

# System Administration

**Week 08, Segment 1**  
**E-mail, Part I**

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**Stevens Institute of Technology**

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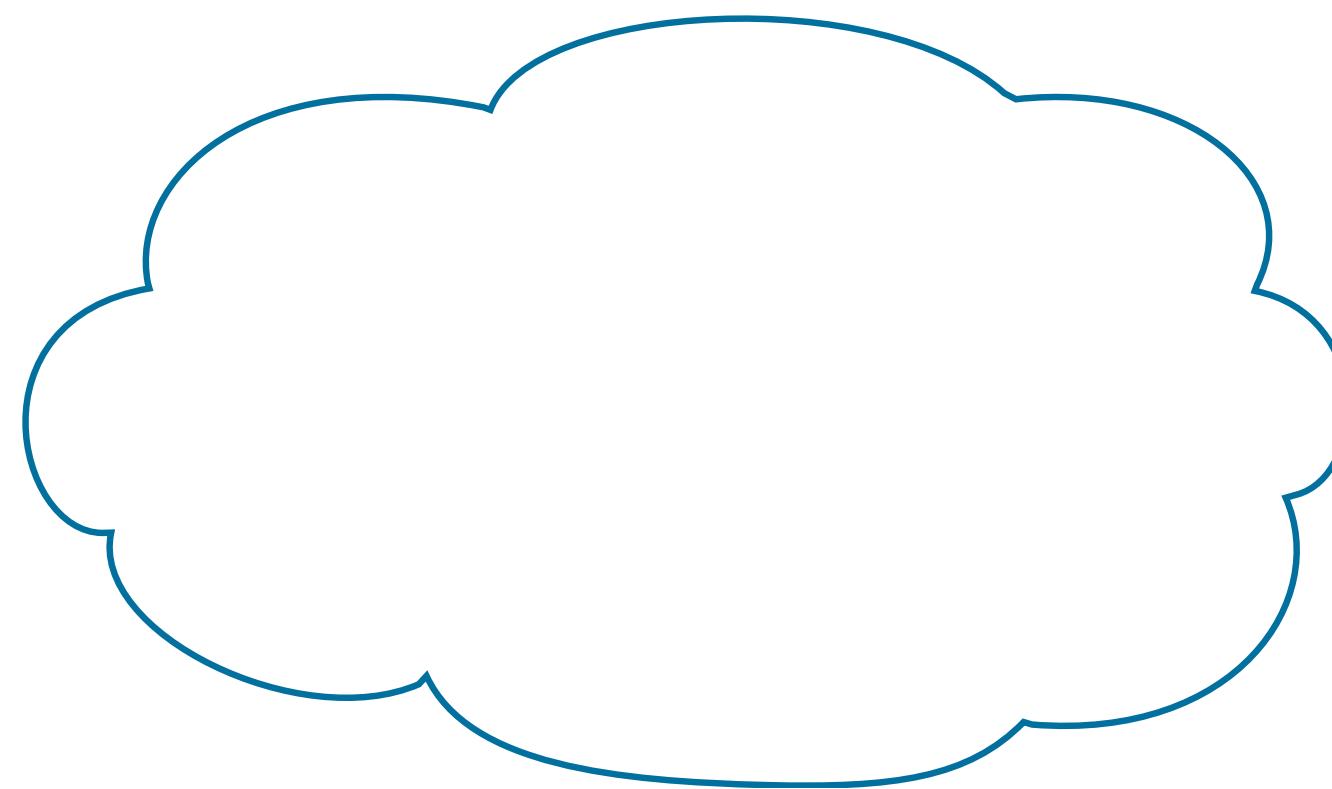
[jschauma@stevens.edu](mailto:jschauma@stevens.edu)

