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.)
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
Andrew, NeXT, and All Survivors Moved to MIME

NeXTMail become Mac Mail.App

From: Nathaniel Borenstein <nmb@bellcore.com>
Subject: A MIME message
MIME-Version: 1.0

This is a multipart message. This is US-ASCII text because it is not marked otherwise.

An Audio Message

It's nice to be able to actually use the name like "Lagertrium" in the mail!
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!