Xerox's Contribution to the Development of Office Automation via the Desktop Metaphor and Distributed Computing Systems

Jeff.Hodges@Stanford.edu
Last updated: 5-Jun-1998

Source
http://www.stanford.edu/~hodges/Xerox/
11 jan 2000

On 2-Jun-1998 Dave Curbow announced yet another The final live demonstration of the Xerox 'Star' computer, 1981 on the exxerox@whyanext.com distribution list (for ex-PARC/OSBU Xeroids). There followed an innaresting email discussion involving some luminaries that not only documents some of the history behind much of what we work with and take for granted today, but also reveals aspects of key players' personalities and feuds yet put to rest...

* Dave Curbow's announcement which touts many innovations embodied in Star
* Ron Newman's reply to the announcement (quibbles about task pre-emption or not)
* Alan Freier's reply (yes, it had pre-emptive multitasking)
* Ted Manley's reply (Harley used for disk delivery)
* Jeff Johnson's reply (cool observations from an earlier playing of the Star demo)
* Frank Ludolph (insights on the above, from giving the demo)
* Larry Tesler's observations on Dave Curbow's announcement (entitled: Rewriting History?), in which he attempts to correct what he perceives as liberal interpretations of the development history of many of Star's innovations in Dave Curbow's announcement.
* Ron Newman's reply to Tesler (user interface quibbles upon quibbles...)
* John Linton's reply (wherein multi-lingual capabilities are remembered...)
* John Talbot (..and all those messages we had to translate for all those languages)
* David Liddle (Whoowee, Dave flames Larry)
* Shannon McElyea (whatever it was, it was useful...)
* Robert Garner(..and was comercially available, way ahead of its time)
* John Linton (now, who is he referring to?)
* Derry Kabcenell (of property and option sheets)
* Keith Marzullo (two examples of key technical architecture/implementation mistakes)
* Hugh Lauer (wherein we find the real mistakes, and who was ultimately right, according to Hugh)
* Jim White("closed, not open" sucked)
* Saund (Gee, the ideas and innovations in Star sure got around eventually)
* Larry Tesler replies again (hyperbole itself)
* Earsh's reply (we did fix one of those major technical issues..)
* Phil Burton (Yep.)
* Jeff Johnson (yet more corrections upon corrections, good stuff though)
* Phil Burton (Gates bashing)
* Hugh Lauer (Thanks to Victor for maintaining the ex-Xerox list)
* Ron Newman (debunking Apple mis-truths about various achievements and innovations)
* Charlie Levy (upon some of the significance multitasking has to users, and the success of Documentor)
* Mark Simmons (a current Xeroid speaks up and sets some of the record straight)
* Larry Garlick (more clarifications on who did what when)
* Robert Purvy (you all were the best folks to work with, miss you)
* Larry Tesler (stands corrected and provides clarifications)
* Larry Tesler (Xerox did sue Apple, but screwed that up too)
* Ron Newman's query about "Pilot 13 was after my Xerox tenure, mind filling me in on what all occured?"
* Mark Simmons (a short sketchy history of Pilot 13, ViewPoint, etc.)
* Ron Newman (yet more questions)
* Martin Cooper (weighs in with Pilot 13 info, and yet more questions...)
* Alan Freier (the scoop on Pilot 13)

==========

---
* Dave Curbow's announcement which touts many innovations embodied in Star

Date: Tue, 2 Jun 1998 22:28:08 -0700 (PDT)
Sender: server@whyanext.com (Listproc server)
Reply-To: dave.curbow@Sun.COM
From: Dave Curbow <dave.curbow@Sun.COM> (by way of Victor Schwartz)
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: "The final live demonstration of the Xerox 'Star' computer, 1981"

Bay Area Computer History Perspectives
and
The Computer Museum History Center
present:

"The final live demonstration of the Xerox 'Star' computer, 1981"

5:30 - 7:00 PM
Wednesday, June 17, 1998
Xerox Palo Alto Research Center Auditorium

Unquestionably, one of the major design innovations of this century has been the Graphical User Interface for computers, with its desktop, icons, pop-up and pull-down menus and ubiquitous windows. The explosion of computer usage in the last decade has in large part been made possible by this simpler and more direct method of user interaction. Though over 100 million people around the world are now using GUI's, few outside of the Human/Computer Interaction field are aware of the history of its design.

The first GUI ever developed was the work of Dr. Douglas Englebart, a researcher at SRI in the 1960s. His visionary and pioneering design and prototypes succeeded in producing the world's first screen-based windows, cursor-selectable pop-up menus, as well as the mouse with which to interact with them.

Though these innovations were truly revolutionary, it was not until a decade later that researchers at the Xerox Palo Alto Research Center (PARC) began systematically applying these ideas in personal computers. During the 1970s, PARC produced the first personal computer to have a bitmapped display and to use overlapping windows (the "Alto"), the first laser printers, the first Ethernet local area network, and object-oriented programming languages such as Smalltalk.

Seventeen years ago, in 1981, these ideas came together in the Xerox 8010 "Star" Information System. This was a commercial personal computer designed for office workers and built by Xerox's System Development Division. It incorporated features that today define personal computers: a bitmapped display, mouse, windows, local hard disk, network connectivity, and laser printing. In addition, Star invented and introduced the first graphical user interface, with the first icons, desktop metaphor, dialog boxes, universal commands, and a "point and click" style of interaction now known as "direct manipulation." It was the first commercial object-oriented computer interface.

As revolutionary as these software ideas were, the hardware was equally innovative. When the Star project was begun in 1975, only rudimentary microprocessors existed such as the Intel 8080. To obtain the speed needed for the graphical user interface and to enable a very cost-effective machine for the time, Star used four 2901 bit-sliced processors to implement the Mesa language and to control I/O and the 10-mbps Ethernet. Without the

advantage of hardware interrupts, its designers supported an event-driven interface by creating a nonpreemptive multitasking architecture. They designed the first commercial Ethernet protocols and developed a suite of network services including a world-wide naming architecture that anticipated today's URL's.