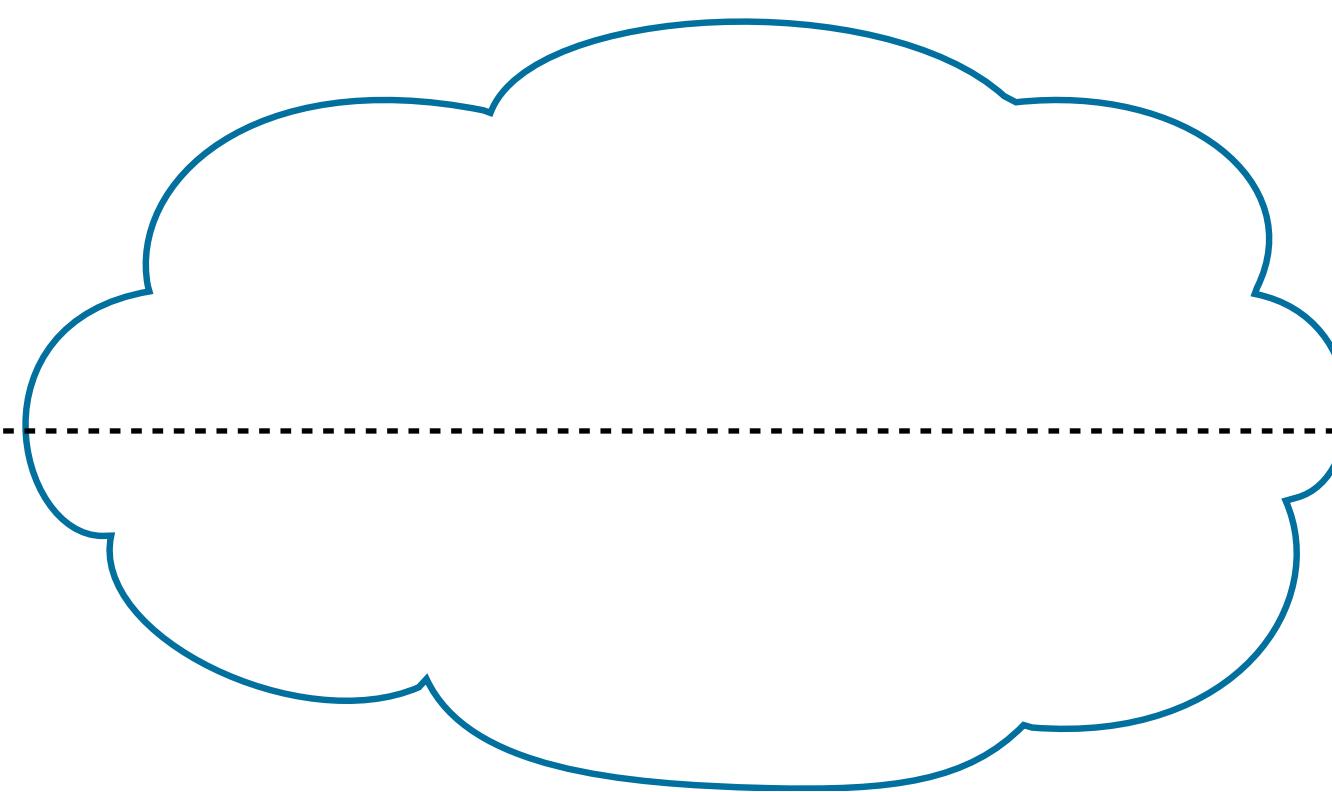
<https://stevens.netmeister.org/615/>

## E-mail - not dead yet

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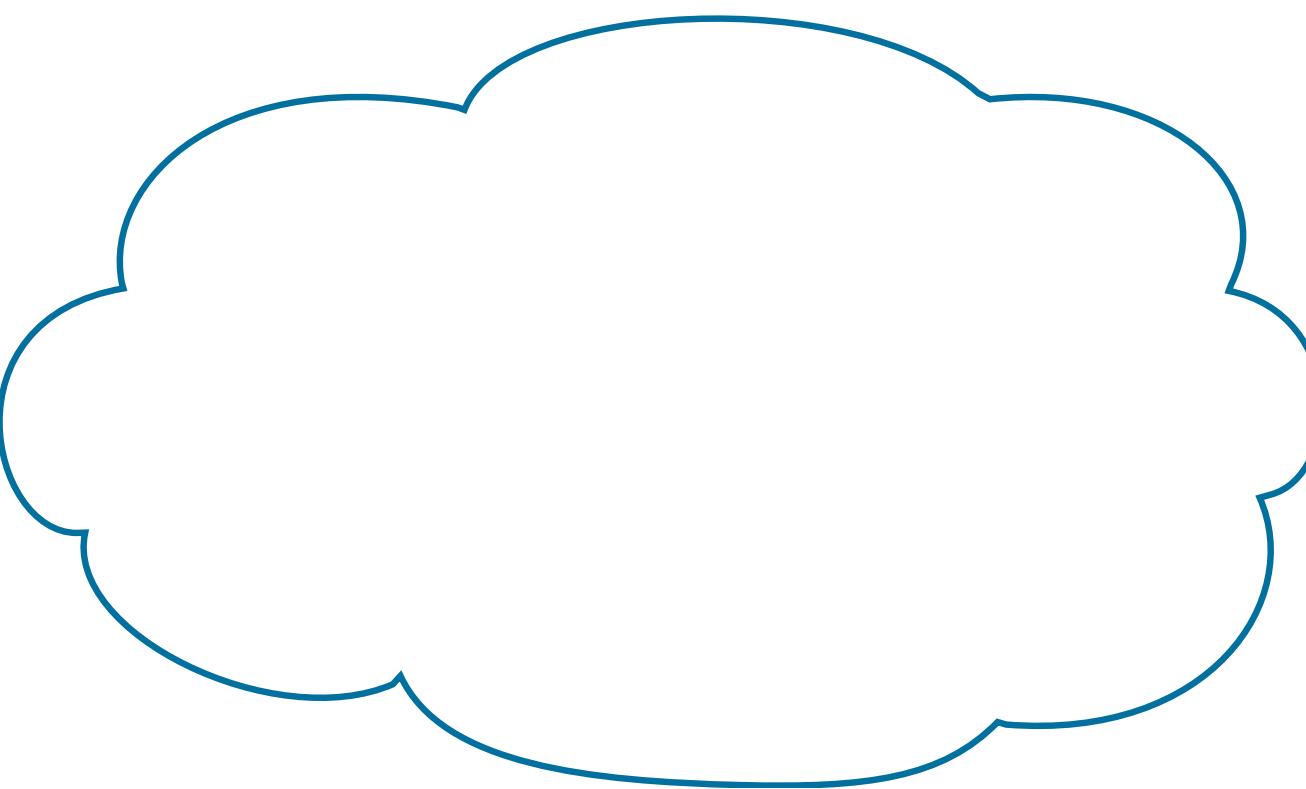
- >5.5 billion : number of email accounts
  - (over 1.8 billion Gmail accounts alone)
- >300 billion: number of emails sent/received every day
  - (over 3.4 million per second)
