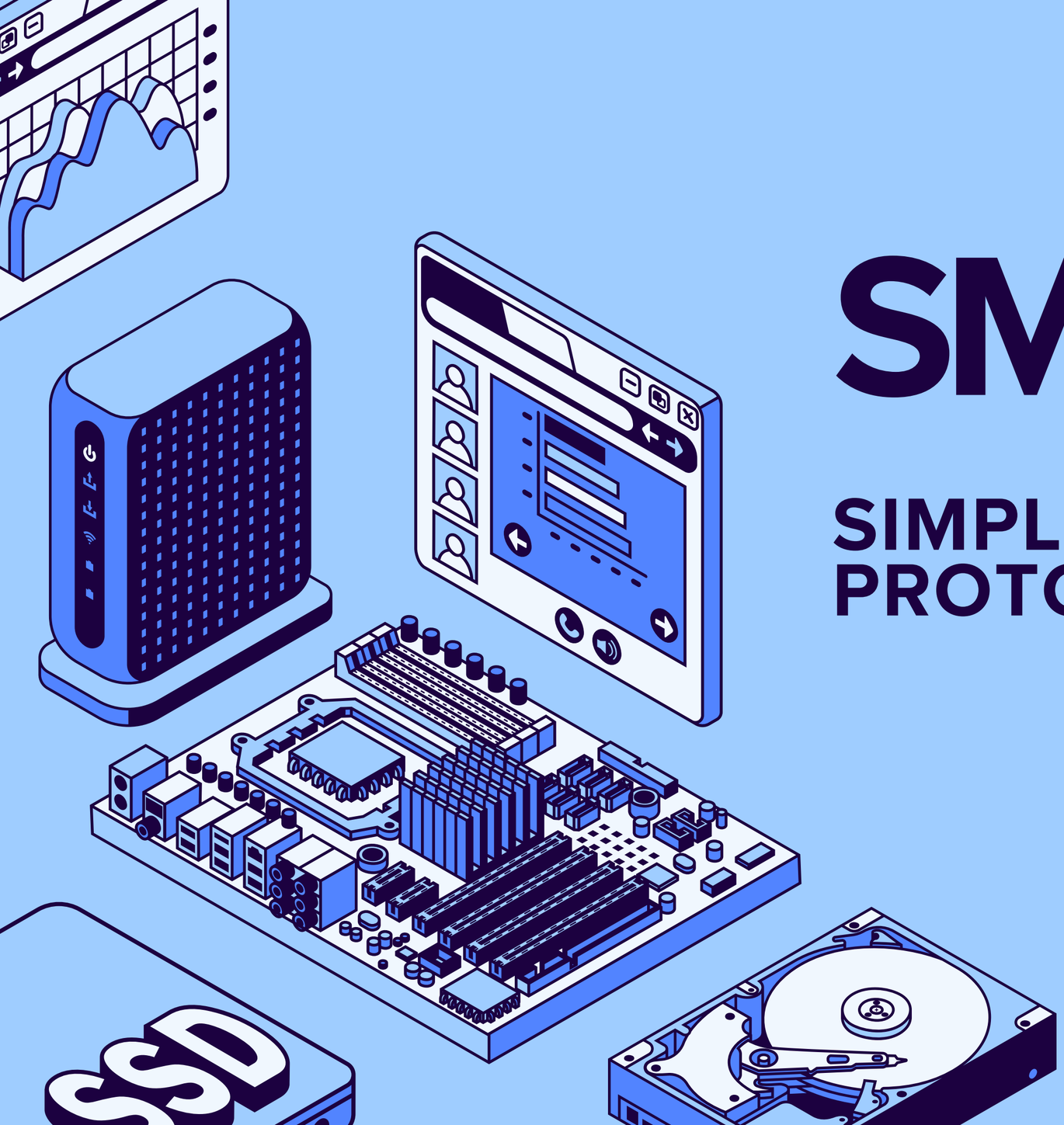


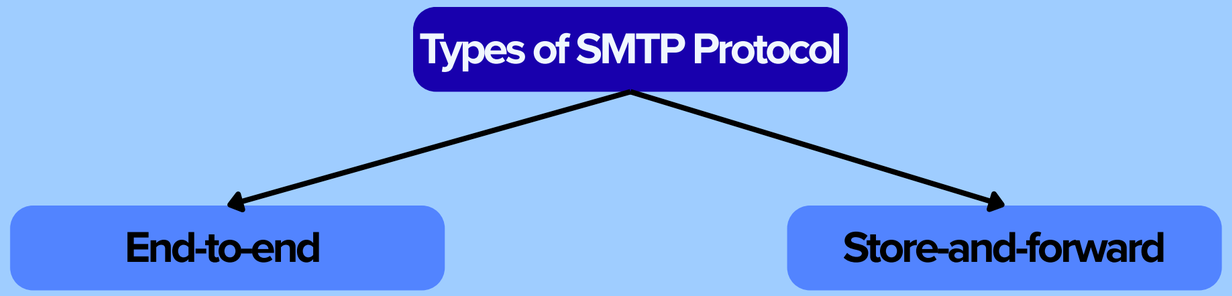
SMTP

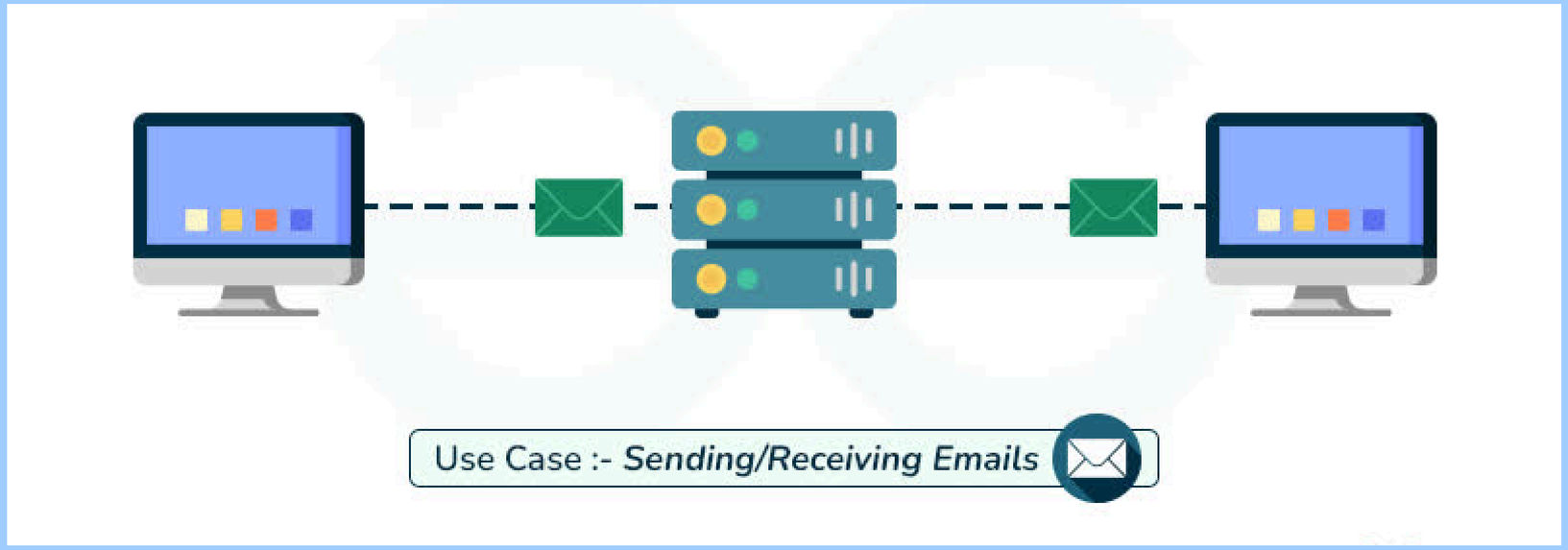
SIMPLE MAIL TRANSFER PROTOCOL

Vishal Singh
Arko Bera
Raghav Kankane
Tushar Ghosh
Fahad Ahmed

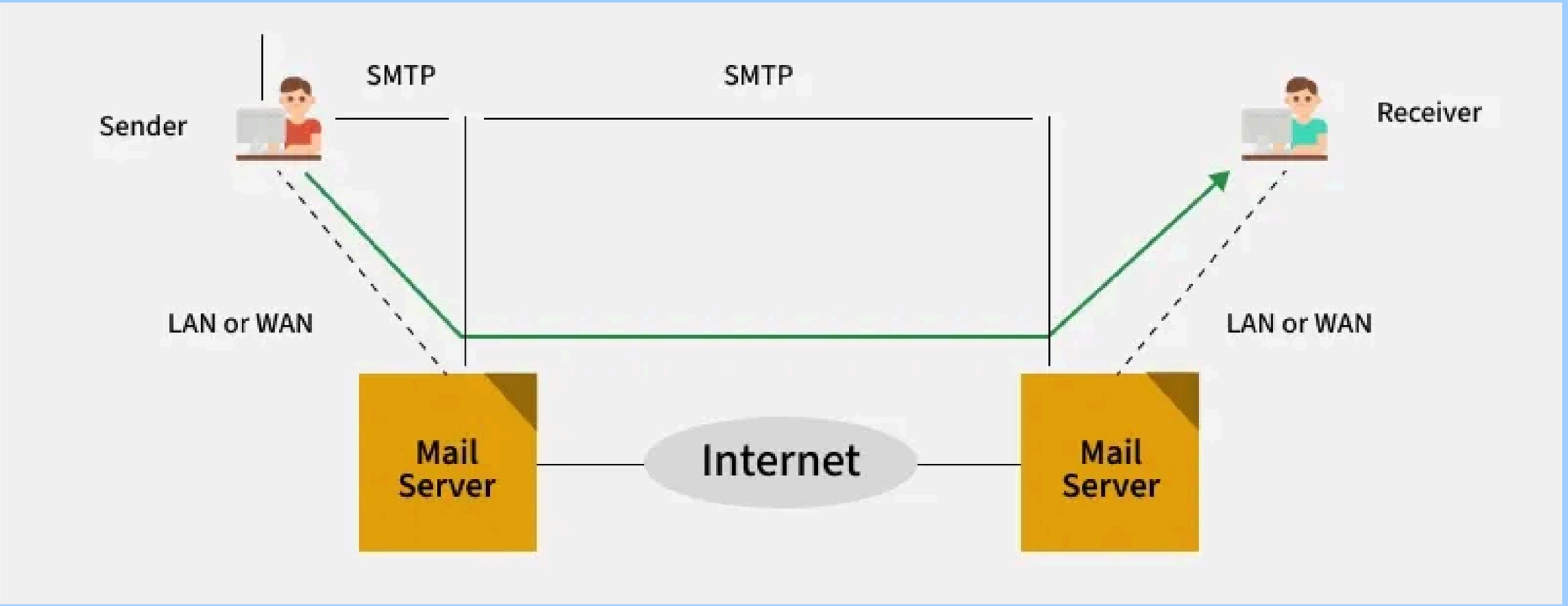
SMTP

application layer protocol used for exchanging email messages between servers.





end-to-end delivery



History of SMTP

- **1960s–70s:** Early email on mainframes; ARPANET spurred networked messaging.
- **1980:** RFC 772 proposed SMTP to replace FTP-based mail transfer.
- **1981:** RFC 788 standardized SMTP as a simple text-based protocol
- **1995:** ESMTP (RFC 1869) added extensions, authentication, and larger message support.
- **2000s–Present:** Security (STARTTLS), authentication (SMTP-AUTH), internationalization (SMTPUTF8); current standard RFC 5321 (2008).

