

# THE EMAIL PARADOX

NAVIGATING DECENTRALIZATION,  
CENTRALIZATION, AND THE FUTURE OF  
COMMUNICATION

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# HISTORY OF E-MAIL

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- 1960s: first mail systems, replacing passing messages using shared files
- 1978: first unsolicited commercial mass mailing
- 1980: SMTP (Simple Mail Transfer Protocol) implemented on the ARPANET
- 1995: ESMTP (Extended SMTP)
- 2004: DKIM proposed
- 2006: SPF proposed
- 2012: DMARC proposed

*If you wonder why email-related software works as it does, or why we have all these add-on protocols, the answer is almost certainly “spam.”*

Source: <https://mwl.io/archives/22653>

# DELIVERABILITY — AN ARISING ISSUE

Avoiding spam means:

- Evolving requirements (PTR, SPF, DKIM, DMARC)
- Reputation (different IP and DNS allow- and blocklists)
- Content based filtering (baysien classifier)

Not every operator implements/requires the same ones.

# DELIVERABILITY — AN ARISING ISSUE

- → independent operator need to comply with all requirements; still risk ending up on reputation bocklist
- for add-on protocols: in addition to MTA and MDA, often further components needed that fill the gaps on the add-on protocols
- makes operating a mail system more and more complex, and opting for a service hosted by one of the big players more attractive

**CENTRALIZATION**

# SOME NUMBERS

- 70% of all domains with MX records are hosted by 100 email providers (IPv4)
- 90% by 10 (IPv6)
- Top 3: Google, Microsoft, Amazon

source: <https://ieeexplore.ieee.org/document/10217834>

# SPECIFIC CASE OF EPFL

- A long time ago: qmail
- A while ago: Microsoft exchange mail servers on premise
- Today: Microsoft servers

# PROBLEMS WITH EMAIL CENTRALIZATION

- in the future: Even more organizations using one of the big mail operators means giving them more power to exclude others from the market
- limited control over the server (no innovation possible)
- dependent on US jurisdiction (surveillance, censorship, ...)
- single point of failure
  - 2021: critical vulnerability led to compromise of ~250'000 microsoft exchange servers

# DECENTRALIZATION

# EMAIL IS STILL AN OPEN PROTOCOL

- Any email server with modern features should be able to be used
- In theory IPs can be allow-listed
- In practice it can take a lot effort to host an email server

# STALWART

- AGPL-3.0 for non-Enterprises features
- Support a lot of protocols (JMAP, IMAP3, POP3, SMTP)
- Good defaults and a lot of features
- Good documentation and easy to deploy

# STALWART DEMO

# SUMMARY

- email: an evolving system, mostly due to dealing with spam
- deliverability: few big operators dominate more and more of the market
- decentralization: essential for preserving our independence
- there is hope: new emerging, easy to host and open source solutions like Stalwart simplify mail hosting

