Distributed computing - A historical perspective (2/3)

MIME: How Email Grew Up

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And
Mimecast

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Email in the 80's

- Text only, with a few exceptions
- Only English – 7 bit US-ASCII was standardized
- Other languages and character sets by mutual agreement
  - If you were in Japan, you assumed ISO-2022-JP
  - In Western Europe: ISO-8859-1
  - In Israel: ISO-8859-8
  - Etc.
  - Life was hard for pre-laptop international travellers
- And a few experimental multimedia mail systems
  - I was personally impassioned about all aspects of email and remote work

CMU's Andrew System (1982-9X)

"The Academic computing environment of the future"

Total control of an entire campus

Andrew File System (AFS)

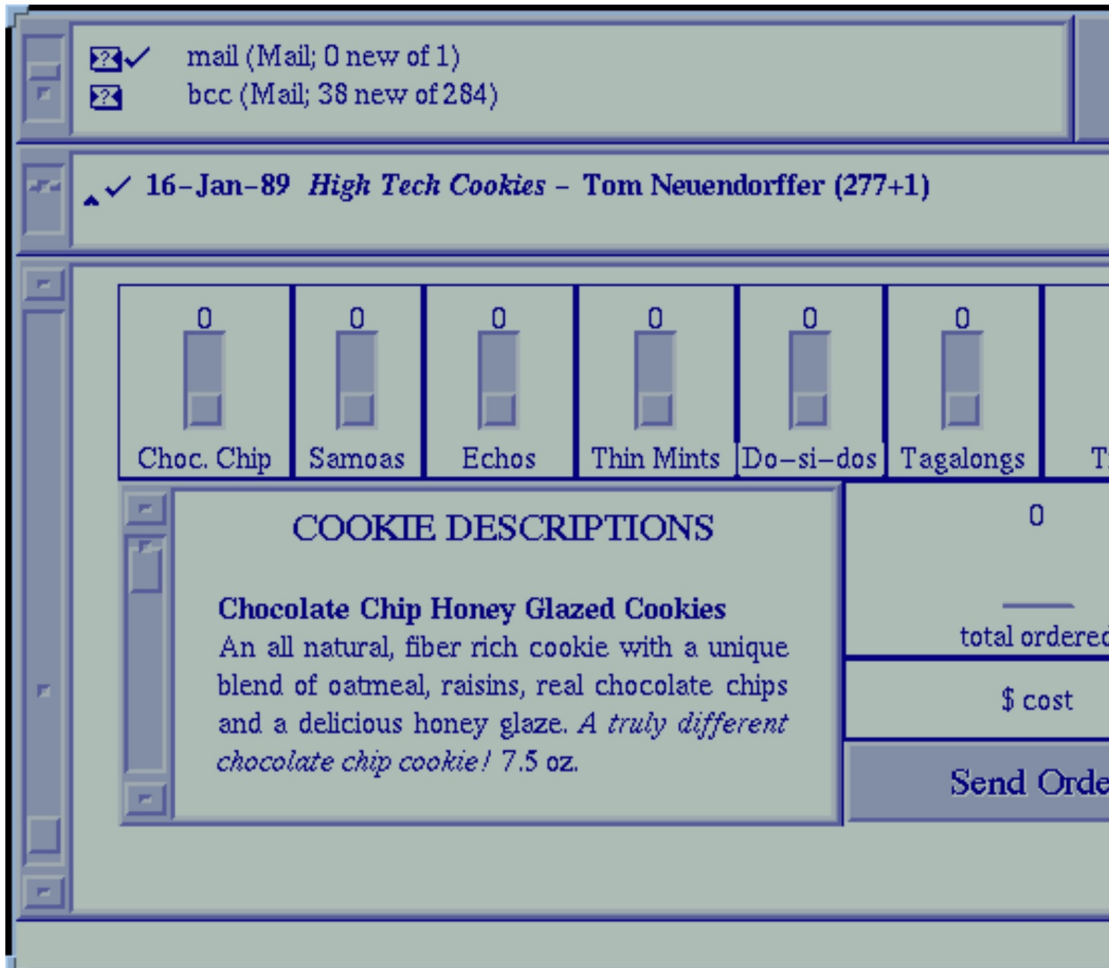
Andrew User Toolkit & window mgr

Andrew Message system – email++

- Pictures
- Sounds
- Rich Text
- International Languages
- Animations
- Working pianos
- Interactive cookie sales
- ….