Model of SMTP System

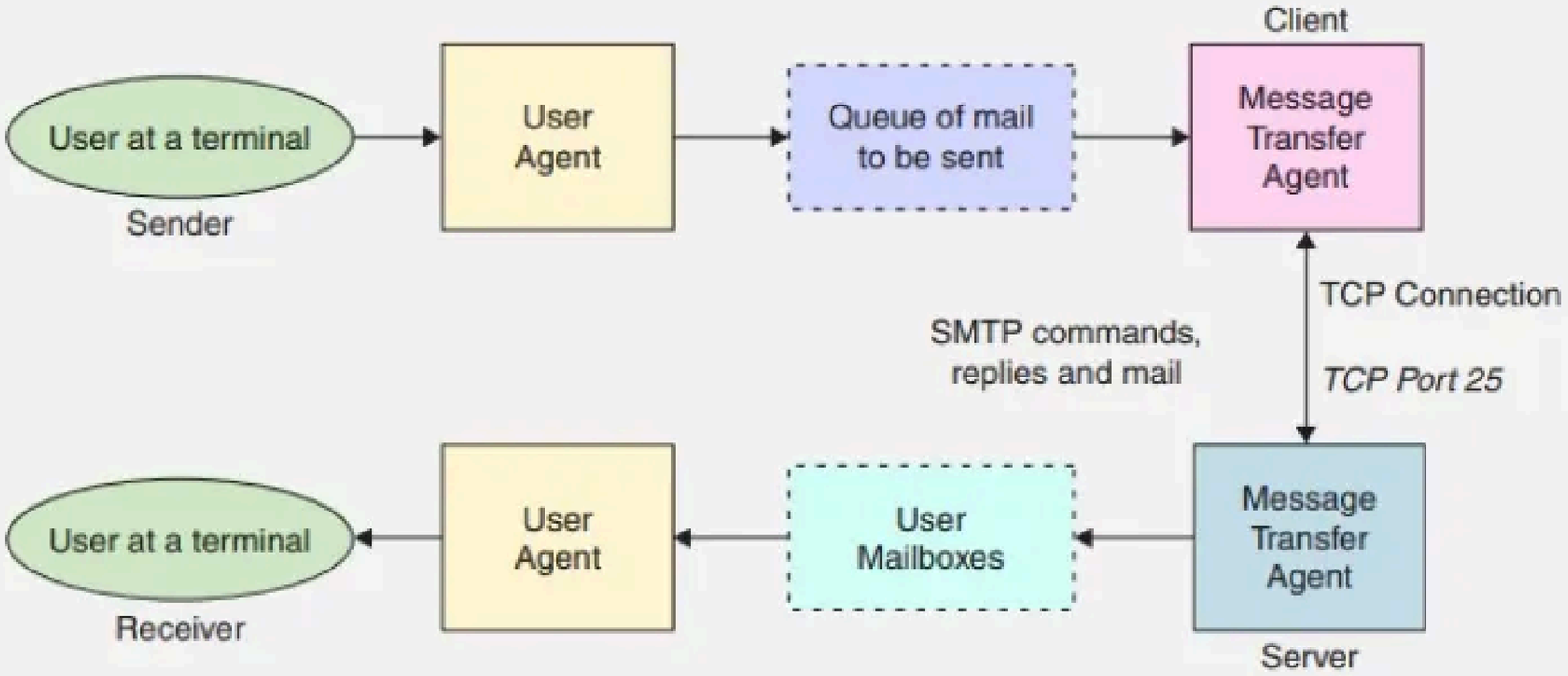
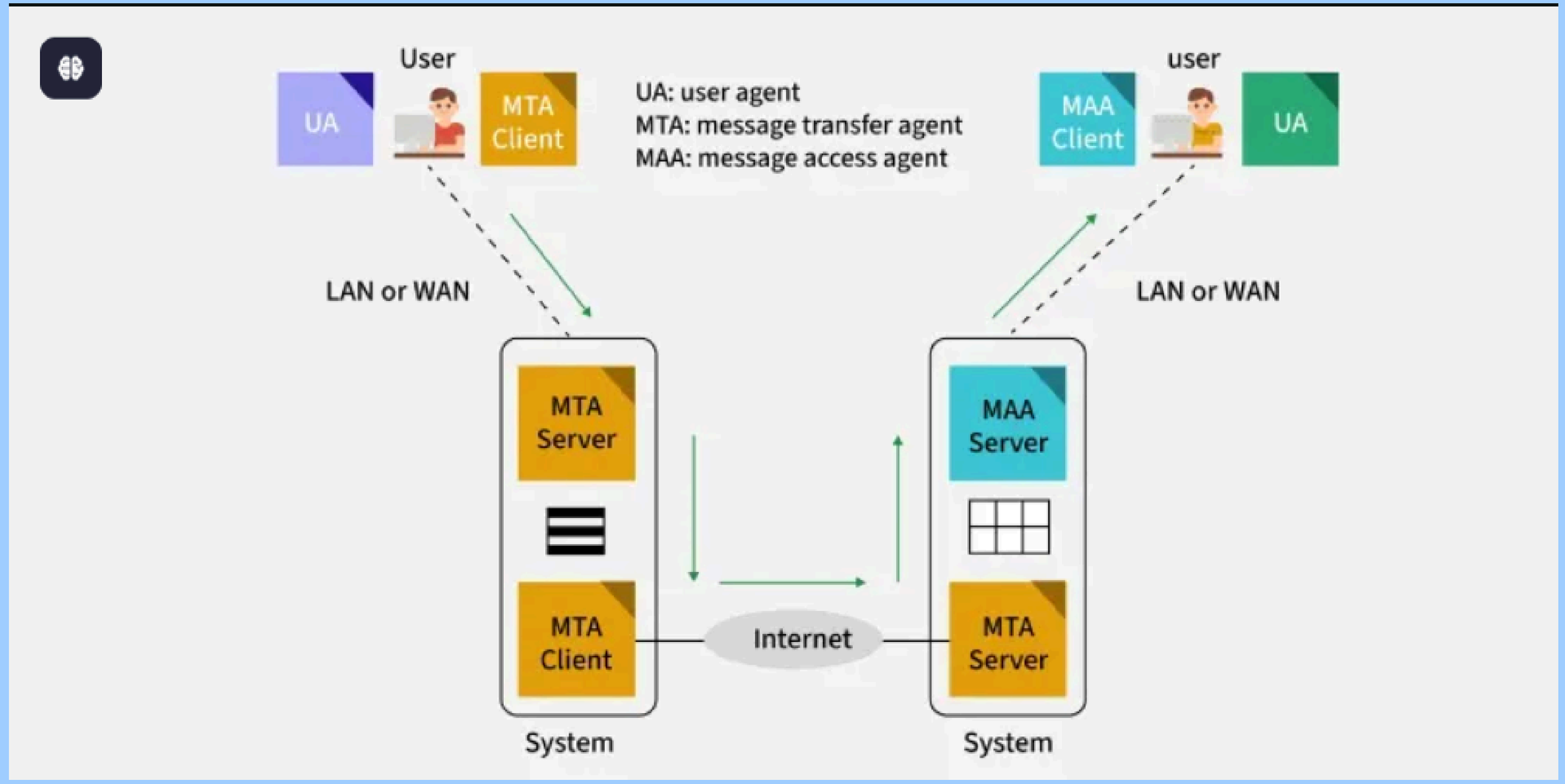


