CS 725/825 & IT 725

Lecture 10

Application Layer

October 29, 2025

Electronic Mail - SMTP

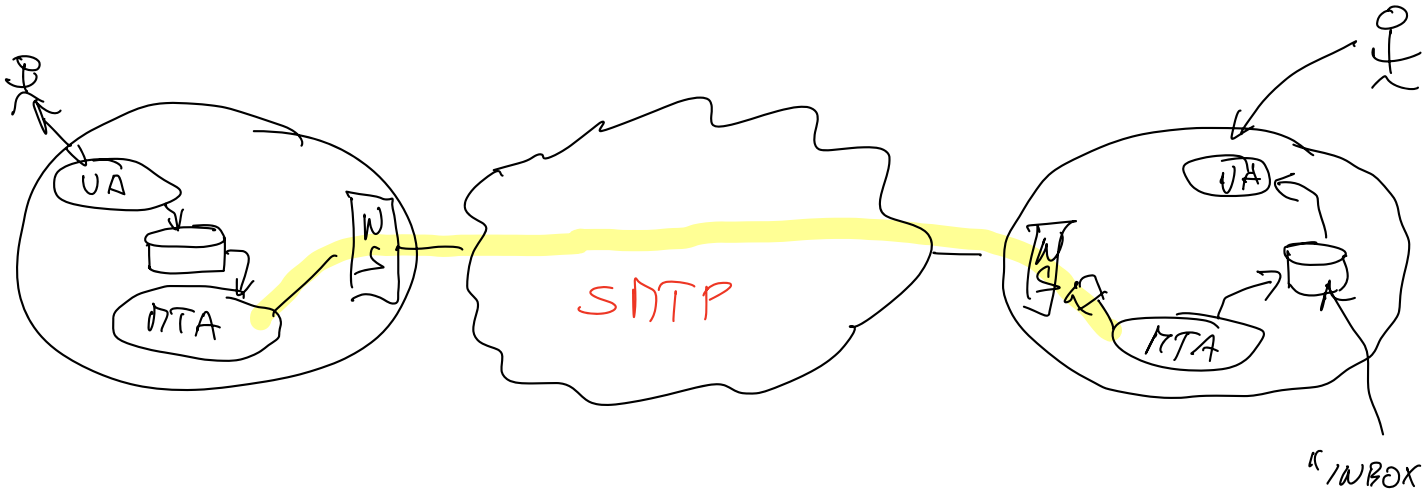
- Asynchronous message delivery
  - delivers robustness and reliability
- Two types of agents:
  - User Agent (UA)
  - Message Transfer Agent (MTA)
- Two types of interactions (and protocols):
  - MTA to MTA
  - UA to MTA