- >120 : number of emails received by office workers per day
- 30 - 75 : percent of mails that are spam
- > 99.9 : percent of SysAdmins, DevOps, and SREs who rely on email for monitoring purposes

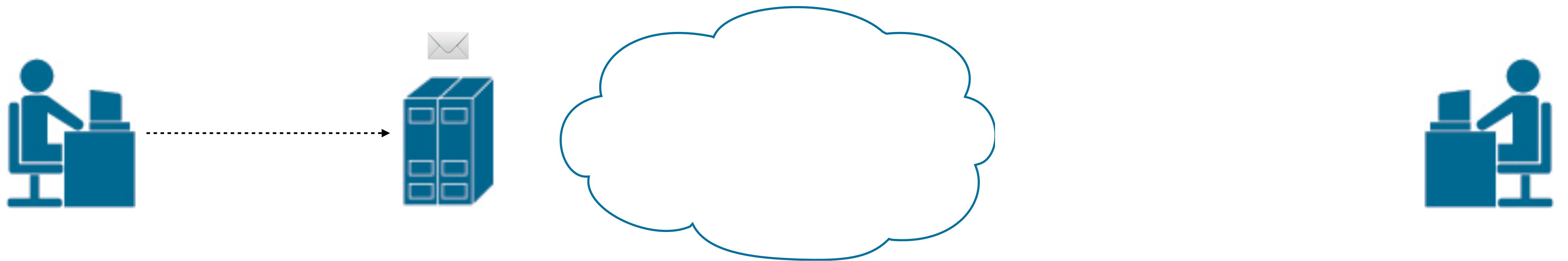






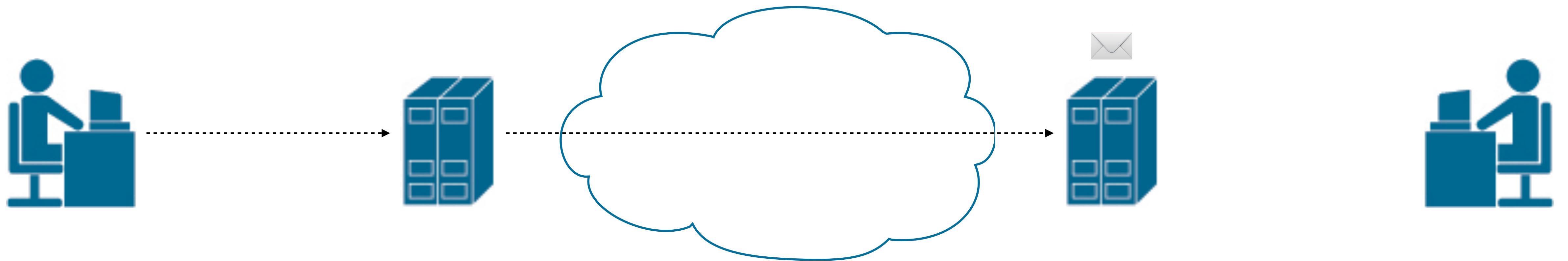
**Mail User Agent**  
(e.g., mutt, Mail.app, Outlook)





