Electronic Mail Representation and Transfer

Chapter 32

Electronic Mailboxes and Addresses

• gvaughn@uab.edu
  – gvaughn – Electronic mailbox
  • Anyone can send mail to the mailbox.
  • Only the owner can open and read the mail in the mailbox.
  • The Email administrator usually selects the mailbox name to identify the user in some manner.
  – uab.edu – Computer (domain name or alias)

Electronic Mail Message Format

• The entire message consists of ASCII text separated into two parts by a blank line.
• The first part is the header:
  – Sender
  – Recipients
  – Date
  – Format of contents
• The header must follow a standard form:
  – “keyword: information”
• The second part is the body.

Example Email Message

From: John.Q.Public@freenet.com
To: 912743.293@freenet.com
Date: Fri, 23 Apr 94 16:21:32 EST
Subject: lunch with me?

Bob,

Can we get together for lunch when you visit next week? I’m free on Tuesday or Wednesday — just let me know which day you would prefer.

John

Examples of Header Keywords

<table>
<thead>
<tr>
<th>Keyword</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>From</td>
<td>Sender’s address</td>
</tr>
<tr>
<td>To</td>
<td>Recipients’ addresses</td>
</tr>
<tr>
<td>Cc</td>
<td>Addresses for carbon copies</td>
</tr>
<tr>
<td>Date</td>
<td>Date on which message was sent</td>
</tr>
<tr>
<td>Subject</td>
<td>Topic of the message</td>
</tr>
<tr>
<td>Reply-To</td>
<td>Address to which reply should go</td>
</tr>
<tr>
<td>X-Charset</td>
<td>Character set used (usually ASCII)</td>
</tr>
<tr>
<td>X-Mailer</td>
<td>Mail software used to send the message</td>
</tr>
<tr>
<td>X-Sender</td>
<td>Duplicate of sender’s address</td>
</tr>
<tr>
<td>X-Face</td>
<td>Encoded image of the sender’s face</td>
</tr>
</tbody>
</table>

• If email software does not understand a header line, it passes it through unchanged.

Mail Transfer

• Usually two programs are used to send email messages.
  – One to interface with the user
  – The other to transfer the mail.
• The transfer program contacts a server on the recipient machine.
Simple Mail Transfer Protocol (SMTP)
- Uses TCP Reliable Transport.
- Port 25
- RFC 821 defines SMTP.
- Push Protocol
  - Sends mail from one Mail Server to another Mail Server
    (Directly; no intermediate servers).
- Can't download mail from my mailbox to My PC
  (assuming my PC is not my mail server).
- Most mail transfer programs are optimized to handle
  all recipients on a given remote server at the same
time.
- Mail exploders, lists, and forwards.

Example Email
- In the following example a client sends the message
  "Do you like ketchup? How about pickles?" from
  mail server crepes.fr to mail server hamburger.edu.
- The client issues five commands:
  - HELO
  - MAIL FROM
  - RCPT TO
  - DATA
  - QUIT

Example Email
C> telnet hamburger.edu 25
S> 220 hamburger.edu
C> HELO crepes.fr
S> 250 Hello crepes.fr, pleased to meet you
C> MAIL FROM: <alice@crepes.fr>
S> 250 alice@crepes.fr... Sender ok
C> RCPT TO: <bob@hamburger.edu>
S> 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>>
C> 250 Message accepted for delivery
C> Quit
S> 221 hamburger.edu closing connection

Multipurpose Internet Mail Extensions
- Originally the body could contain only printable
  ASCII text.
- Multiple methods exist by which binary data
  could be "encoded" as printable text.
- Multipurpose Internet Mail Extensions (MIME)
  allow the body to contain multiple parts each
  encoded by an independent method.
- RFC 2045 and RFC 2046.
- Two lines are added to the header:
  - MIME-Version: 1.0
  - Content-Type: text/plain

MIME Example
From: alice@crepes.fr
To: bob@hamburger.edu
Subject: Picture of yummy crepe
MIME-Version: 1.0
Content-Transfer-Encoding: base64
Content-Type: image/jpeg
start of base64 encoded data.
..........................
..........................
..........................
end of base64 encoded data

MIME Types
- Top level Types of content handled by MIME
  - Text
  - Image
  - Audio
  - Video
  - Application
  - Multipart
Mail Gateways

- Many organizations dedicate a machine to processing electronic mail: email gateway or relay.
- The purpose of the gateway is to forward an email message to a large mailing list.

Mailbox Access

- On which computer should the mailbox be placed?
- TCP/IP protocols include one that provides remote access to an electronic mailbox.
- Post Office Protocol (POP) requires an additional POP server running on the email server.
- Internet Message Access Protocol (IMAP) protocol allows for more sophisticated server-client interaction than POP.

POP3 RFC 1939

- Uses TCP.
- Uses port 110

POP Example

```
C> telnet mailserver 110
S> +OK POP3 server ready
S> +OK
C> user alice
S> +OK
C> pass hungry
S> +OK user successfully logged on
C> list
S> 1 498
S> 2 912
S> ...
S> blah blah ...
S> .................blah
S> ...
C> dele 1
C> dele 2
S> +OK POP3 server signing off
S> quit
```