Figure 1: The basic simple mail transfer protocol (SMTP) model.

Components of SMTP

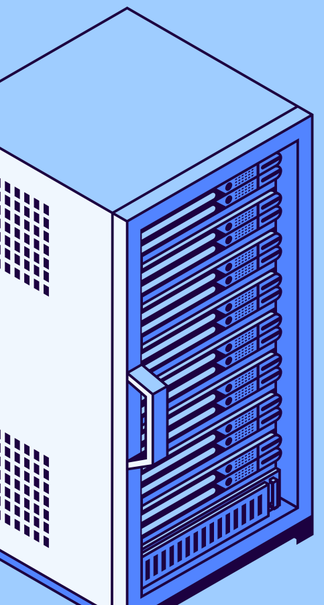
- Mail User Agent
- Mail Submission Agent
- Mail Transfer Agent
- Mail Delivery Agent

Client Server Architecture



SMTP Envelope

```
MAIL FROM: <mosh@evoch.com>
250 2.1.0 <mosh@evoch.com>... Sender ok
RCPT TO: <someGuy@evoch.com>
250 2.1.5 <someGuy@evoch.com>... Recipient ok
RCPT TO: <someGuy2@evoch.com>
250 2.1.5 <someGuy2@evoch.com>... Recipient ok
RCPT TO: <someGuy3@evoch.com>
250 2.1.5 <someGuy3@evoch.com>... Recipient ok
```



- **It contains information that guides the message to the recipient.**
- **It contains the senders, recipient’s address along with routing information**

