Web and Email Protocols

15.3.1

Hypertext Transfer Protocol and Hypertext Markup Language

There are application layer-specific protocols that are designed for common uses such as web browsing and email. The first topic gave you an overview of these protocols. This topic goes into more detail.

When a web address or Uniform Resource Locator (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. URLs and Uniform Resource Identifiers (URIs) are the names most people associate with web addresses.

To better understand how the web browser and web server interact, examine how a web page is opened in a browser. For this example, use the http://www.cisco.com/index.html URL.

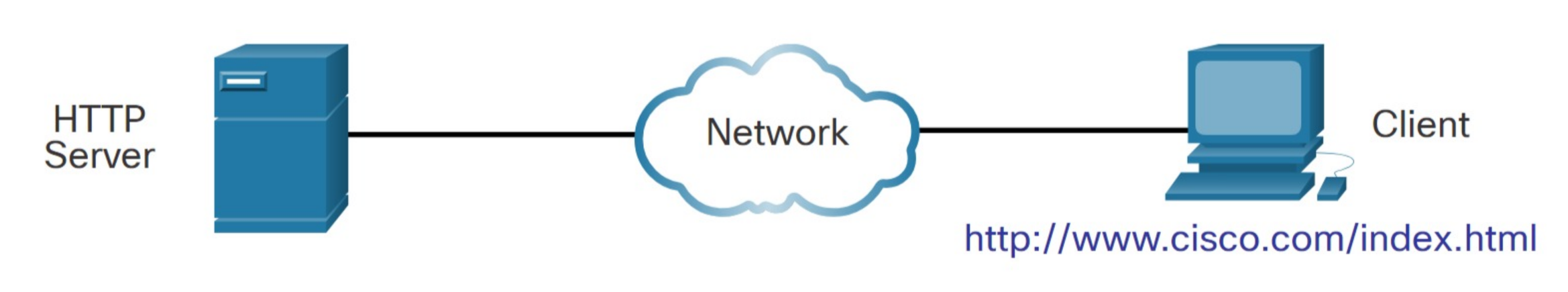
Click each button for more information.

Step 1 | Step 2 | Step 3 | Step 4

Step 1

The browser interprets the three parts of the URL:

- http (the protocol or scheme)
- www.cisco.com (the server name)
- index.html (the specific filename requested)