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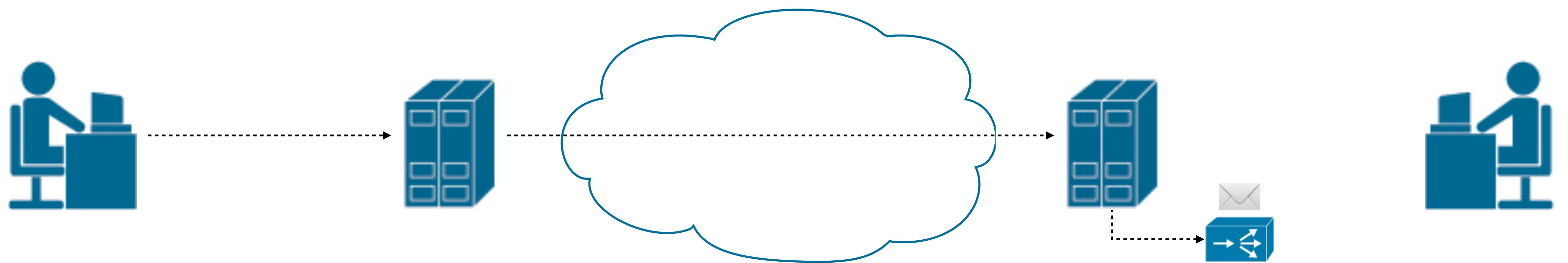
**Mail Transfer Agent**  
(e.g., postfix, sendmail, qmail)



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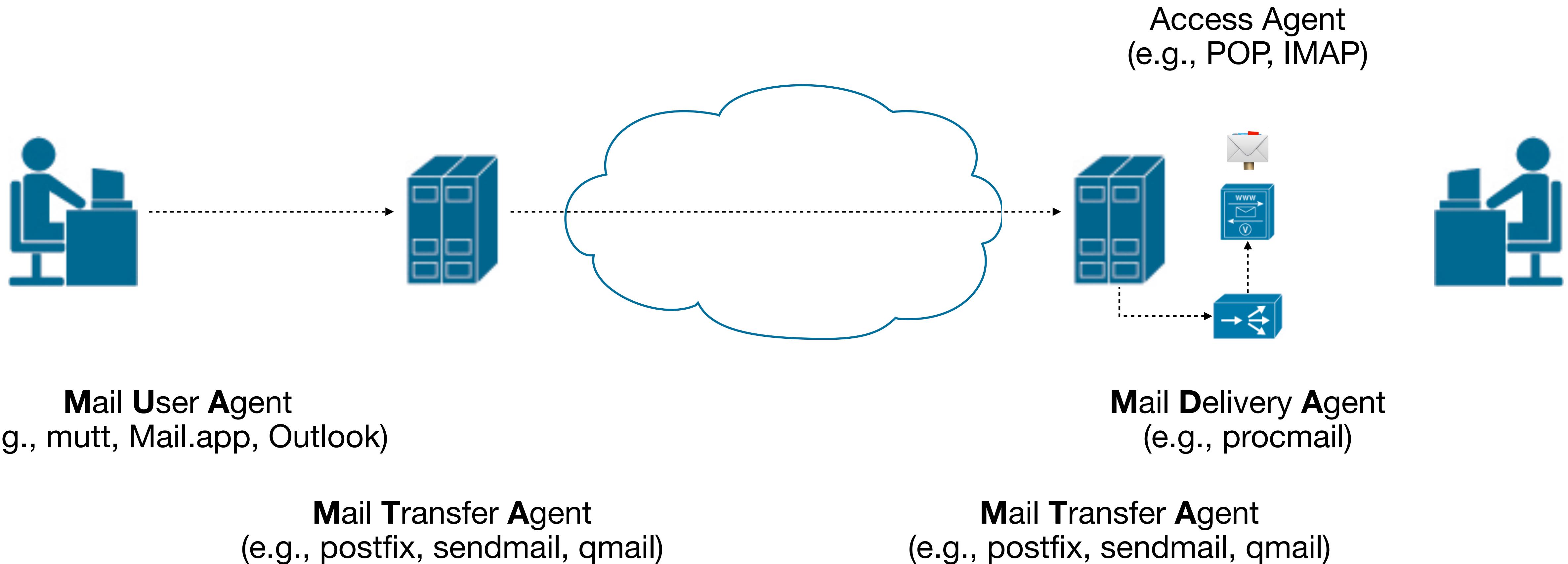