SMTP commands

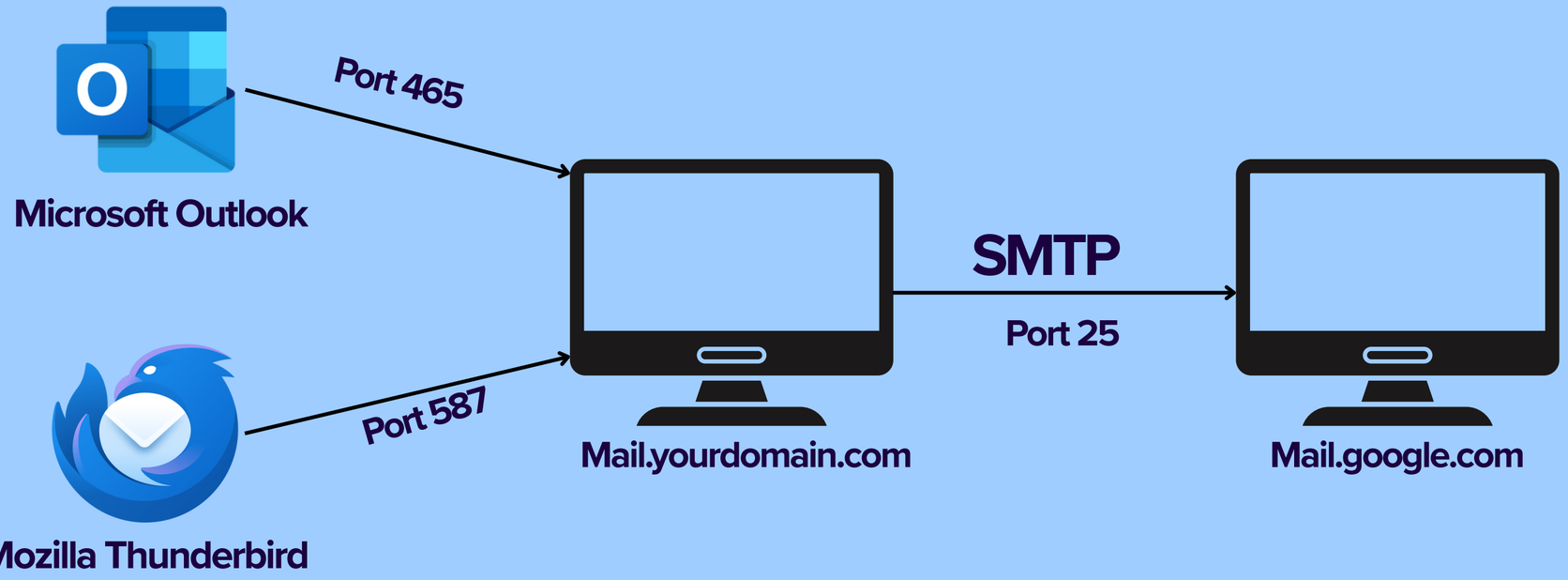
SMTP uses a set of textual commands for communication between mail clients and servers.

Each command helps control different stages of mail transmission.

Command	Purpose / Description	Usage
HELO	Provides the identification of the sender i.e. the host name.	Mandatory
MAIL FROM:	Specifies the originator of the mail.	Mandatory
RCPT TO:	Specifies the recipient of mail.	Mandatory
DATA	Specifies the beginning of the mail.	Mandatory
QUIT	Closes the TCP connection.	Mandatory
RSET	Aborts the current mail transaction but the TCP connection remains open.	Highly Recommended
VRFY	Used to confirm or verify the user name.	Highly Recommended
NOOP	No operation, used to check if the connection is still active.	Highly Recommended

SMTP ports

Ports define how email clients and servers communicate securely and efficiently across the internet using the SMTP protocol.



- **Port 587:** Used port for secure SMTP submission using TLS (Transport Layer Security). It is recommended for client-to-server communication, as it ensures the security of the email transmission.
- **Port 465:** This port is not considered an official standard anymore. Many email providers have switched to port 587.
- **Port 25:** Used for SMTP relay between mail servers, not for email submission. It is often blocked by ISPs for outgoing mail due to its frequent use for spam and malicious activities.
- **Port 2525:** Not official, used as an alternative for SMTP submission, when port 587 is blocked or restricted.

Advantages

Dedicated Server Architecture

- SMTP uses specialized mail servers (MTAs) to handle email delivery.
- Ensures reliable, scalable delivery with centralized management, retries, and error handling.