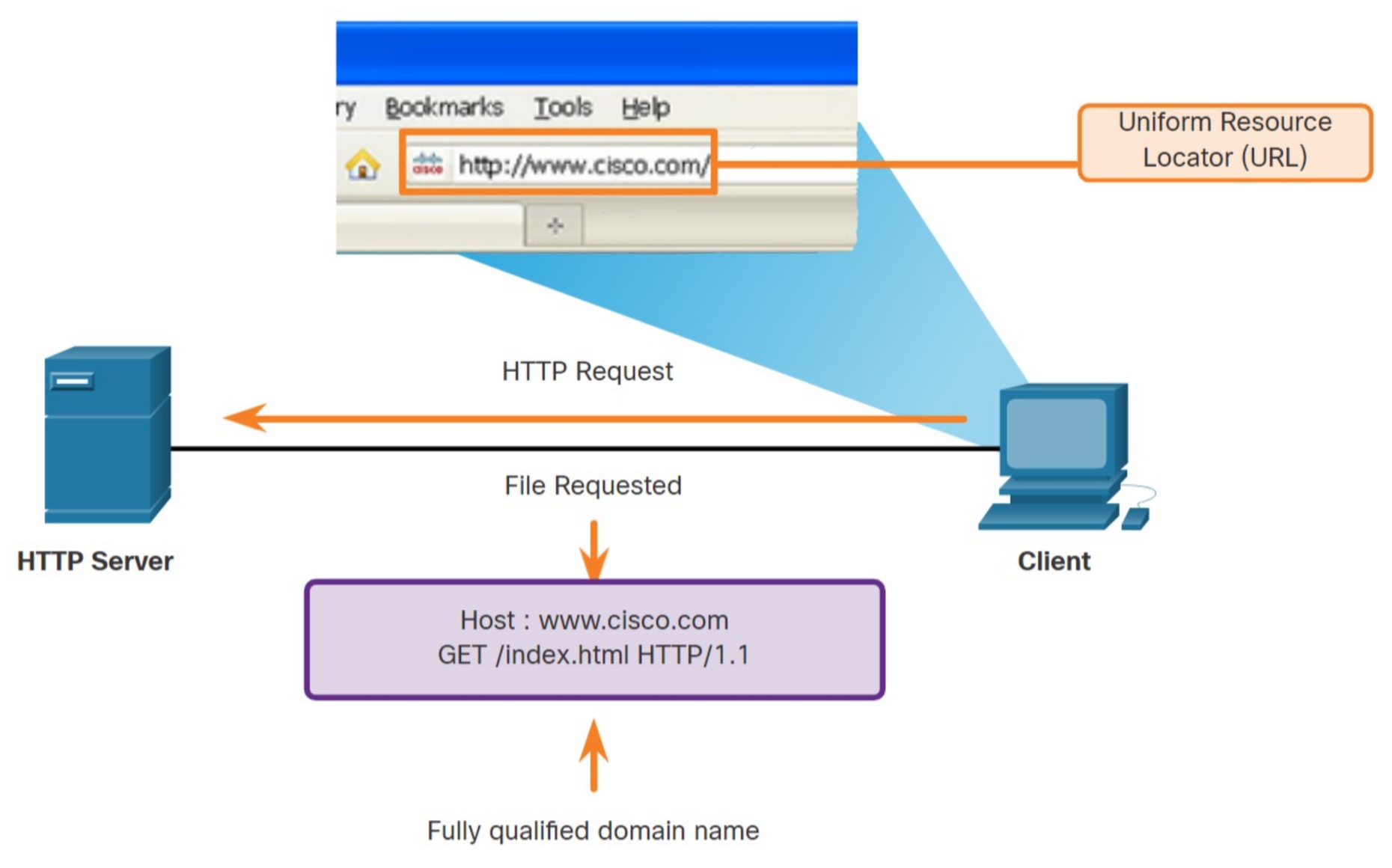


15.3.2

HTTP and HTTPS

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 (see figure), POST, and PUT:

- **GET** - This is a client request for data. A client (web browser) sends the GET message to the web server to request HTML pages.
- **POST** - This uploads data files to the web server, such as form data.
