server and a client. One computer might assume the role of server for one transaction while simultaneously serving as a client for another. P2P applications require that each end device provide a user interface and run a background service. Some P2P applications use a hybrid system where resource sharing is decentralized, but the indexes that point to resource locations are stored in a centralized directory. Many P2P applications allow users to share pieces of files with each other at the same time. Clients use a small file called a torrent file to locate other users who have pieces that they need so that they can connect directly to them. This file also contains information about tracker computers that keep track of which users have what pieces of which files.

#### Web and Email Protocols

When a web address or URL is typed into a web browser, the web browser establishes a connection to the web service. The web service is running on the server that is using the HTTP protocol. HTTP is a request/response protocol. When a client, typically a web browser, sends a request to a web server, HTTP specifies the message types used for that communication. The three common message types are GET, POST, and PUT. For secure communication across the internet, HTTPS uses the same client request-server response process as HTTP but the data stream is encrypted with SSL before being transported across the network. Email supports three separate protocols for operation: SMTP, POP, and IMAP. The application layer process that sends mail uses SMTP. A client retrieves email using POP or IMAP. SMTP message formats require a message header and a message body. While the message body can contain any amount of text, the message header must have a properly formatted recipient email address and a sender address. POP is used by an application to retrieve mail from a mail server. With POP, mail is downloaded from the server to the client and then deleted on the server. With IMAP, unlike POP, when the user connects to an IMAP-capable server, copies of the messages are downloaded to the client application. The original messages are kept on the server until manually deleted.

#### IP Addressing Services

The DNS protocol matches resource names with the required numeric network address. The DNS protocol communications use a message format for all types of client queries and server responses, error messages, and the transfer of resource record information between servers. DNS uses domain names to form a hierarchy. Each DNS server maintains a specific database file and is only responsible for managing name-to-IP mappings for that small portion of the entire DNS structure. Computer OSs use nslookup to allow the user to manually query the name servers to resolve a given host name. DHCP for IPv4 service automates the assignment of IPv4 addresses, subnet masks, gateways, and other IPv4 networking parameters. DHCPv6 provides similar services for IPv6 clients, except that it does not provide a default gateway address. When an IPv4, DHCP-configured device boots up or connects to the network, the client broadcasts a DHCPDISCOVER message to identify any available DHCP servers on the network. A DHCP server replies with a DHCPOFFER message, which offers a lease to the client. DHCPv6 has a set of messages that is similar to those for DHCPv4. The DHCPv6 messages are SOLICIT, ADVERTISE, INFORMATION REQUEST, and REPLY.

#### File Sharing Services

An FTP client is an application which runs on a computer that is being used to push and pull data from an FTP server. The client establishes the first connection to the server for control traffic using TCP port 21. The client establishes the second connection to the server for the actual data transfer using TCP port 20. The client can download (pull) data from the server, or the client can upload (push) data to the server. Here are three functions of SMB messages: start, authenticate, and terminate sessions, control file and printer access, and allow an application to send or receive messages to or from another device. Unlike the file sharing supported by FTP, clients establish a long-term connection to servers. After the connection is established, the user of the client can access the resources on the server as if the resource is local to the client host.

15.6.2

## Module Quiz – Application Layer



1. On a home network, which device is most likely to provide dynamic IPv4 addressing to clients on the home network?

- a dedicated file server
- an ISP DHCP server
- a home router
- a DNS server

2. What part of the URL, <http://www.cisco.com/index.html>, represents the top-level DNS domain?

- http
- www
- .com
- index

3. What are two characteristics of the application layer of the TCP/IP model? (Choose two.)

- responsibility for physical addressing
- the creation and maintenance of dialogue between source and destination applications
- responsibility for logical addressing
- closest to the end user

4. What message type is used by an HTTP client to request data from a web server?

- GET
- POST
- PUT
- ACK

5. Which protocol can be used to transfer messages from an email server to an email client?

- SNMP
- SMTP
- HTTP
- POP3

6. Which application layer protocol is used to provide file-sharing and print services to Microsoft applications?

- SMB
- SMTP
- HTTP
- DHCP

7. Which three protocols or standards are used at the application layer of the TCP/IP model? (Choose three.)

- HTTP
- IP
- UDP
- GIF
- TCP
- MPEG

8. Why is DHCP for IPv4 preferred for use on large networks?

- Large networks send more requests for domain to IP address resolution than do smaller networks.
- It is a more efficient way to manage IPv4 addresses than static address assignment is.
- Hosts on large networks require more IPv4 addressing configuration settings than do hosts on small networks.
- DHCP uses a reliable transport layer protocol.
- It prevents sharing of files that are copyrighted.

9. An author is uploading one chapter document from a personal computer to a file server of a book publisher. What role is the personal computer assuming in this network model?

- slave
- master
- transient
- server
- client

10. Which statement is true about FTP?

- FTP does not provide reliability during data transmission.
- The client can choose if FTP is going to establish one or two connections with the server.
- The client can download data from or upload data to the server.
- FTP is a peer-to-peer application.

11. A wireless host needs to request an IPv4 address. What protocol would be used to process the request?

- FTP
- HTTP
- ICMP
- SNMP
- DHCP

12. Which TCP/IP model layer is closest to the end user?

- transport
- network access
- application
- internet

13. When retrieving email messages, which protocol allows for easy, centralized storage and backup of emails that would be desirable for a small- to medium-sized business?

- SMTP
- POP
- IMAP
- HTTPS

14. Which protocol uses encryption?

- DNS
- DHCP
- FTP
- HTTPS

15. Which two tasks can be performed by a local DNS server? (Choose two.)

- mapping name-to-IP addresses for internal hosts
- retrieving email messages
- providing IP addresses to local hosts
- forwarding name resolution requests between servers
- allowing data transfer between two network devices

Check

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