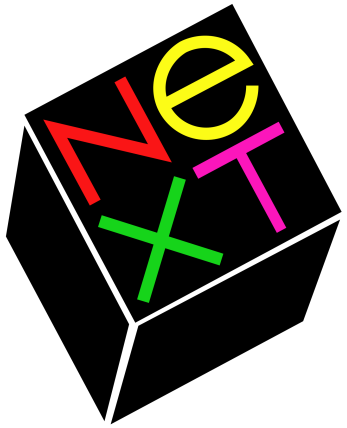
Impressive Demos!

- Steve Jobs tried to hire us all
- No one bit!



NeXTMail (circa 1991?)

"The Sincerest Form of Flattery"



But our users couldn't interoperate!

Email Interoperation Was Hard

- No non-text media standard
- No non-ASCII text standard
- No rich text standard
- Nasty interoperation problems
  - 80 character line wrapping
  - Truncations to 7 bits, and not all 128 of those characters worked!
  - ASCII-EBCDIC conversions, ASCII variants, other character sets
  - Major protocol gateways (e.g. BITNET, UUCP)
  - Special constraints on email headers
  - Huge character set headaches
- Some people did non-interoperable experiments (CMU/Andrew, NeXT, Sun, BBN)
- Some people wanted to start over (Steve Jobs: Just do what we do!)

The Politics of MIME

- A lot of people focused on character sets & natural languages, but most didn't understand email.
- Some of us were focused on extending email from text to multimedia.
- A few people wanted to simplify gateways between mail systems.
- Wrapping these together produced great momentum for producing and implementing a standard for all of them.
- (A little ego massage helped too.)

Einar Stefferud
1930-2011

Stef saw my Andrew demos, introduced me to Ned Freed, and suggested we collaborate "to finish off OSI"

MIME: Multipurpose Internet **Mail** Extensions

- Goal: solve all those problems with total backwards compatibility!
- Complex Encodings for robust transport across gateways
- Special encodings for email headers
- Media Type Registry
- Two-tier media structure
  - Text (w/charsets), Image, Audio, Video
  - Multipart, Encapsulated Messages
  - Application (catchall)
  - Later: Font, Model, Example

```
Message-Id: <Edjbh9O0M2YtQL5uct@thumper.bellcore.com>
Date: Wed, 11 Mar 1992 16:27:37 -0500 (EST)
From: Nathaniel Borenstein <nsb>
Mime-Version: 1.0
To: ietf-822@...., info-metamail@....
Subject: Barbershop MIME

Those of you not running MIME-compliant mail readers won't get a lot out
of this, nor will those without ftp access to the Internet, but for the
lucky few....

Here are the infamous Telephone Chords, the world's premier (=only)
all-Bellcore barbershop quartet, singing about MIME.  Note that because
the "message/external-body" MIME construct is used, this whole message
is only about 3000 bytes -- at least, until you start reading it.  :-)
```