- **PUT** - This uploads resources or content to the web server, such as an image.



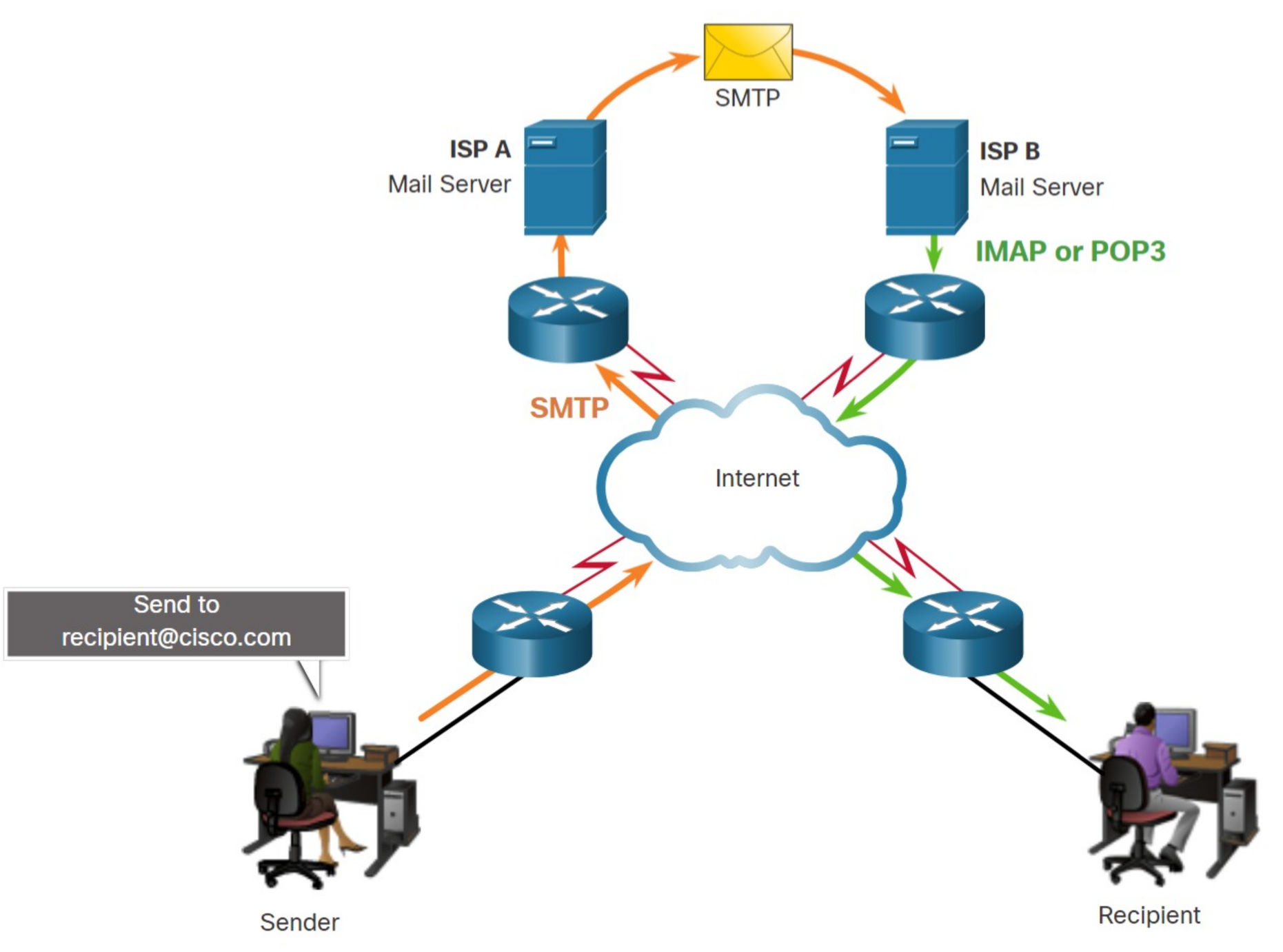
Although HTTP is remarkably flexible, it is not a secure protocol. The request messages send information to the server in plaintext that can be intercepted and read. The server responses, typically HTML pages, are also unencrypted.