**Mail User Agent**  
(e.g., mutt, Mail.app, Outlook)

**Mail Transfer Agent**  
(e.g., postfix, sendmail, qmail)

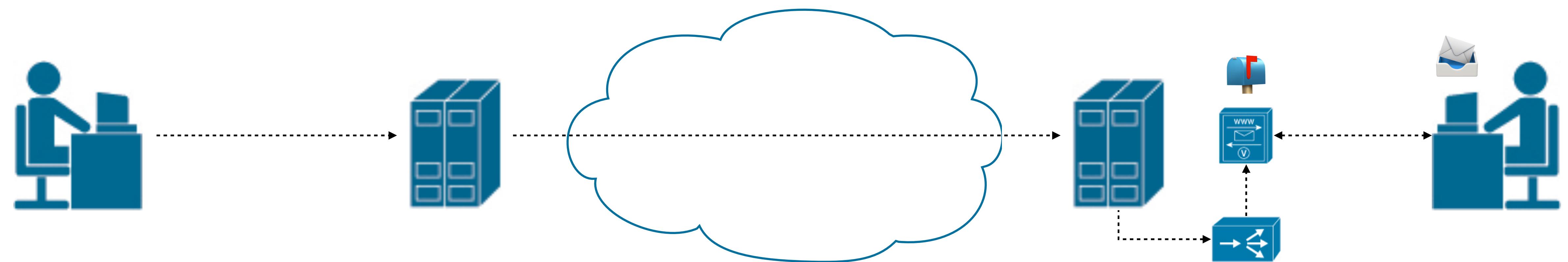
**Mail Delivery Agent**  
(e.g., procmail)

**Mail Transfer Agent**  
(e.g., postfix, sendmail, qmail)



**Mail User Agent**  
(e.g., mutt, Mail.app, Outlook)

Access Agent  
(e.g., POP, IMAP)



**Mail User Agent**  
(e.g., mutt, Mail.app, Outlook)

**Mail Transfer Agent**  
(e.g., postfix, sendmail, qmail)

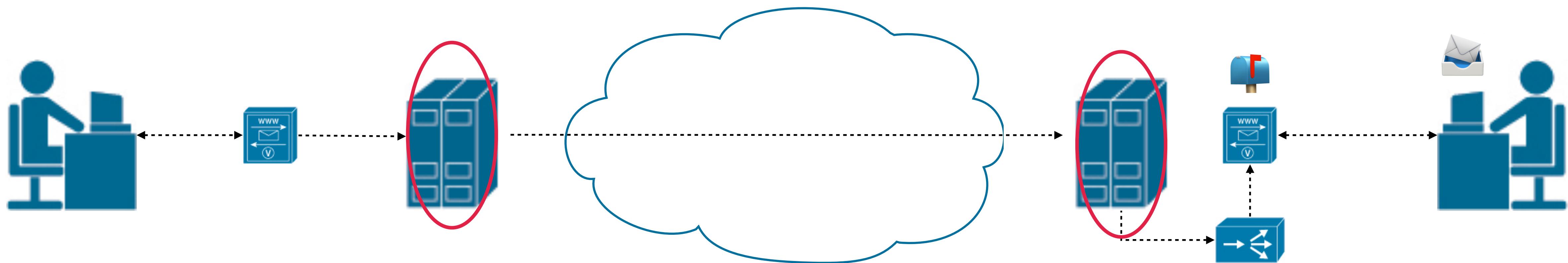
**Mail Delivery Agent**  
(e.g., procmail)

**Mail Transfer Agent**  
(e.g., postfix, sendmail, qmail)

**Mail User Agent**  
(e.g., mutt, Mail.app, Outlook)

## SMTP (RFC821)

Access Agent  
(e.g., POP, IMAP)