UA to MTA Communication

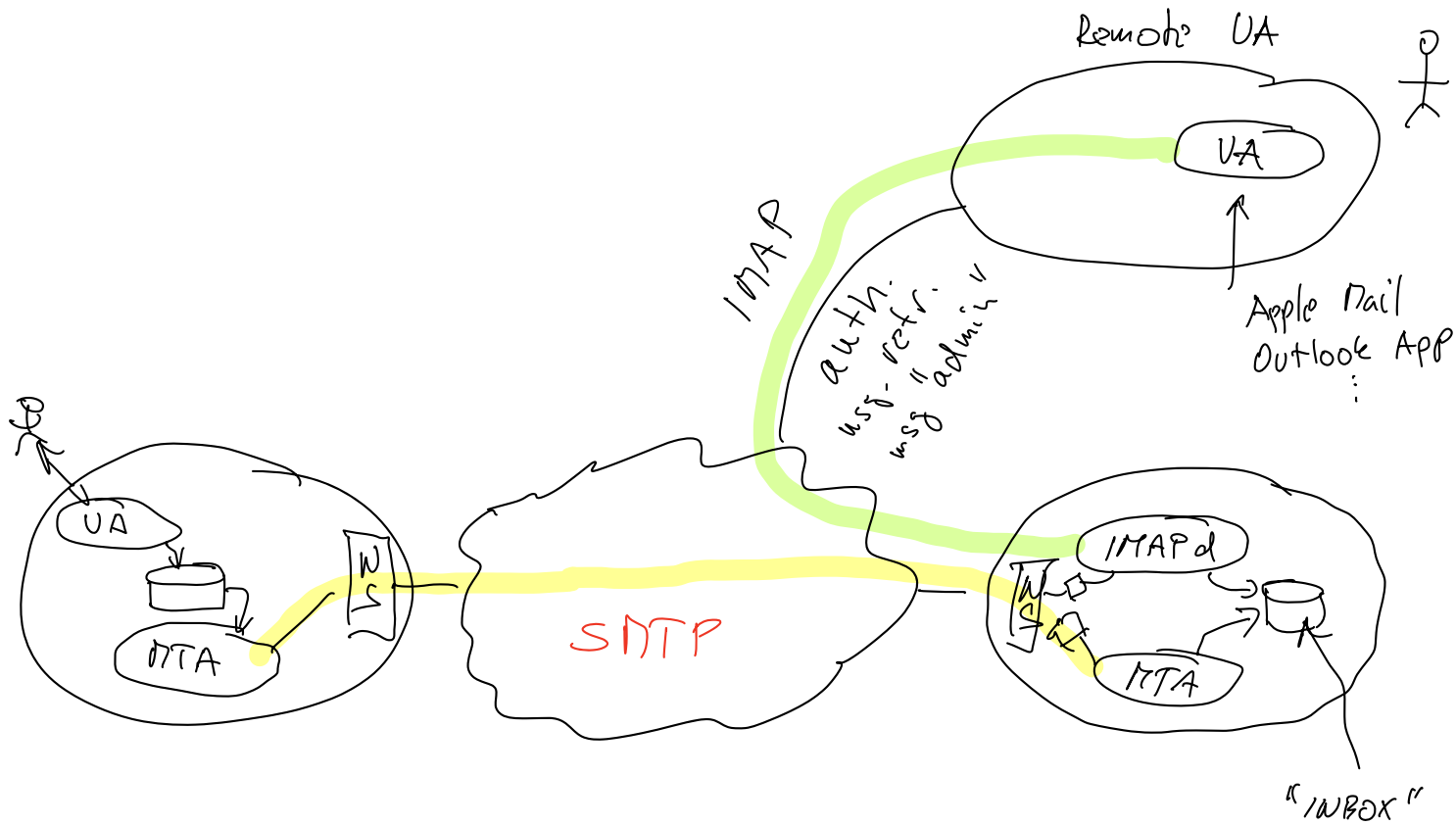
- UA and MTA on the same host (the old days)
  - UA and MTA communicate using files
  - use of host's authentication methods
- UA and MTA communicate over a network (today)
  - SMTP was not designed for this
  - sending mail: SMPT with authentication
  - retrieving mail: IMAP (includes authentication) or "remote authenticated access via HTTP" (webmail)

