Computer Networks

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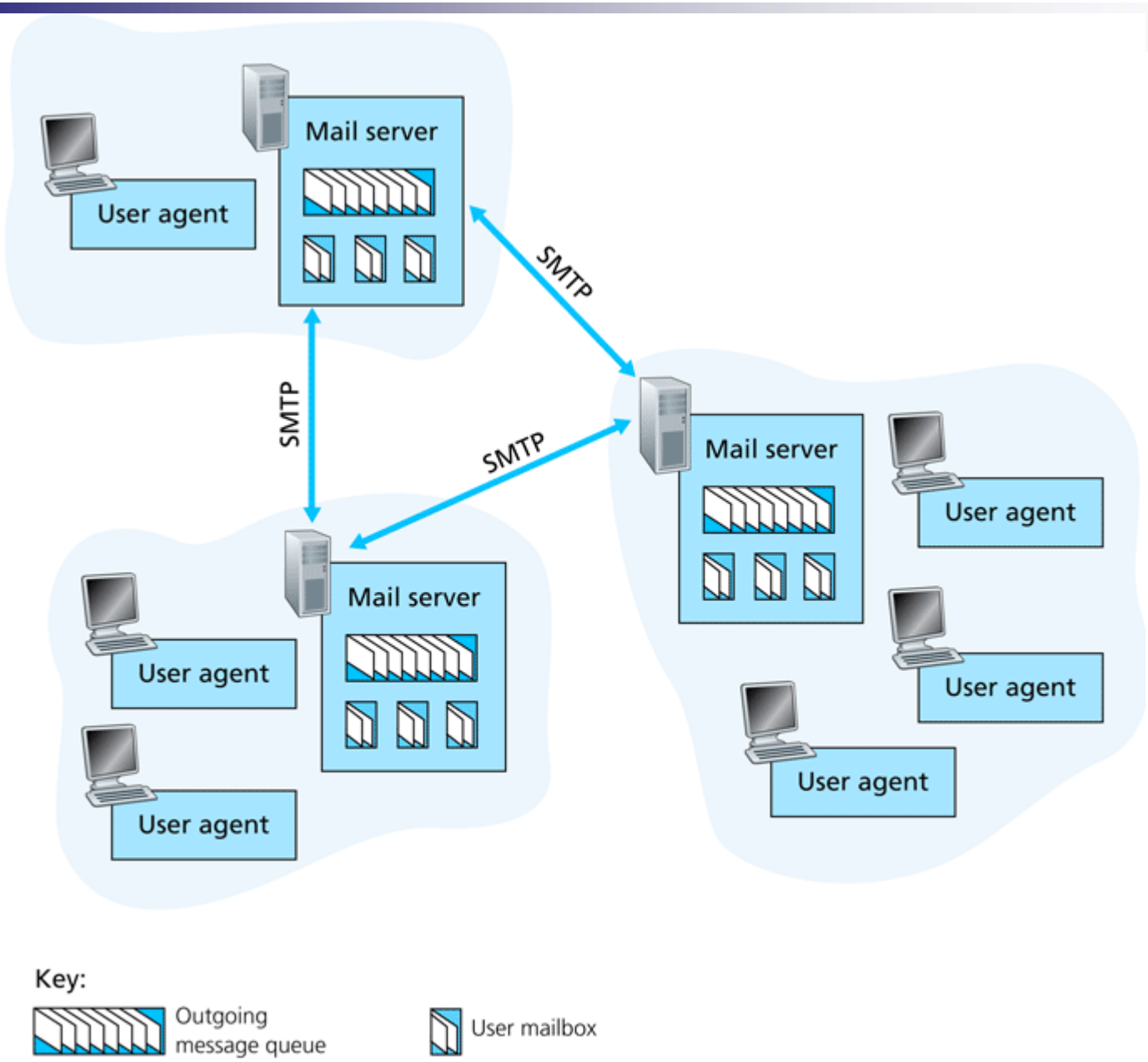

Figure 2.16 ♦ A high-level view of the Internet e-mail system

Email Pieces

- User Agents
- Mail Servers
  - Mailbox
  - Message queues
- SMTP

Email – A little history

- Ray Tomlinson
- QUERTYIOP
- SNDMSG
- Mailboxes
- @

SMTP Walk Through

- Alice invokes user agent, provides Bob's email address, composes the message, and sends it.
- Alice's user agent send the message to her mail server where it is placed in a message queue.
- The client side of SMTP, running on Alice's mail server, sees the message in the message queue and opens a TCP connection to an SMTP server, running on Bob's mail server.

SMTP Walk Through, cont.

- After some initial SMTP handshaking, the SMTP client sends Alice's message into the TCP connection.
- At Bob's mail server host, the server side of SMTP receives the message. Bob's mail server places the message in Bob's mailbox.
- Bob invokes his user agent to read the message.