Star had a profound effect on the personal computer industry. Today all personal computers and many workstations incorporate its ideas. It is not farfetched to state that Star was a motivating factor in the formation of the computer-human interaction field and ACM's SIGCHI organization (which was formed in 1982, the year after Star came out). Yet few people have actually seen a Star computer. We will remedy that in this presentation. The head of the Star project and several of its inventors will give a one final demonstration of Star and use it to illustrate its design principles. This may be the last time it gets demoed, as the hardware has begun failing due to its age. Don't miss this opportunity to witness an important step in the history of computing and user interface design.

The Speakers:

Dr. David E. Liddle is co-founder, president and CEO of Interval Research Corporation, a high-technology research lab studying technologies that will be meaningful to people in the future. Interval performs research and advanced development in more than 20 technology areas, including network cultures, interactive entertainment, fashionable technology and signal computation.

During and after his education (B.S., E.E., University of Michigan; Ph.D, Computer Science, University of Toledo, Ohio), Liddle has spent his professional career developing technologies for interaction and communication between people and computers. He worked for ten years at the Xerox Palo Alto Research Center and the Xerox Information Products Group where he was responsible for the first commercial implementation of the Graphical User Interface and local area networking. He then founded Metaphor Computer Systems which was acquired by IBM in 1991. In 1992, he co-founded Interval Research with Paul Allen.

**Liddle is a consulting professor of Computer Science at Stanford University. He is chairman of the board of trustees of the Santa Fe Institute. He has served as a director of several companies. He was honored as a distinguished alumnus from the University of Michigan, as a member of the advisory committee of the school of Engineering at Stanford University and as a Senior Fellow of the
Royal College of Art.**

Dr. David Canfield Smith received a B.A. in mathematics from Oberlin College in 1967 and a Ph.D. in computer science from Stanford University in 1975. His Ph.D. thesis contained two new ideas: icons and programming by demonstration. After a brief stop at SRI in Doug Englebart's lab at SRI, Dr. Smith joined the Xerox Corporation's "Star" computer project in Palo Alto, remaining with it for seven years. He was one of the principle designers of the Star user interface, inventing for it the concepts of icons (from his Ph.D. work), the desktop metaphor, dialog boxes, and generic commands. After joining and/or founding three start-up companies in five years, Dr. Smith joined Apple Computer in 1988. At Apple he worked on a variety of software projects for future computers, including educational software with Alan Kay. This work culminated in a new approach to programming by children, called "Cocoa." Today he is in a start-up company that is turning Cocoa into a product. The unifying goal behind Dr. Smith's work for the past twenty years has been to make computers more accessible to ordinary people.

Dr. Robert L. Belleville joined Doug Englebart's pioneering

laboratory at SRI after completing his Ph.D in 1974. At Xerox he developed both the 8010 Star and 8086 based network pc called Cub. Called by Steve Jobs in 1982 he directed the development of the original Macintosh, Laserwriter and AppleTalk network. Until 1997 he investigated information access technology at SGI. He is currently a clock maker in Los Altos.

Robert Garner joined Xerox in 1977 and co-designed the Xerox STAR Professional Workstation, responsible for the CPU and Ethernet interface hardware. In 1984 at Sun Microsystems, he was co-architect of Sun's SPARC RISC architecture and co-designed the Sun-4/200, Sun's first SPARC workstation. More recently he was a senior manager on the UltraSPARC-I microprocessor and then director of Java media microprocessors.

Dave Curbow joined the Star development team in 1983 as a software engineer and later as HI designer. In 1990 he moved to Apple where he worked for HI designer and researcher for another 7 years. During this time, Dave Curbow and Dave Smith were two of the principle HI designers of OpenDoc -- which attempted to bring some of Star's pioneering features to today's PCs. Today Dave is a member of the SunSoft Science Office. Dave has a garage full of Xerox hardware that was the basis for the first "last" Star demo at the CHI '98 conference.

---

* Ron Newman's reply to the announcement (quibbles about task pre-emption or not)

Date: Tue, 2 Jun 1998 22:42:24 -0700 (PDT)
Sender: server@whyanext.com (Listproc server)
Reply-To: rnewman@theCIA.net
From: Ron Newman <rnewman@theCIA.net>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: "The final live demonstration of the Xerox 'Star' computer,

On 6/3/98 at 1:28 AM -0400 , Dave Curbow wrote:

>Without the
>advantage of hardware interrupts, [Star's] designers supported an event-driven
>interface by creating a nonpreemptive multitasking architecture.

Are you sure about this? My memory is fading, but I distinctly
recall Mesa and Pilot providing a *preemptive* multitasking architecture.

In a non-preemptive architecture, there would have been no need for
all of those MONITORLOCKs and CONDITION variables.

--
Ron Newman rnewman@thecia.net
Web: http://www2.thecia.net/users/rnewman/

---

* Alan Freier's reply (yes, it had pre-emptive multitasking)

Date: Tue, 2 Jun 1998 23:40:25 -0700 (PDT)
Sender: server@whyanext.com (Listproc server)
Reply-To: freier@hamilton.com
From: "Alan O. Freier" <freier@hamilton.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: "The final live demonstration of the Xerox 'Star' computer,

You're right. Preemption was put into Mesa in '79. This story does indicate the 8010, and preemption was certainly in Mesa before the 8010 turned a mop-code.

AO

--
Alan O. Freier http://wildflower.meer.net
Day job mailto:freier@netscape.com

---

* Ted Manley's reply (Harley used for disk delivery)

Date: Wed, 3 Jun 1998 08:37:07 -0700 (PDT)
Reply-To: TManley@aol.com
From: <TManley@aol.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: "The final live demonstration of the Xerox 'Star' computer, 1981"

Side note, the first version of Star software on 8 inch floppies was delivered to LAX to be shipped to the manufacturer in Dallas on the back of a Harley-Davidson, I know this for a fact :-)

Later.....
\TMP. . . .
"Star will run on 196k of memory!!"

