Evolving The Future

Nathaniel Borenstein
Email World Special Presentation
Tuesday, November 2, 1993

1. The History of Human Work
2. Email as the key technology of tomorrow
3. What can email do?
4. What stands in the way?
5. The standards process
6. How to avoid the "character set trap"?
7. A vehicle for technology *and* attitude: The Electric Eclectic
8. Calls to Arms

1. The History of Human Work

Man the hunter-gatherer: Privation, but Freedom: "Looks like a good day to pick berries".

The Farmer

Somewhat more security, considerably less freedom

The Factory Worker-- Much more security, very little freedom

The Office Worker -- (Need I say more?)

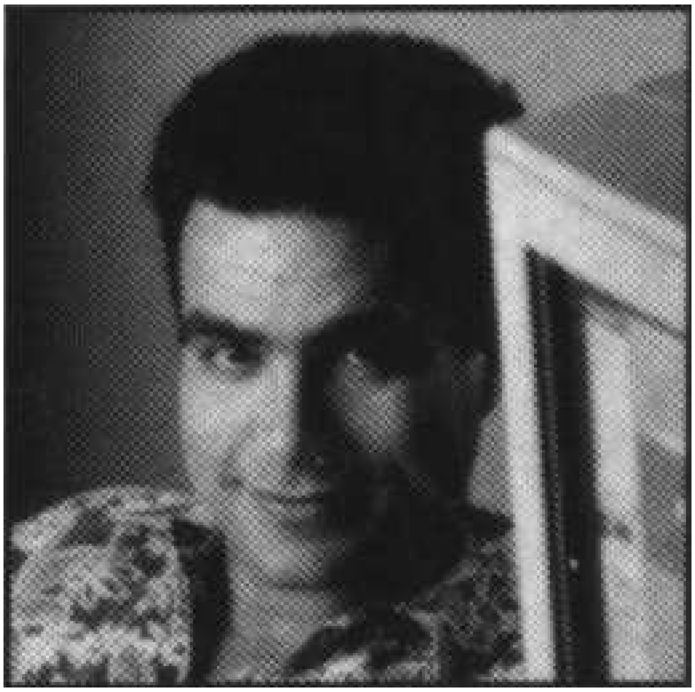
The Telecommuter -- The best of both worlds?