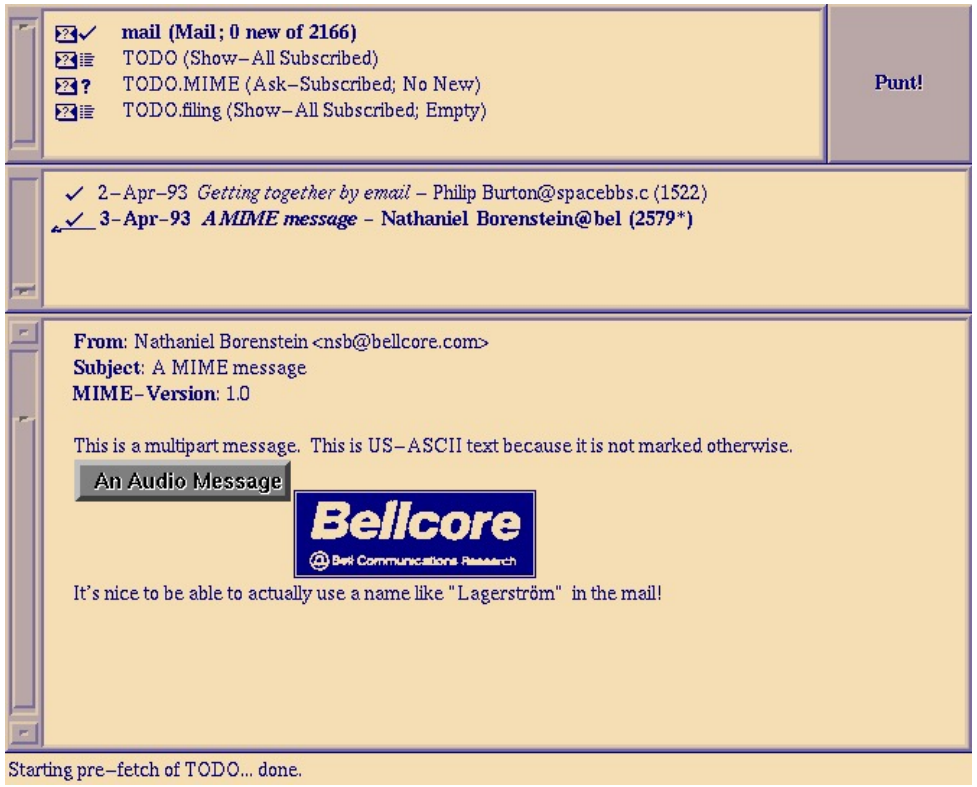
(To the tune of "Let Me Call You Sweetheart")

Let me send you email if you have the time
Let me sing you email now that we have MIME
You have lots of bandwidth, I have lots of bits
Let's use MIME for email, plain text is the pits!

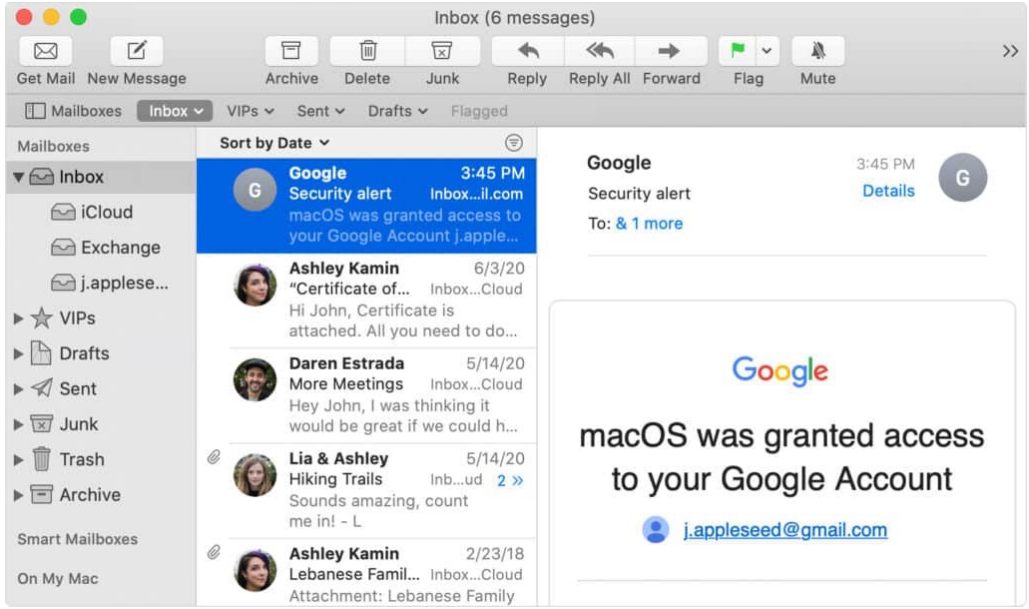
The Telephone Chords, 1992

John Lamb, bass; David Braun, baritone; Michael Littman, lead; Nathaniel Borenstein, tenor

Andrew, NeXT, and All Survivors Moved to MIME



NeXTMail become Mac Mail.App



Adoption Hastened By Open Source

Metamail: A Portable Open Source MIME Implementation

- Easily incorporated into existing mail readers
  (typically opened media objects in new windows)
- Defined “mailcap” files
- Worldwide adoption within weeks. (My wildest dream? Done.)
- Code gradually cannibalized/integrated; mostly a transition tool.
- In 10 days, I received patches for *ix, DOS, Mac, Amiga, VMS …
  - … and soon much more!