For secure communication across the internet, the HTTP Secure (HTTPS) protocol is used. HTTPS uses authentication and encryption to secure data as it travels between the client and server. HTTPS uses the same client request-server response process as HTTP, but the data stream is encrypted with Transport Layer Security (TLS) or its predecessor Secure Socket Layer (SSL) before being transported across the network.

15.3.3

Email Protocols

One of the primary services offered by an ISP is email hosting. To run on a computer or other end device, email requires several applications and services, as shown in the figure. Email is a store-and-forward method of sending, storing, and retrieving electronic messages across a network. Email messages are stored in databases on mail servers.



Email clients communicate with mail servers to send and receive email. Mail servers communicate with other mail servers to transport messages from one domain to another. An email client does not communicate directly with another email client when sending email. Instead, both clients rely on the mail server to transport messages.

Email supports three separate protocols for operation: Simple Mail Transfer Protocol (SMTP), Post Office Protocol (POP), and IMAP. The application layer process that sends mail uses SMTP. A client retrieves email using one of the two application layer protocols: POP or IMAP.

15.3.4

SMTP, POP, and IMAP

Click each button for more information.

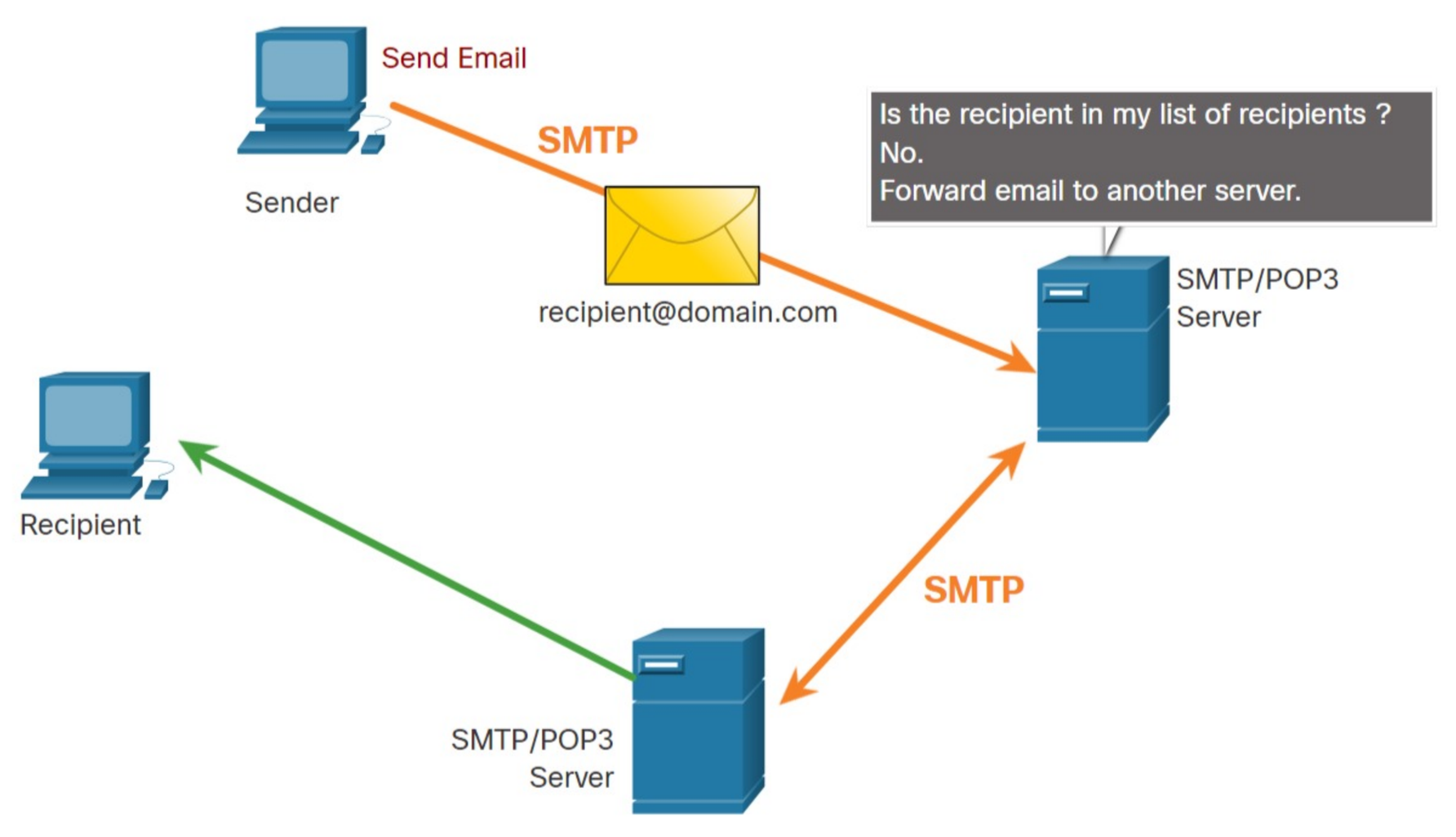
SMTP | POP | IMAP

SMTP

SMTP message formats require a message header and a message body. Although the message body can contain any amount of text, the message header must have a properly formatted recipient email address and a sender address.

When a client sends email, the client SMTP process connects with a server SMTP process on well-known port 25. After the connection is made, the client attempts to send the email to the server across the connection. When the server receives the message, it either places the message in a local account, if the recipient is local, or forwards the message to another mail server for delivery.

The destination email server may not be online, or may be busy, when email messages are sent. Therefore, SMTP spools messages to be sent at a later time. Periodically, the server checks the queue for messages and attempts to send them again. If the message is still not delivered after a predetermined expiration time, it is returned to the sender as undeliverable.



15.3.5

Check Your Understanding - Web and Email Protocols

Check your understanding of web and email protocols by choosing the BEST answer to the following questions.

1. This message type is used when uploading data files to a web server.
   - ( ) GET
   - (x) POST
   - ( ) PUT
2. This protocol is used by a web browser to establish a connection to a web server.
   - (x) HTTP
   - ( ) SSL
   - ( ) IMAP
   - ( ) SMTP
3. This protocol is used by a client to send email to a mail server.
   - ( ) POP
   - (x) SMTP
   - ( ) IMAP
   - ( ) HTTP
4. Which is a feature of IMAP?
   - ( ) It uploads email messages to a server.
   - ( ) It listens passively on port 110 for client requests.
   - (x) It downloads a copy of email messages leaving the original on the server.
5. True or false? HTTP is a secure protocol.
   - ( ) True
   - (x) False

Check | Show Me | Reset