"TRADITIONAL" MAIL DELIVERY

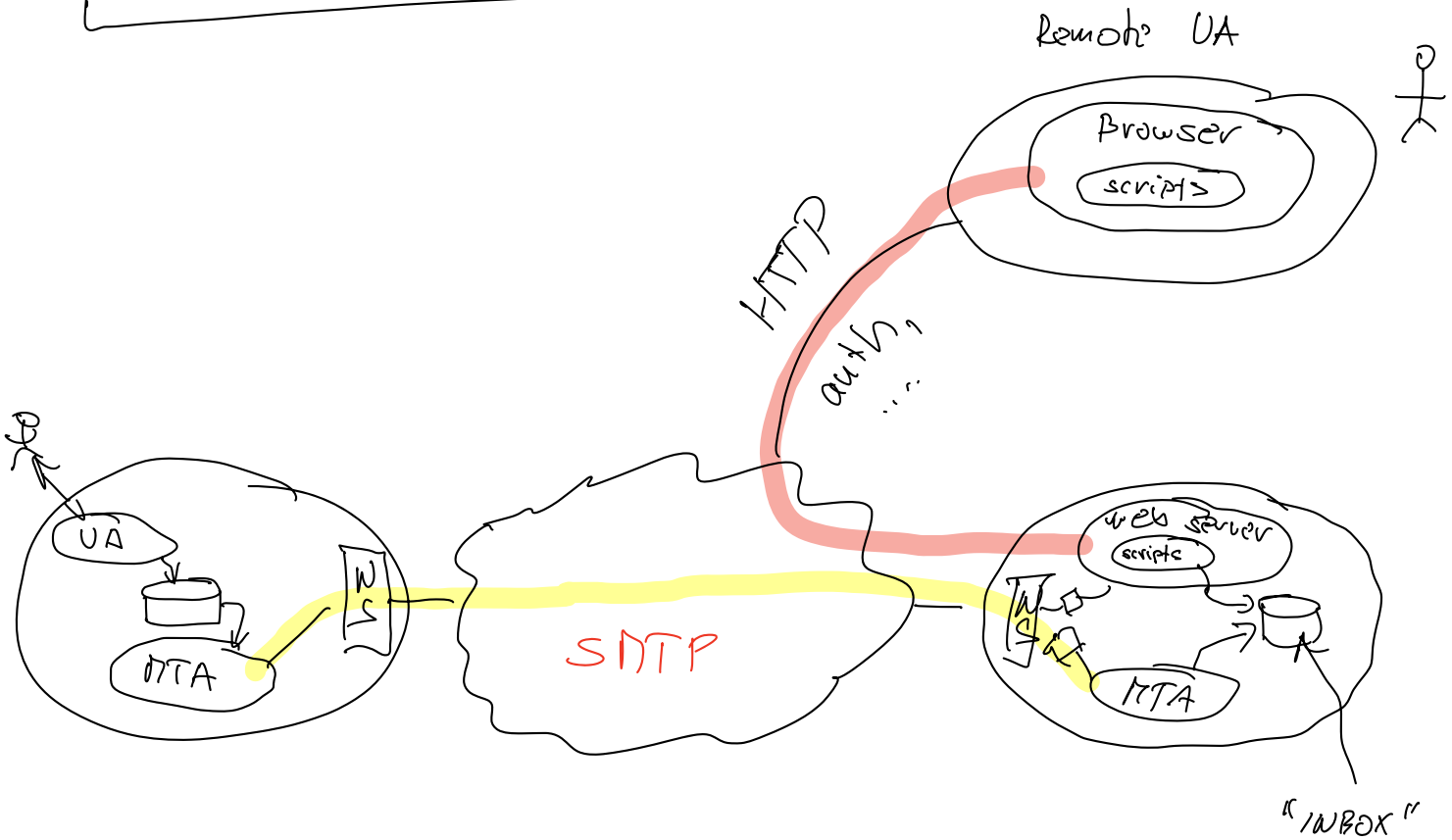
UA's & MTA's are on the same host, shared authentication