The Call From CERN (circa 1992)

I get lucky:

> CERN: "We've heard about MIME. Do you think it would work for the World Wide Web?"
>
> Me: "What's the World Wide Web?"

So now, quadrillions of times daily , the web uses (parts of) the Multipurpose Internet **MAIL** Extensions.

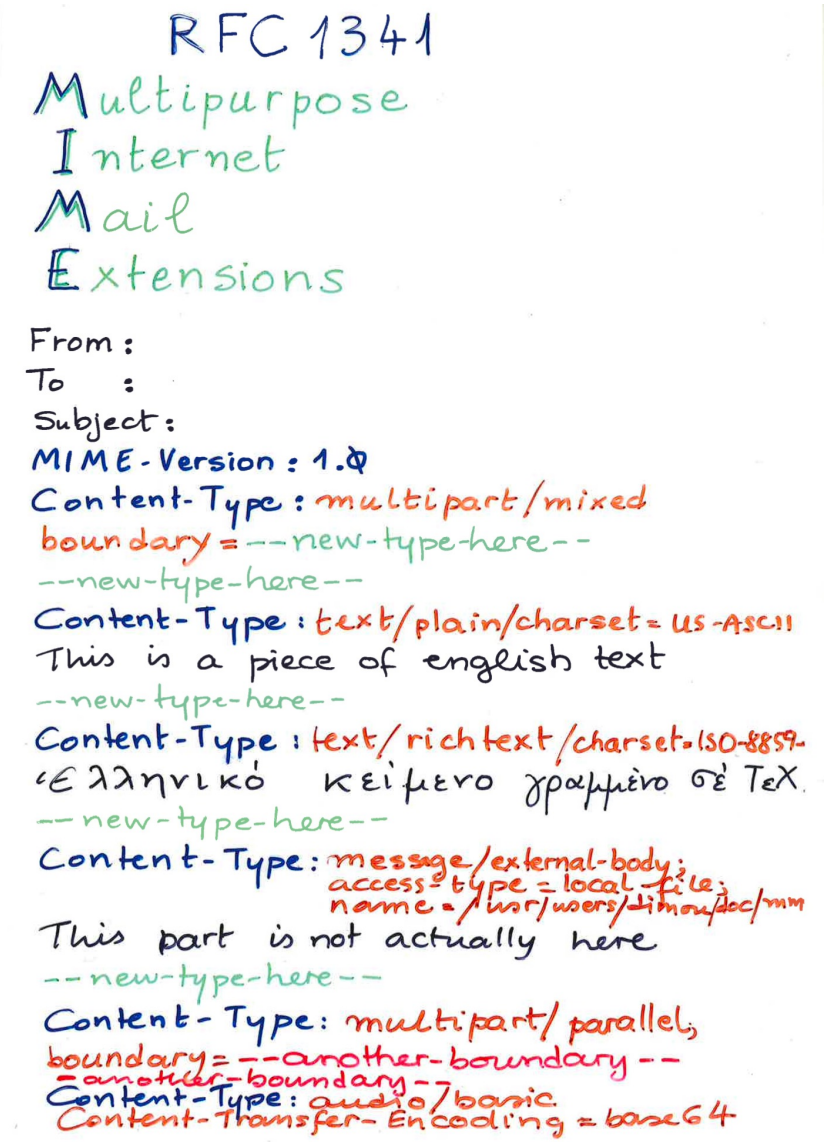
Not long after…

Maria Dimou, not yet having succumbed to PowerPoint, spreads the word at CERN…

Web team took media type structure
(& some metamail code, I think)

but not the email crud

or the structuring MIME types.
(HTML structuring is richer.)



The MIME (Media Type) Registry

- 1992: 16 types
- Today: ~1600?
  - Smells
  - Matter ("model/*" - for 3D printing, drug smuggling, transporter beams)
  - Zillions of proprietary formats
- Common naming for global media interoperation.

….and back to Maria!