---

* Jeff Johnson's reply (cool observations from an earlier playing of the Star demo)

Date: Thu, 4 Jun 1998 07:47:43 -0700 (PDT)
From: jeffjohnson@igc.apc.org (Jeff Johnson)
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: The final live demonstration of the Xerox 'Star' computer

An additional comment:

Both Lisa and Star (actually Viewpoint) were demo'ed at this year's CHI'98 conference in L.A. in April, in sessions titled "Honoring Our Elders". For me, those demos were the highpoint of the entire conference. From those demos, four occurances (all unplanned) stand out most of all in my memory, three of which have to do with Lisa, and one of which had to do with both Lisa and Star:

1. When Rod Perkins was giving an informal demo of Lisa (the day before the formal demo session), he remarked that when he was invited to do the demo, he went up into his attic to find the Lisa he had stored there. He told us that he found it, pulled off the boxes that were stacked on top of it, blew the dust off, took it down to his kitchen table, plugged it in, turned it on, and it came up into the taxes that he had been working on in 1985! Same position in the document. Same selection. Same cut-buffer contents. All state restored from thirteen years ago. Amazing! I don't believe Star would have preserved that much state.

2. When Frank Ludolph was giving the formal Lisa demo, he edited a graphics file. When he tried to close the file, a dialog box appeared, reading "Do you want to replace the document that you last edited 7 years ago?" The audience got a laugh out of this, but I think it was quite noteworthy for two reasons, one of which Frank mentioned and one of which he didn't. Frank said that the document had in fact been last edited 10 years ago, but Lisa's clock stopped advancing in 1995. In other words, Lisa didn't have a year-2000 problem; it had a 1995 problem. What Frank didn't point out was that the dialog box gave the elapsed time in years. Most systems in this situation would have given a specific last-edit date, or displayed the elapsed time as "2555 days". Whoever programmed that dialog box thought to convert very-long time intervals into years. What foresight!

3. During the Lisa demo, Frank Ludolph at one point duplicated a file that he meant to move. He was quick to point out that Lisa (and Mac) use the same UI for moving and copying documents, and that this was sometimes a problem for users, but usually did what users want. Behind me in the audience, a fellow suddenly said: "Hey! Those two files have the same name!" No one else picked up on this, so I told him that in both Lisa and Star, filenames have no particular significance to the O.S. and users are free to give multiple files the same name if they want to. He found that hard to swallow.

4. During the question-answer period, one audience member said: "Seeing these two amazing systems makes me wonder what we've been *doing* for the past 15 years. We have color now, what else?" Neither the Star demoers nor the Lisa demoers gave him much of an answer. In my opinion, what "we" have done over the past 15 years is put these kinds of UIs on the vast majority of the huge number of PCs that are in daily use (the "we" being mostly Microsoft and Apple, with a little help from unix system vendors). The audience member who raised the question was of course thinking more of innovation than of proliferation, but in my view the proliferation is a

more useful and tangible advance than further innovation would have been.

So now my question is: can we have a Bay Area "last Lisa demo" to complement the "last Star demo"? And maybe a "last Metaphor demo"?

-- Jeff Johnson

---
* Frank Ludolph (insights on the above, from giving the demo)

Date: Thu, 4 Jun 1998 12:00:20 -0700 (PDT)
From: Frank Ludolph <frank.ludolph@Eng.Sun.COM>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: The final live demonstration of the Xerox 'Star' computer

Jeff mentioned the CHI joint Star/Lisa demo. As one of the presenters it was a blast to do. Most of you have experienced 'Oh, I should have said...' Jeff's comments give me the chance to say it, though to a differenct audience. :-)

> From: jeffjohnson@igc.apc.org
> ...
> 2. When Frank Ludolph was giving the formal Lisa demo, he edited a graphics
> file. When he tried to close the file, a dialog box appeared, reading "Do
> you want to replace the document that you last edited 7 years ago?" The
> audience got a laugh out of this, but I think it was quite noteworthy for
> two reasons, one of which Frank mentioned and one of which he didn't.
> Frank said that the document had in fact been last edited 10 years ago, but
> Lisa's clock stopped advancing in 1995. In other words, Lisa didn't have a
> year-2000 problem; it had a 1995 problem. What Frank didn't point out was
> that the dialog box gave the elapsed time in years. Most systems in this
> situation would have given a specific last-edit date, or displayed the
> elapsed time as "2555 days". Whoever programmed that dialog box thought to
> convert very-long time intervals into years. What foresight!

Thanks to Larry Tesler. I alway thought it was a great feature.

> 3. During the Lisa demo, Frank Ludolph at one point duplicated a file that
> he meant to move. He was quick to point out that Lisa (and Mac) use the
> same UI for moving and copying documents, and that this was sometimes a
> problem for users, but usually did what users want.

Actually, Mac and Lisa used the same drag-and-drop action, but Mac does a copy when the destination is a different disk while Lisa always did a move. The Mac get beat-up for being inconsistent, but Lisa's consistency lead to difficult to correct errors when an item was dragged from hard disk to diskette - the item was removed from the hard disk and the diskette may have been physically taken to another location.

> ... Behind me in the
> audience, a fellow suddenly said: "Hey! Those two files have the same
> name!" No one else picked up on this, so I told him that in both Lisa and
> Star, filenames have no particular significance to the O.S. and users are
> free to give multiple files the same name if they want to. He found that
> hard to swallow.

I considered mentioning this but cut it from the demo as time was tight. Near the end of the demo I mentioned that the object icons (docs, folders, tools, etc.) were *not* diskfiles and behind an icon could be 0-n diskfiles. (The unique naming being a requirment of the file directory.) This enabled the Lisa to keep two versions of an edited document, 'saved' and 'edits'. The Mac ignored this but NeXT picked it up for their applications and, at 3.0, for other objects as well. This both reduces the number of superflous icons and prevents accidental corruption of the object (move/copy/delete). Removing the 1-1 icon-to-diskfile relationship is one that I'd really like Apple and Microsoft do.