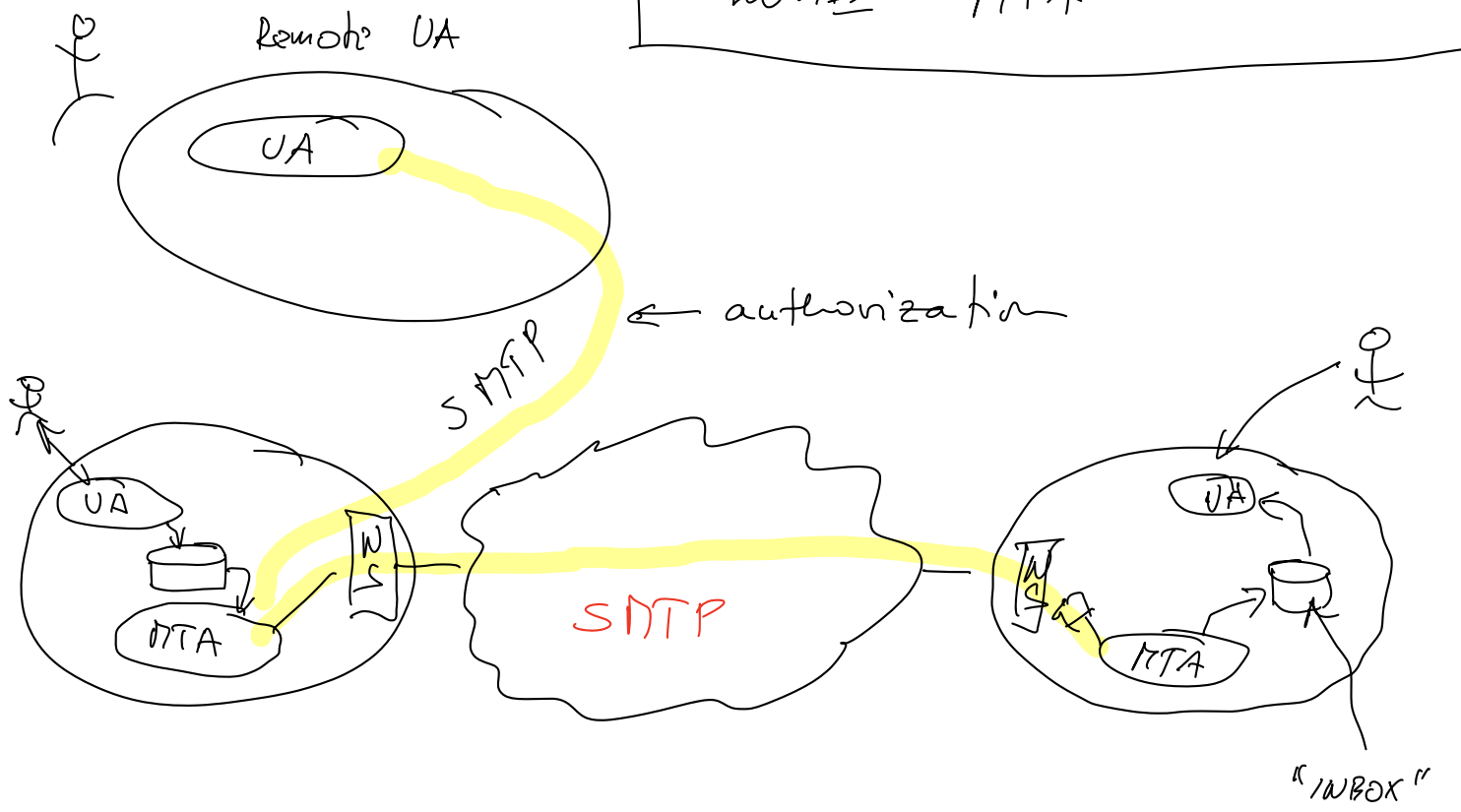
REMOTE MAIL RETRIEVAL USING IMAP



MAIL ACCESS USING A WEB CLIENT



MAIL DELIVERY USING "HOME" MTA



MTA to MTA communication

- Simple Mail Transfer Protocol (SMTP)
  - covers single hop
  - no encryption
  - no authentication
  - there was supposed to be a “not so simple” mail transfer protocol
  - some problems were addressed by ESMTP (extended SMTP) and other procedural methods

SMTP Server Actions

- SMTP server is deciding whether to accept an email message for delivery
  - Local: recognized user of the organization that runs the server:
    - by IP address
    - authenticated
  - Global: everyone else

To: / From:	Local	Global
Local	Deliver	Deliver
Global	Deliver (with caution)	Deny (unless authenticated)

MIME

- Problem: SMTP was designed to deliver limited length, English text
- Solution: MIME (Multipurpose Internet Mail Extensions)
  - encode content to look like text
  - mark it with content type so it can be unpacked and rendered on the receiving end
  - package components of the message