Bulk Mailing Capabilities

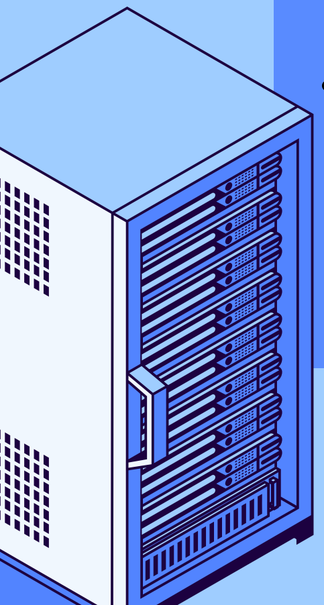
- Optimized for sending messages to multiple recipients efficiently.
- Supports marketing campaigns, newsletters, and organizational announcements at scale.

Low Cost

- Open standard, free to implement; minimal service fees for most users.
- Cost-effective compared to physical mail or other communication channels.

Push-Based Delivery

- Actively delivers messages to recipient servers immediately.
- Faster than pull-based protocols (POP/IMAP), essential for time-sensitive communication.



Disadvantages

Port Blocking

- ISPs often block default port 25 to prevent spam.
- Users may need to use alternate ports (e.g., 587) or authorized mail relays.

Simplicity Limits

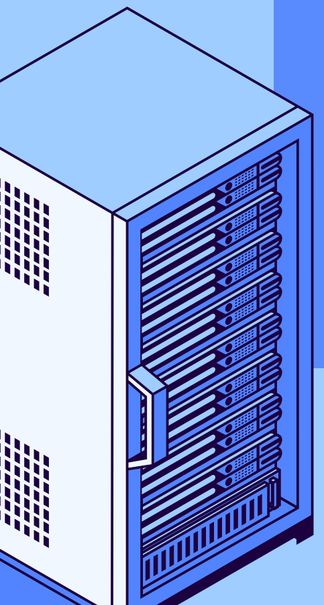
- SMTP was designed for plain text (7-bit ASCII) only.
- Rich content like HTML and attachments require MIME, layered on top of SMTP.

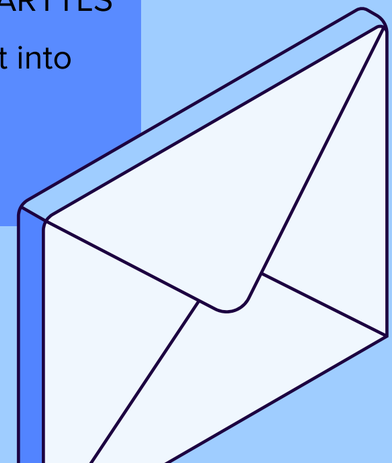
Potential Delays

- Network congestion, spam filtering, or server issues can slow delivery.
- SMTP retries help overcome temporary issues but may still cause delays.

Security Concerns

- SMTP is unencrypted by default, exposing messages to interception.
- Security relies on extensions like STARTTLS or SMTPS, not built into the base protocol.





Difference Between SMTP and ESMTP

	SMTP	Extended SMTP
User Authentication	Users are not verified in SMTP as a result scam emails can being sent.	Sender authentication is performed.
Multimedia Support	We cannot attach a Multimedia file in SMTP directly without the help of MMIE.	We can directly attach Multimedia FIle in ESMTP.
Email Size Management	We cannot reduce the size of the email in SMTP.	We can reduce the size of the email in ESMTP.
Initial Command	SMTP clients open transmission with the command HELO.	Transmission begins with the EHLO (Extended HELLO) command.

Comparison with POP and IMAP

Feature	SMTP	POP3	IMAP
Primary	Sending/Transferring emails	Retrieving emails from a server	Retrieving and managing emails on a server
Direction	Push (Server-to- Server, Client-to -Server)	Pull (Client-to-Server)	Pull/Synchronization (Client-to-Server)
Storage	Transmits messages, does not st ore them long-term for retrieval	Downloads emails to the client device; typically deletes them from the server.	Manages emails on the server; clients synchronize with the server state.
Client Action on	Client sends mail.	Client fetches mail and may delete from server.	Client accesses mail on server, synchronizes folders.
Offline Acess	Not applicable (concerned with transmission).	High (once downloaded).	Possible (via client caching), but prim arily online.
Server Load	High for MTA infrastructure.	Low (once mail is downloaded).	High (server manages all mail states).
Use Case	Sending emails to any recipient.	Simple, single-device email access where mail is kept locally.	Multi-device, collaborative, and server-centric email management.

Thank You