> 4. During the question-answer period, one audience member said: "Seeing

> these two amazing systems makes me wonder what we've been *doing* for the
> past 15 years. We have color now, what else?" Neither the Star demoers
> nor the Lisa demoers gave him much of an answer. In my opinion, what "we"
> have done over the past 15 years is put these kinds of UIs on the vast
> majority of the huge number of PCs that are in daily use (the "we" being
> mostly Microsoft and Apple, with a little help from unix system vendors).
> The audience member who raised the question was of course thinking more of
> innovation than of proliferation, but in my view the proliferation is a
> more useful and tangible advance than further innovation would have been.

Having flubbed the answer then, I would have answered that we have spent the time, with diminishing returns, on evolving the UI mechanisms. Unfortunately we have been unable to prune off the earlier mechanisms and the result is some rather baroque UIs. I believe that we could build a very good bitmap/mouse UI now if we could do it from the ground up without having to include everyone's favorite feature.

Jeff's comment about proliferation addresses a flubbed answer to a comment from Dave Ungar who said that "these system's really cared about users in a way that today's systems don't seem to." (Or words to that effect.) In those days we were trying to convince people to use computers, that they *could* use computers, in an office environment. Now days, not being able to use a computer is like not having a driver's license in Los Angeles - you can't get by without it. Today users are over a barrel. They have to invest the effort to learn how to use the machine no matter how difficult - it's part of the job requirement. And in the end useability issues rank in priority no higher than 3rd behind features and performance. Just read all the reviews...

When I look back at the technical achievements of Star, well, it is just awesome! It took about 15 years for desktop products to begin to match the overall feature set.

Frank

---

* Larry Tesler's observations on Dave Curbow's announcement (entitled: Rewriting History?), in which he attempts to correct what he perceives as liberal interpretations of the development history of many of Star's innovations in Dave Curbow's announcement.

Date: Wed, 3 Jun 1998 01:04:45 -0700 (PDT)
From: Larry Tesler <tesler@pobox.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Rewriting history?

David,

The Star is unquestionably historic and the talk is going to be a great occasion. But the wording of the announcement contains loose language and overstated claims. Hopefully, these claims are just to get people's attention, and aren't made in the talk itself.

>Unquestionably, one of the major design innovations of this century has
>been the Graphical User Interface for computers, with its desktop, icons,
>pop-up and pull-down menus and ubiquitous windows.

Pull-down menus, are, by definition, menus pulled down from a menu bar high on the screen. They first appeared in the Lisa.

>The first GUI ever developed was the work of Dr. Douglas Englebart, a
>researcher at SRI in the 1960s. His visionary and pioneering design and
>prototypes succeeded in producing the world's first screen-based windows,
>cursor-selectable pop-up menus, as well as the mouse with which to
>interact with them.

The mouse was developed by Doug and his group, but the rest is news to me.

Cursor-selectable pop-up menus? I don't recall seeing any in NLS demos. Something closer to popup menus existed in 1960's systems like Sketchpad and perhaps Grail.

First screen-based windows? Windows are as old as displays, and SRI didn't invent the display.

GUI (graphical user interface)? NLS was all text except the vector drawing app.

>In addition, Star invented and introduced the first graphical user
>interface, with the first icons, desktop metaphor, dialog boxes, universal
>commands, and a "point and click" style of interaction now known as
>"direct manipulation."

Here it says Star invented and introduced the first GUI. Above it says NLS did.

>the first icons

I wrote about using icons to represent office objects in 1973 at PARC, and they weren't a new idea then. A 1970 book about Semiotics had suggested their use in human-computer interfaces. Markup (Newman) used Star-like pictorial icons around 1974 in a working application, though not as desktop objects. Smalltalk used unpicturesque icons (collapsed window tabs) for desktop objects as far back as 1972.

What Star probably had was the first commercial use of manipulable document and folder icons to represent files.

>desktop metaphor

Smalltalk (Kay) and Woodstock (Swinehart) used a desktop metaphor years before.

>dialog boxes

Star had lots of property sheets (attributes of nouns) but did it have any dialog boxes (parameters of verbs) except maybe the Print sheet?

If my memory serves, Wang and other word processors had property sheets (attributes of nouns) years before, though the user made choices with cursor keys, not a mouse.

Gypsy (Tesler and Mott) had a mouse-oprated Find/change dialog box in 1975.

>"point and click" style of interaction

Dates back to the RAND tablet, or was it the light pen?

>direct manipulation.

Ben Shneiderman coined the term "direct manipulation" years before the Star, and it wasn't a new idea, just a new term.

A user of a direct manipulation interface should be able to move a window, icon, or other object by dragging it. I concede that Star's manipulation, though less direct, may have been direct enough, as compared to, say TECO, to deserve the name. But even if so, it was no more direct than the more venerable Bravo--press a move key, then click source and destination.

Smalltalk was also about as direct, or as indirect, as Star.

>Though over 100 million people
>around the world are now using GUI's, few outside of the Human/Computer
>Interaction field are aware of the history of its design.

Few inside either. Star's importance is usually either ignored or overstated. I hope this "final demo" manages to do neither.

Despite my quibbles above, some flaws in Star's pioneering user testing process, and an overdone consistency, I do think the Star was revolutionary. It combined most of the above-mentioned ideas, for the first time, into a commercial product that was very well executed.

I think the features Star brought to the market that took years to appear elsewhere were more distinctive than the WIMP features mentioned in the announcement. Examples of such Star innovations were network centricity, network browsing, network object icons, and document orientation.

It seems to me that all of that is more than enough to earn the Star a special place in history. There is no need to claim inventions that weren't in Star or weren't novel.