Information technology liberates in space, Email in time

2. Email as the key technology of tomorrow

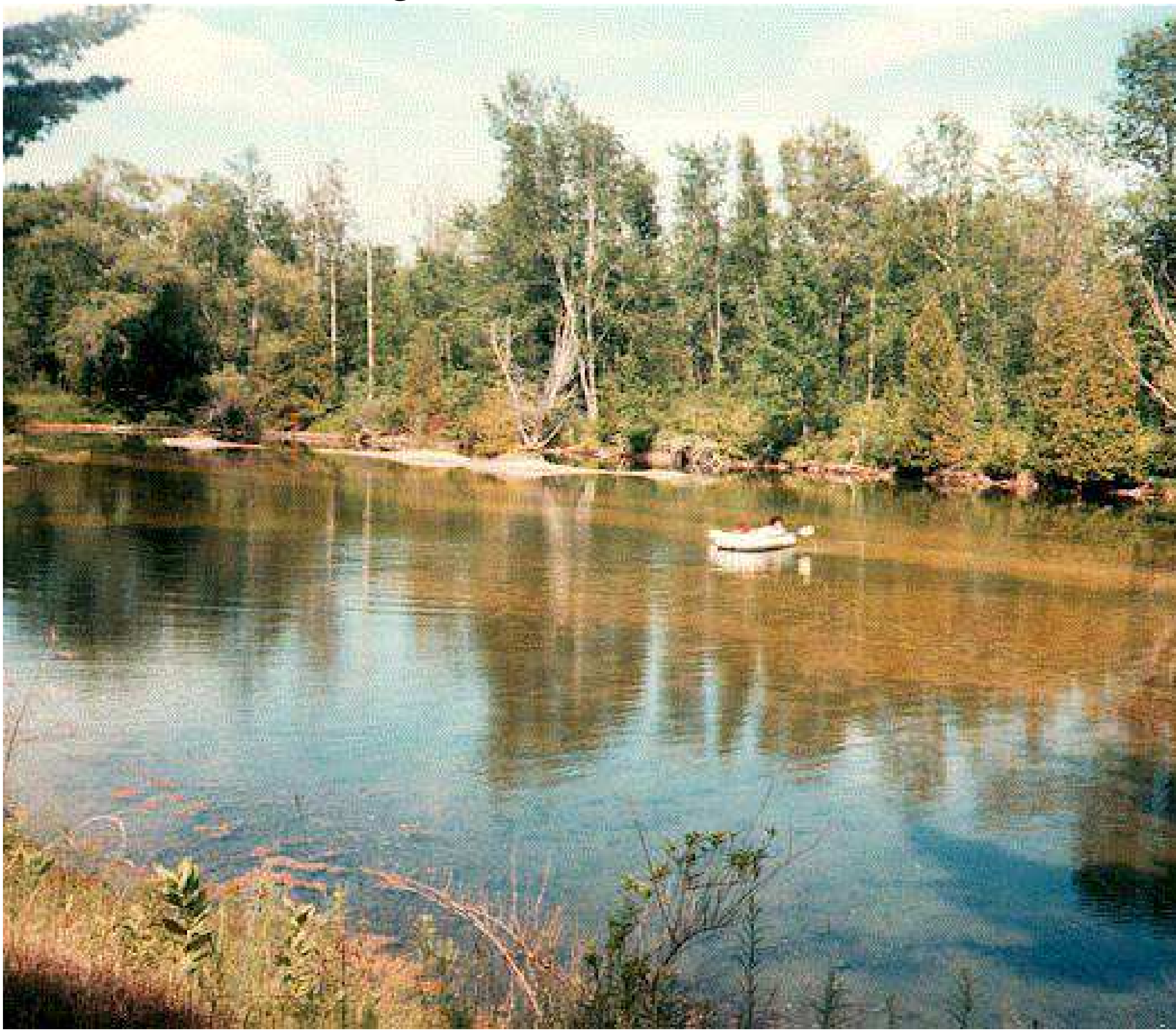
Email is fundamentally the most distributed technology in history.

Most egalitarian -- Softens social, economic, and gender roles



Email is also the technology most flexible in space and time

Most freedom-enhancing.



3. What can email do?

Anything you can do with words, pictures, or sounds, with higher throughput and latency, greater flexibility and precision.

Throughput: less hemming, hawing, polite chitchat

Latency: fast answers are problematic

Flexibility: no need for colocation spatially OR temporally

Precision: Sophisticated mail types can get precise annswers to well-formed queries.

Any application that relies on human communication can be done with email!

Only latency-critical applications are inherently problematic.

Email has the potential to transform our whole economy and society.

Most critical to realizing this dream: interchange formats and languages

Partial solution: MIME (Multipurpose Internet Mail Extensions)

Critical MIME omission: Standardized language for mail-enabled applications
and "active" mail

4. What stands in the way? Aren't we there yet?

Biggest obstacle: lack of universal interchange standards.

Biggest problem: NIH ("Not Invented Here")

Invention is too easy.

It's apparently more natural to invent than to cooperate .

Proprietary formats prevent interoperation, promote holy wars

Historical example: Andrew & Diamond/Slate

Current examples: Lotus (Notes), General Magic (Magicap), Adobe (Acrobat)

5. The standards process

Everyone believes in standards. Motherhood, apple pie.

But which standards? And how to make them work?

Three stories:

- X.400 versus MIME
- Standardizing an active messaging language
- The history of character sets

X.400 versus Internet Mail: The Real Scoop At Last!

[Disclaimer: I used to be an Internet bigot, but now I'm perfect...]

People knew Internet mail standards were inadequate over a decade ago. Bettering them has been a fascinating story:

1. X.400. Originally designed to replace existing mail systems, fix all the problems with Internet, BITNET, etc.

2. Process flawed for many reasons. Results technically flawed in some ways, but more critical failure was incompatibility with installed base (or even earlier X.400 versions!)