**Mail User Agent**  
(e.g., mutt, Mail.app, Outlook)

**Mail Transfer Agent**  
(e.g., postfix, sendmail, qmail)

**Mail Delivery Agent**  
(e.g., procmail)

**Mail Transfer Agent**  
(e.g., postfix, sendmail, qmail)



```
IP 166.84.7.99.25 > 10.10.0.47.64939: Flags [P.], seq 41:175, ack 31, win 4197,  
options [nop,nop,TS val 1 ecr 1], length 134: SMTP: 250-panix.netmeister.org  
IP 10.10.0.47.64939 > 166.84.7.99.25: Flags [P.], seq 31:164, ack 175, win 4197,  
options [nop,nop,TS val 1 ecr 1], length 133: SMTP: MAIL FROM:<jschauma@cs615as  
a.netmeister.org> SIZE=408  
IP 166.84.7.99.25 > 10.10.0.47.64939: Flags [.], ack 164, win 4197, options [nop  
,nop,TS val 1 ecr 1], length 0  
IP 166.84.7.99.25 > 10.10.0.47.64939: Flags [P.], seq 175:240, ack 164, win 4197  
, options [nop,nop,TS val 1 ecr 1], length 65: SMTP: 250 2.1.0 Ok  
IP 10.10.0.47.64939 > 166.84.7.99.25: Flags [P.], seq 164:581, ack 240, win 4197  
, options [nop,nop,TS val 1 ecr 1], length 417: SMTP: Received: by cs615asa.netm  
eister.org (Postfix, from userid 1002)  
IP 166.84.7.99.25 > 10.10.0.47.64939: Flags [P.], seq 240:291, ack 581, win 4197  
, options [nop,nop,TS val 1 ecr 1], length 51: SMTP: 250 2.0.0 Ok: queued as E84  
3D855AB  
IP 10.10.0.47.64939 > 166.84.7.99.25: Flags [F.], seq 581, ack 291, win 4197, op  
tions [nop,nop,TS val 1 ecr 1], length 0  
IP 166.84.7.99.25 > 10.10.0.47.64939: Flags [F.], seq 291, ack 581, win 4197, op  
tions [nop,nop,TS val 1 ecr 1], length 0  
IP 10.10.0.47.64939 > 166.84.7.99.25: Flags [.], ack 292, win 4197, options [nop  
,nop,TS val 1 ecr 1], length 0  
IP 166.84.7.99.25 > 10.10.0.47.64939: Flags [.], ack 582, win 4197, options [nop  
,nop,TS val 1 ecr 1], length 0  
$
```



i:Exit -:PrevPg <Space>:NextPg v:View Attachm. d:Del r:Reply j:Next ?:Help  
**Date:** Tue, 23 Mar 2021 02:33:19 +0000 (UTC)  
**From:** Jan Schaumann <jschauma@cs615asa.netmeister.org>  
**To:** jschauma@netmeister.org  
**Subject:** SMTP Test

Hello,

SMTP is a \_simple\_ mail transfer protocol, indeed.

-Jan



```
250-STARTTLS
250-ENHANCEDSTATUSCODES
250-8BITMIME
250 DSN
[MAIL FROM: <jschauma@cs615asa.netmeister.org>
250 2.1.0 0k
[RCPT TO: <jschauma@netmeister.org>
250 2.1.5 0k
[DATA
354 End data with <CR><LF>.<CR><LF>
[From: Jan Schaumann <jschauma@cs615asa.netmeister.org>
[To: jschauma@netmeister.org
[Subject: SMTP Test

[Hello,
[SMTP is a _simple_ mail transfer protocol, indeed.

[-Jan
[

250 2.0.0 0k: queued as EF09F855AB
[quit
221 2.0.0 Bye
Connection closed by foreign host.
```

## Summary

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### Simple Mail Transport Protocol

- TCP port 25, transport is in clear text
- use of DNS MX records for service discovery
- text based protocol with simple dialog structure and return codes
  - HELO/EHLO
  - MAIL FROM
  - RCPT TO
  - DATA
  - 1xx – Command accepted, but no action taken yet.
  - 2xx – Request completed successfully without errors.
  - 3xx – Further information required.
  - 4xx – Temporary failure.
  - 5xx – Fatal error.

## Up Next

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- Receiving mail, directly and via intermediate systems
- Protecting data in transit via STARTTLS
- Anatomy of an E-mail message
- Authenticity, Spam, and abuse

Recommended exercise: <https://stevens.netmeister.org/615/smtp-exercise.html>