Sample SMTP Session

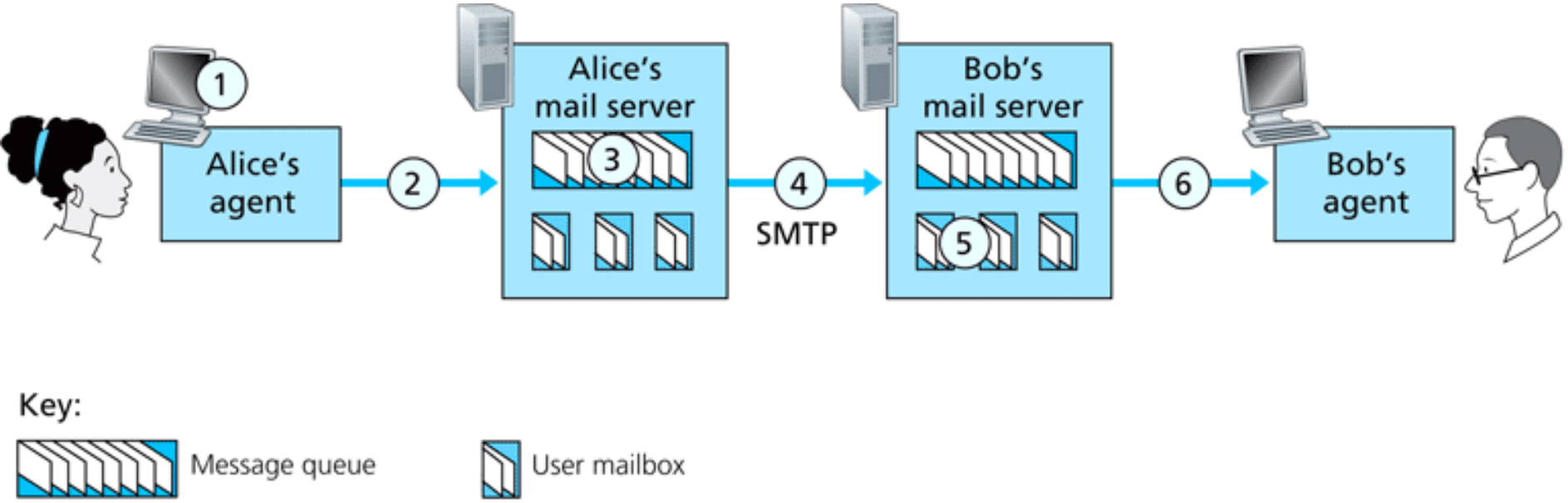

Figure 2.17 ♦ Alice sends a message to Bob

An SMTP Session

- Client establishes connection
- Server sends “220 READY FOR MAIL”
- Client sends HELO command
- Server identifies itself
- Communication established

An SMTP Session, cont.

- Sender: MAIL command
- Recipient: “250 OK”
- Sender: RCPT commands
- Recipient: “250 OK” or “550 No such user here”
- Sender: DATA command
- Recipient: “354 Start mail input”

Mail Server Supports

- Persistent Connections
- Forwarding
- Aliases

SMTP vs. HTTP

- Both protocols are used to transfer files
- Persistent connections
- Pull vs. Push protocol
- ASCII
- Responses

Mail Message Formats

- Header information (RFC 822)
- Blank line
- Body of message

MIME

- Multipurpose Internet Mail Extensions
- Extra headers
  - Content-Type:
  - Content-Transfer-Encoding:
- Types and subtypes
- Multipart
  - Boundary characters
- Received: header

Receiving Server

- Received: header
- Several mail servers

Sender Message

From: alice@crepes.fr
To: bob@hamburger.edu
Subject: Picture of yummy crepe.
MIME-Version: 1.0
Content-Transfer-Encoding: base64
Content-Type: image/jpeg

(base64 encoded data …….
……..
…….. base64 encoded data)

Receiver Message

Received: from crepes.fr by hamburger.edu; 12 Oct 98 15:27:39 GMT
From: alice@crepes.fr
To: bob@hamburger.edu
Subject: Picture of yummy crepe.
MIME-Version: 1.0
Content-Transfer-Encoding: base64
Content-Type: image/jpeg

base64 encoded data ……..
……..
…….. base64 encoded data

Mail Access Protocols

- POP3
  - Simple
  - Download & Delete
  - Three phases
- IMAP
  - More complex
  - Manipulate messages on mail server
- Web Browsers

- What protocol is best for retrieving E-mail for a mobile user that checks from multiple machines?
  1. POP
  2. IMAP
  3. HTTP
  4. SMTP

- What protocol is best for retrieving E-mail for a traveling salesperson that checks from the same laptop from many locations?
  1. POP
  2. IMAP
  3. HTTP
  4. SMTP

- What protocol is best for retrieving E-mail for a user that checks from one location?
  1. POP
  2. IMAP
  3. HTTP
  4. SMTP

E-mail Protocols

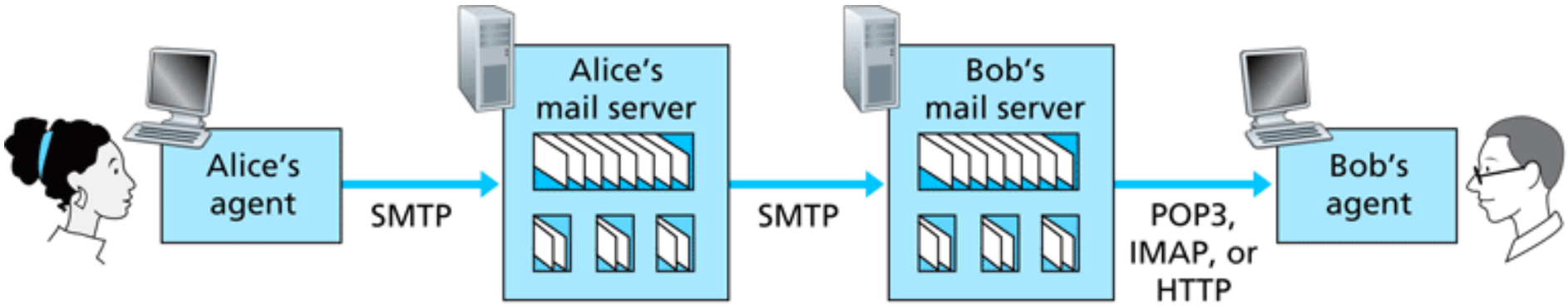

Figure 2.18 ♦ E-mail protocols and their communicating entities

Sample Session to cis