Larry

*** Ron Newman's reply to Tesler (user interface quibbles upon quibbles...)**

Date: Wed, 3 Jun 1998 05:17:13 -0700 (PDT)
From: Ron Newman <rnewman@theCIA.net>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

On 6/3/98 at 4:04 AM -0400 , Larry Tesler wrote:

>>Unquestionably, one of the major design innovations of this century has
>>been the Graphical User Interface for computers, with its desktop, icons,
>>pop-up and pull-down menus and ubiquitous windows.
>
>Pull-down menus, are, by definition, menus pulled down from a menu bar high
>on the screen. They first appeared in the Lisa.

I recall that on the Star, each application window had a single menu that could be activiated from a small icon at the top right (or was it top left?) of that window. Not the same as the Lisa/Macintosh concept, but arguably a 'pull-down menu' nevertheless.

>>The first GUI ever developed was the work of Dr. Douglas Englebart, a
>>researcher at SRI in the 1960s. His visionary and pioneering design and
>>prototypes succeeded in producing the world's first screen-based windows,
>>cursor-selectable pop-up menus, as well as the mouse with which to
>>interact with them.
>
>The mouse was developed by Doug and his group, but the rest is news to me.

I've never seen NLS, only read its description in Ted Nelson's "Computer Lib", but my impression is that NLS contained Bravo-style tiled windows so that you could look at more than one document at a time. (Did Bravo get this idea from NLS?) Of course, since NLS used a character screen, I'd have to question the use of the term "GUI" to describe it.

>First screen-based windows? Windows are as old as displays, and SRI didn't
>invent the display.

But was NLS the first system that let you divide a text display into separate windows displaying different documents?

>>the first icons
>
>I wrote about using icons to represent office objects in 1973 at PARC, and
>they weren't a new idea then. A 1970 book about Semiotics had suggested
>their use in human-computer interfaces. Markup (Newman) used Star-like
>pictorial icons around 1974 in a working application, though not as desktop
>objects. Smalltalk used unpicturesque icons (collapsed window tabs) for
>desktop objects as far back as 1972.

And, for that matter, the Mesa Development Environment (later called "Tajo") also had "unpicturesque icons" for application windows that you wanted to keep around but not display on the desktop.

>What Star probably had was the first commercial use of manipulable document
>and folder icons to represent files.

Agreed.

>Despite my quibbles above, some flaws in Star's pioneering user testing
>process, and an overdone consistency, I do think the Star was
>revolutionary.

I'd love to hear more about the testing flaws, if you have
the time and inclination to go into that subject further.

>I think the features Star brought to the market that took years to appear
>elsewhere were more distinctive than the WIMP features mentioned in the
>announcement. Examples of such Star innovations were network centricity,
>network browsing, network object icons, and document orientation.

Well, the way I usually describe the Star to people is
"the first commercial product to use a mouse, windows, bitmap
display, WYSIWYG user interface, Ethernet, and laser printer".
That's quite enough to impress most people!

--
Ron Newman rnewman@thecia.net
Web: http://www2.thecia.net/users/rnewman/

---

* John Linton's reply (wherein multi-lingual capabilities are remembered...)

Date: Wed, 3 Jun 1998 09:15:54 -0700 (PDT)
From: John Linton <Jlinton@rsa.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: RE: Rewriting history?

and let's not forget the innovation (and blood, sweat and tears) that went into thinking through and implementing the first truly multilingual and multinational user interface...character codes, fonts, editors...

---

* John Talbot (..and all those messages we had to translate for all those languages)

Date: Wed, 3 Jun 1998 09:38:54 -0700 (PDT)
From: John.Talbot@nmp.nokia.com
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: RE: Rewriting history?

...and not forgetting translating all those messages into 14 language versions, with virtual keyboards for each, terminal emulations etc.....

John

---

* David Liddle (Whoowee, Dave flames Larry)

Date: Wed, 3 Jun 1998 10:33:30 -0700 (PDT)
From: David Liddle <liddle@interval.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

Larry,

I can't tell from the address which "David" you're directing your remarks to; I didn't write this blurb, and perhaps you were addressing your remarks to David Curbow or David Canfield Smith. Regardless, you don't need to take such a high-and-mighty tone. If whoever wrote it made some errors or adduced too much credit to Xerox or the Star Developers, it's nothing like the outright lies that Apple (particularly Lisa, later Macintosh) marketing told and let stand about their vast contributions in "inventing" the graphic user interface, etc. If you're suddenly so interested in setting the record straight, that might be a more meaningful place to start.

David Liddle

---

* Shannon McElyea (whatever it was, it was useful...)

Date: Wed, 3 Jun 1998 11:10:34 -0700 (PDT)
From: Shannon McElyea <shannon@ipass.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

And the first 'Open Architecture' Open-standards based networking and computing environment. Remember IBM PCs could also be plugged into the environment, and fax machines (remember sending documents to fax machines?), Clearinghouse (look at LDS - Directory Services and Radicatti now). It was also convenient to send entire directories, filedrawers and folders (virtual pointers) over the net.

sigh, we could go on and on, oh for Mesa and Star on my desktop today.

-- Newman
Well, the way I usually describe the Star to people is
"the first commercial product to use a mouse, windows, bitmap
display, WYSIWYG user interface, Ethernet, and laser printer".
That's quite enough to impress most people!
-- Linton
and let's not forget the innovation (and blood, sweat and tears) that went into thinking through and implementing the first truly multilingual and multinational user interface...character codes, fonts, editors...
-- Talbot
..and not forgetting translating all those messages into 14 language versions, with virtual keyboards for each, terminal emulations etc.....

<http://www.ipass.com>
Local dial Internet access in EVERY major city WORLDWIDE!

Shannon McElyea *** more than 2,500 POPS in 150+ countries***
iPass Inc. ACCESS. ANYWHERE.
Tel: +1 (650) 944-0321 (Direct) Fax: +1 (650) 237-7321
<mailto:shannon@ipass.com>
650 Castro Street, Suite 500, Mountain View, California 94041 USA

---

* Robert Garner(..and was comercially available, way ahead of its time)

Date: Wed, 3 Jun 1998 11:45:51 -0700 (PDT)
From: Robert Garner <Robert.Garner@Eng.Sun.COM>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

The allure with Star is that it was a commercially available **PRODUCT**,
in 1981, with embedded networking/ethernet, windows/icons/bit-mapped display,
mouse, etc.. Think of what the PC's were like in 1981....