3. Meanwhile, Internet mail grew exponentially. Eventually, MIME fixed most of the problems backward-compatibly.

X.400 versus Internet, continued

4. Meanwhile, X.400 is here to stay too!

5. Good MIME-X.400 gateways may finally make the Internet versus X.400 question completely irrelevant except as an implementation decision.

6. MIME is even the glue between X.400-84 and X.400-88!

7. The Internet attitude is all-inclusive. The Internet has no enemies.

Some Morals To Be Drawn

1. Internet & X.400 bigots are both wrong. Heterogeneity will rule forever.

2. The true Internet philosophy wants X.400-compatibilty even more than it wants BITNET-compatibility.

3. Revolution in organic or distributed systems is very hard.

4. Evolution is very powerful.

5. Attempts at revolution turn into evolution.

Standardizing an active messaging language

First working active messaging language: R2D2 (late ’70’s). Other early efforts: imail, Andrew/Ness, ATOMICMAIL

None of the above were designed to be standards. Explored basic mechanisms, security, portability.

Problem: Programming language design promotes bloodshed.

Standard is needed. Internet effort: Safe-Tcl.

Think about PL/I and Ada. Think about X.400. We need to do something differently this time!

Come to tomorrow’s talk for the answer....

A Cautionary Tale: character sets

The only "universal" character set: ASCII

No languages but English

Many incompatible supersets/extensions

Ongoing confusion as to precise definition, minor variants

Still not universal! (Think "EBCDIC").

Other character sets in enclaves -- Europe, Israel, Japan, etc...

Character Sets - A Solution in Sight?

Obvious solution: A single world character set

Unicode: the world’s standard character set

ISO 10646: the world’s standard character set

Uh-oh.

Well, they’re sort of merging, sort of, maybe, well...

Programming languages are inherently MORE complicated!

This sort of thing MUST be nipped in the bud if possible.

6. How can we avoid the "character set trap"?

The problem is not technical. All the character sets are fine.

That’s what makes it hard. The solutions are non-technical too:

> Mutual respect. What others have done should be assumed to be of value unless proven otherwise.
>
> Coherent, mutually friendly evolution
>
> Presumption of incremental advances rather than revolutions
> -- (e.g. new MIME entities, new Safe-Tcl versions)
>
> Avoidance of gratuitous invention

How to Develop Data Format Standards

Internet standards process: a working but creaky model. Still need:

Better communication among interested parties

SHARED email technology for discussing the evolution of email technology!

Greatest need: A positive attitude

-- about the competence of others

-- about technology-in-place while better stuff is being designed.

7. A vehicle for both technology and attitude: The Electric Eclectic

A customizable multimedia metamagazine for the Internet Community

-- Multimedia: sound, pictures, video, interaction (Safe-Tcl)...

-- Customizable
- content (many virtual magazines)
- medium (no video for me, please)
- representation format (I prefer JPEG to GIF)
- quality (only send me the best 10%)
- delivery frequency (I want weekly delivery)
- complex subscription management software coming

The Electric Eclectic: Initial Incarnation

Free, volunteer-based, using MIME

Initial virtual magazines:
- Email Universe (see below)
- Soul of The Internet
- Digital Video Review
- Digital Music Review
- Extremely Eclectic

Future incarnations: Who knows?

Help wanted: Editors, writers, artist, musicians, hackers, thinkers, subscribers....

The "Email Universe" Submagazine

Email World + the rest

Forum for coherent explanations. (Discussion spillover to lists/news)

Socialization environment for Email People

Forum for technological experimentation

New minimum standard for email software: good enough to read "Email Universe
"

8. Calls to Arms

Support MIME.

- Demand to take multimedia capability for granted.
- Ask intelligent questions
  - multipart alternative?
  - message/external-body?

Push techies towards Tcl.

- Ask "why not?"
- Demand serious answers.
- Accept no bigotry from ANY side.

Subscribe to the Electric Eclectic.

Imagine how to use email to create new forms of literature and distributed systems.

The Electric Eclectic: How To Participate

Subscribe: ee-subscribe@eitech.com
Join discussion list: ee-discuss-request@eitech.com
Volunteer: ee-volunteer@eitech.com
Submissions: ee-submit@eitech.com (or physical mail)

Bellcore
Bell Communications Research