

CIS 457 - Data Communications

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Images taken from Kurose and Ross book

SMTP

Already know general structure of how email moves
through internet

Next, investigate protocol used to send messages:
SMTP

SMTP runs on TCP over port 25

Begins with **handshake** -- servers introduce themselves and sending server gives email addresses of sender and recipient

S: 220 hamburger.edu

C: HELO crepes.fr

S: 250 Hello crepes.fr, pleased to meet you

After handshake, actual message is sent

Message ends with . on its own line

Connection is persistent -- if another message is ready to send, sender can keep going

When all messages sent, close TCP connection

```
C: MAIL FROM: <alice@crepes.fr>
S: 250 alice@crepes.fr ... Sender ok
C: RCPT TO: <bob@hamburger.edu>
S: 250 bob@hamburger.edu ... Recipient ok
C: DATA
S: 354 Enter mail, end with "." on a line by itself
C: Do you like ketchup?
C: How about pickles?
C: .
S: 250 Message accepted for delivery
C: QUIT
S: 221 hamburger.edu closing connection
```

SMTP requires just a few basic commands:

- HELO -- abbreviation of "hello"
- MAIL FROM -- address of sender
- RCPT TO -- address of recipient ...continued...

- DATA -- announces start of message
- QUIT -- close connection after final message sent

Note that these commands are part of the SMTP protocol, and are not part of the actual email message composed by users

Similar to HTTP, server replies with status code and (optional) explanation of code

S: 250 Message accepted for delivery

Recall that connection is persistent -- after client finishes first message, can go back to MAIL FROM part of protocol to send another

TCP connection stays open until client specifies QUIT

Thus far we have described SMTP commands

Messages sent via SMTP also have formatting requirements (RFC 5322)

Messages must include headers

Like HTTP, these are human-readable key: value pairs, some of which are optional and some of which are required

Message required to have From : and To : headers

Note that these are *different* from MAIL FROM and RCPT TO commands in SMTP protocol

Subject : header is optional, along with other headers

In general, don't confuse commands from SMTP protocol with headers of email messages

From: alice@crepes.fr
To: bob@hamburger.edu
Subject: Searching for the meaning of life.

In theory, because protocol is plain text, sending messages to SMTP servers is just as easy as sending to HTTP servers

Could use e.g., `telnet` or `netcat`

However, to prevent spam, SMTP traffic is often blocked

Comparing to HTTP, both protocols:

- transfer files (web pages vs emails)
- offer persistent connections
- are text-based

Contrasting with HTTP:

- HTTP is *pull* protocol -- server sends files to client
- SMTP is *push* protocol -- client (i.e., entity that initiates TCP) sends files to server
- SMTP messages must be 7-bit ASCII
- Each HTTP object (e.g., an image) encapsulated in its own message
- SMTP sends all objects in one message