I still recall the marketing literature explaining to "executives" that what
they really needed was a keyboard, bitmapped screen, networking, and a "mouse"
to increase their productivity. From the "Getting Started" documentation:
"The small box to the side of your keyboard is a pointing device
called a mouse."....

Even though the Star was expensive ($16K) for the market, it was ironically,
relative to contemporaneous, simililarly featured systems (e.g., PDP-11, etc.),
very cheap given it's capabilities: It had a very small/integrated
Ethernet controller, a small disk controller, a small bitmap-display
controller, etc..

The Alto and Dandelion (Wildflower) hardware was innovative for its time...

- r

---

* John Linton (now, who is he referring to?)

Date: Wed, 3 Jun 1998 12:08:52 -0700 (PDT)
From: John Linton <Jlinton@rsa.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: RE: Rewriting history?

oh,,,and besides all of the wonderful technological innovations that spewed forth from this fountain of wisdom (aka Temple of NIH), I forgot to mention that we experienced the first commercially available ego...

---

* Derry Kabcenell (of property and option sheets)

Date: Wed, 3 Jun 1998 13:03:33 -0700 (PDT)
From: Derry Kabcenell <dkabcene@us.oracle.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

"Star had lots of property sheets (attributes of nouns) but did it have any dialog boxes (parameters of verbs) except maybe the Print sheet?"

Yes. They were called "option sheets", as I recall. "Print" was one of the verbs that had option sheets.

On the general topic: I think that the description is within an acceptable margin of error. Star was certainly not perfect, and not every feature was brand new, but it pioneered quite a few innovations -- and commercially introduced several more.

-- Derry Kabcenell

---

* Keith Marzullo (two examples of key technical architecture/implementation mistakes)

Date: Wed, 3 Jun 1998 13:31:51 -0700 (PDT)
From: Keith Marzullo <marzullo@cs.ucsd.edu>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

At 01:03 PM 6/3/98 -0700, Derry Kabcenell wrote:
>On the general topic: I think that the description is within
>an acceptable margin of error. Star was certainly not perfect, and not
>every feature was brand new, but it pioneered quite a few innovations --
>and commercially introduced several more.

i think that it's also interesting thinking about what we did wrong in a technical sense (rather than in a marketing and management sense). i'm most familiar with the underlying operating system - pilot - and am struck by some design decisions that now seem wrong. here's two:

- we designed an astonishingly slow file system (in counterpoint to the astonishingly fast user interface). the file system had a very clean design, and being able to simultaneously support multiple file systems was very nice. but, the disk label structure forced too many reliability-induced synchronous writes that hurt performance. and, as i recall it seemed like scavenging occured more often than one would statistically expect, even taking shugart disks into account :-). given how much time it took to scavenge a huge 300MB pack (!), it was a very poor design.

- we assumed that all packages would be friendly and cooperative with each other. there was just one big, friendly address space in which all processes ran (in fact, that's what gave us that wonderfully fast and flexible user interface, which i still miss). this implies that we believed only xerox (tm) certified packages would run on the star, since there was no method of providing isolation of processes. if star had been sucessful, then this would have proven to be a poor assumption.

- keith

Keith Marzullo
University of California, San Diego
Department of Computer Science & Engineering 0114
9500 Gilman Drive
La Jolla, CA 92093-0114
marzullo@cs.ucsd.edu
+1-619-534-3729 office, +1-619-534-7029 fax
http://www.cse.ucsd.edu/users/marzullo/marzullo.html

---

* Hugh Lauer (wherein we find the real mistakes, and who was ultimately right, according to Hugh)

Date: Wed, 3 Jun 1998 14:16:05 -0700 (PDT)
From: "Hugh C. Lauer" <lauer@merl.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

At 01:31 PM 6/3/98 -0700, Keith Marzullo wrote:
>...
>i think that it's also interesting thinking about what we did wrong in a
>technical sense (rather than in a marketing and management sense). i'm most
>familiar with the underlying operating system - pilot - and am struck by
>some design decisions that now seem wrong. here's two:
>
>- we designed an astonishingly slow file system (in counterpoint to the
>astonishingly fast user interface). the file system had a very clean
>design, and being able to simultaneously support multiple file systems was
>very nice. but, the disk label structure forced too many
>reliability-induced synchronous writes that hurt performance. and, as i
>recall it seemed like scavenging occured more often than one would
>statistically expect, even taking shugart disks into account :-). given how
>much time it took to scavenge a huge 300MB pack (!), it was a very poor
>design.

We could have recovered from this one and done it right in a subsequent release.

>
>- we assumed that all packages would be friendly and cooperative with each
>other. there was just one big, friendly address space in which all
>processes ran (in fact, that's what gave us that wonderfully fast and
>flexible user interface, which i still miss). this implies that we believed
>only xerox (tm) certified packages would run on the star, since there was
>no method of providing isolation of processes. if star had been sucessful,
>then this would have proven to be a poor assumption.
>...

It was an explicit decision that only Xerox written (or certified) code would run on Star. This propagated throughout the organization in many ways, but it was both explicitly and consciously made.

It is also, I believe, one of at most two or three fundamentally fatal flaws of Star. Once we had agreed to it, a zillion lower-level design decisions followed that would have been different in an open system. Any one of them could easily be fixed, but not all of them together.

I recall a continuing set of arguments about this subject during the planning and development of Star. While people had many different opinions about whether others besides Xerox would write code for Star, the only strong and consistent opponent to the idea was Butler Lampson. In the end, Butler was right and the rest of us were wrong.

/Hugh Lauer

---

* Jim White("closed, not open" sucked)

Date: Wed, 3 Jun 1998 16:15:54 -0700 (PDT)
From: "Jim White" <white@genmagic.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

The closed-not-open decision had an important effect upon the Star network protocol specifications, which we used to call Xerox System Integration Standards (XSIS). The initial business decision was to have open (i.e., public) protocols. This led to Xerox's external publication of first the Ethernet specification and then the Xerox transport protocol specifications. (Steps were even taken to create an organization that would certify third-party implementations of the protocols.) Then the initial decision was reversed and the publication of application protocols (e.g., for filing and printing) was withheld. As Hugh said, this was a fatal change in strategy, one that led many to leave the company.

/Jim White

---

* Saund (Gee, the ideas and innovations in Star sure got around eventually)

Date: Wed, 3 Jun 1998 20:35:23 -0700 (PDT)
From: saund@reachcast.com (S. Saund)
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

So how many "correct" implementations of Star can we count?

1. Adobe--interpress, laser printing, fontology
2. Sun--NFS
3. Apple-Microsoft--windows (exclude Lisa): HP (NewWave) Apple (OpenDoc) Wang () are all dead. Sun licensed the Star GUI and then did whatever they wanted.
4. Remedy-- Mesa's AR database (PS: Remedy calls them Action Reports or ARs!)
5. Novell with a basic lift of XSIS
6. 3-Com although like Adobe it was the inventor that took the technology for a profitable commercial venture
7. More?

As usual it's marketing, positioning, sales, "good" implementations of raw ideas, smart planning and a huge does of "luck". The latter specially today where there is more technology than the market can swallow!

S.

---

* Larry Tesler replies again (hyperbole itself)

Date: Wed, 3 Jun 1998 21:37:02 -0700 (PDT)
From: Larry Tesler <tesler@pobox.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

At 12:11 PM -0700 6/3/98, Derry Kabcenell wrote:
>"Star had lots of property sheets (attributes of nouns) but did it have
>any dialog boxes (parameters of verbs) except maybe the Print sheet?"
>
>Yes. They were called "option sheets", as I recall. "Print" was one of
>the verbs that had option sheets.

I stand corrected. There were dialog boxes other than Print. I didn't know. Thanks.

>On the general topic: I think that Dave Curbow's description is within
>an acceptable margin of error. Star was certainly not perfect, and not
>every feature was brand new, but it pioneered quite a few innovations --
>and commercially introduced several more.

It certainly did.

I think if the word "innovate" had been the verb instead of "invent", I would have had very little to correct in Dave's space-constrained essay. But I would still have wanted to acknowledge all the other innovations that Star pioneered in addition to those mentioned. The entire Star team deserves recognition for an engineering feat akin to the first lunar landing.

Larry

---

* Earsh's reply (we did fix one of those major technical issues..)

Date: Thu, 4 Jun 1998 07:47:01 -0700 (PDT)
From: "Alan O. Freier" <freier@hamilton.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Forwarding for Earsh 'cause ... well, just 'cause

Hugh C. Lauer wrote:

> At 01:31 PM 6/3/98 -0700, Keith Marzullo wrote:
> >...
> >i think that it's also interesting thinking about what we did
> >wrong in a technical sense (rather than in a marketing and
> >management sense). i'm most familiar with the underlying operating
> >system - pilot - and am struck by some design decisions that now
> >seem wrong. here's two:
> >
> >- we designed an astonishingly slow file system (in counterpoint
> >to the astonishingly fast user interface). the file system had
> >a very clean design, and being able to simultaneously support
> >multiple file systems was very nice. but, the disk label structure
> >forced too many reliability-induced synchronous writes that hurt
> >performance. and, as i
> >recall it seemed like scavenging occured more often than one would
> >statistically expect, even taking shugart disks into account :-).
> >given how much time it took to scavenge a huge 300MB pack (!),
> >it was a very poor design.
>
> We could have recovered from this one and done it right in a
> subsequent release.

We did. Pilot 13.0. Labelless Pilot. Took out all dependencies on labels so we could go with industry standard disks. We took care of redundancy by duplicating the metadata structures. We stopped writing all zeros out to disk on data files upon deletion. We made great improvements performance wise. And, as far as recoverability, though in theory we should not have been able to recover as well, in practice statistics probably didn't show much difference.

Given, that I still work on file systems, I don't think Pilot scavenged more than the norm. It was just slow. If we went with what Cedar later did
with adding a log to handle meta-data, the scavenging time would have been
greatly improved. And we made some of those changes in Pilot 13.0 also.

The team working on it, was not the original Pilot folks, though.

earsh

---
* Phil Burton (Yep.)

Date: Thu, 4 Jun 1998 07:47:15 -0700 (PDT)
From: Phil Burton <philb@alink.net>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

At 10:33 AM 6/3/98 -0700, David Liddle wrote:
>Larry,
>
>I can't tell from the address which "David" you're directing your remarks
>to; I didn't write this blurb, and perhaps you were addressing your remarks
>to David Curbow or David Canfield Smith. Regardless, you don't need to take
>such a high-and-mighty tone. If whoever wrote it made some errors or
>adduced too much credit to Xerox or the Star Developers, it's nothing like
>the outright lies that Apple (particularly Lisa, later Macintosh) marketing
>told and let stand about their vast contributions in "inventing" the
>graphic user interface, etc. If you're suddenly so interested in setting
>the record straight, that might be a more meaningful place to start.

Not to mention the outrageous claims Microsoft makes ...

When I was at Xerox, I used to wonder why we didn't take a more aggresive stance towards Apple for those claims. I hate to say this (but I will anyway ...), but for the same reasons that our management then didn't press the claims, they didn't make the 8010/6085 a commercial success.

Phil Burton   philb@alink.net
Palo Alto, CA 94306

---

* Jeff Johnson (yet more corrections upon corrections, good stuff though)

Date: Thu, 4 Jun 1998 07:46:48 -0700 (PDT)
From: jeffjohnson@igc.apc.org (Jeff Johnson)
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

It's good to see discussion coming out of this. I have a few comments on Larry's message to augment those of Ron Newman:

>Pull-down menus, are, by definition, menus pulled down from a menu bar high
>on the screen. They first appeared in the Lisa.

Before GUIs, menus/pallets from which functions/objects were selected were either permanently displayed or hierarchies of full-screen menus that replaced each other. The first GUIs (before Star) used so-called "pop-up" menus, i.e., menus that appeared based on some user-action (e.g., a right mouse click) in some contexts. Pop-up menus provide no visible target. Pull-down menus are menus invoked by (left-mouse) clicking on a visible target. To avoid using pop-up menus, Star had pull-down menus: on each window title-bar, in property sheets, and elsewhere. There is no requirement that the menu targets be on menubars positioned "high on the screen". Today, for example, the menus in Windows and Motif, which are on menubars in each application's own window, are pull-down menus, even though they are not high on the screen.

>GUI (graphical user interface)? NLS was all text except the vector drawing app.

I've seen several demos and videotapes of NLS, and all of them showed graphics tightly interwoven with text to show hierarchical relationships between text-elements. It seemed to me from these demos and videos that graphics were not confined to a separate vector drawing app.

>I wrote about using icons to represent office objects in 1973 at PARC, and
>they weren't a new idea then. A 1970 book about Semiotics had suggested
>their use in human-computer interfaces. Markup (Newman) used Star-like
>pictorial icons around 1974 in a working application, though not as desktop
>objects. Smalltalk used unpicturesque icons (collapsed window tabs) for
>desktop objects as far back as 1972.

I would distinguish between minimized windows (a window-management artifact) and desktop icons (a file-management artifact). My recollection of Smalltalk is that it, like Tajo, Cedar, and InterLisp, had the former, not the latter.

>Smalltalk (Kay) and Woodstock (Swinehart) used a desktop metaphor years before.

In the Star Retrospective (Johnson et al, IEEE Computer, 9/'89), I and my co-authors argued that most window-and-mouse based systems (both before Star and after it) did not exemplify a desktop metaphor. In particular, Smalltalk, Perq, Apollo, Andrew, VisiOn, GEM, Symbolics, Tajo, Cedar, InterLisp, SunView, NeWs, X-windows, Motif, and all versions of Microsoft Windows prior to Windows 95 exemplified a window-based tools metaphor, not the desktop metaphor. The systems that exemplified a desktop metaphor have been: Star, Lisa, Mac, HP New Wave, and Windows 95. I am not familiar with Woodstock.

> Ben Shneiderman coined the term "direct manipulation" years before the
> Star, and it wasn't a new idea, just a new term.

Ben Shneiderman's article coining the term "direct manipulation" was first published in 1983 (IEEE Computer, August), after Star, Lisa, and perhaps even Mac had made their debut. In fact, my impression is that Ben coined the term largely in *response* to the GUI-based systems he had seen.

--Jeff Johnson

---

* Phil Burton (Gates bashing)

Date: Thu, 4 Jun 1998 07:47:30 -0700 (PDT)
From: Phil Burton <philb@alink.net>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

At 11:45 AM 6/3/98 -0700, Robert Garner wrote:
>The allure with Star is that it was a commercially available PRODUCT,
>in 1981, with embedded networking/ethernet, windows/icons/bit-mapped display,
>mouse, etc.. Think of what the PC's were like in 1981....

Yeah. Much much better marketing from THE COMPUTER COMPANY of that era, and about $10K-plus cheaper ...

It isn't always the best product. Otherwise how can anyone explain all of Gate's billions?

Phil Burton philb@alink.net
Palo Alto, CA 94306

---

* Hugh Lauer (Thanks to Victor for maintaining the ex-Xerox list)

Date: Thu, 4 Jun 1998 07:47:58 -0700 (PDT)
From: "Hugh C. Lauer" <lauer@merl.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

At 03:45 PM 6/3/98 -0700, Jim White wrote:
>The closed-not-open decision had an important effect upon the Star network
>protocol specifications, which we used to call Xerox System Integration
>Standards (XSIS). The initial business decision was to have open (i.e.,
>public) protocols. This led to Xerox's external publication of first the
>Ethernet specification and then the Xerox transport protocol specifications.
>(Steps were even taken to create an organization that would certify
>third-party implementations of the protocols.) Then the initial decision was
>reversed and the publication of application protocols (e.g., for filing and
>printing) was withheld. As Hugh said, this was a fatal change in strategy,
>one that led many to leave the company.

... including me.

Nice to see that you are still around, Jim. In fact, it is nice to hear from a lot of old friends in this very interesting discussion.

I would also like to extend my public thanks especially to Victor Schwartz for keeping the mailing list of former Xeroids intact and up to date. Few people could have managed the discpline to do that for so long and so diligently.

Regards,

/Hugh Lauer

---

* Ron Newman (debunking Apple mis-truths about various achievements and innovations)

Date: Thu, 4 Jun 1998 09:30:13 -0700 (PDT)
From: Ron Newman <rnewman@theCIA.net>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

On 6/4/98 at 10:46 AM -0400 , Jeff Johnson wrote:

>>GUI (graphical user interface)?
>>NLS was all text except the vector drawing app.
>
>I've seen several demos and videotapes of NLS, and all of them showed
>graphics tightly interwoven with text to show hierarchical relationships
>between text-elements.

Were these true graphics, or just
|
|
----- creative use of horizontal and
vertical bar characters?

>In the Star Retrospective (Johnson et al, IEEE Computer, 9/'89), I and my
>co-authors argued that most window-and-mouse based systems (both before
>Star and after it) did not exemplify a desktop metaphor. In particular,
>Smalltalk, Perq, Apollo, Andrew, VisiOn, GEM, Symbolics, Tajo,
>Cedar, InterLisp, SunView, NeWs, X-windows, Motif, and all versions of
>Microsoft Windows prior to Windows 95 exemplified a window-based tools

>metaphor, not the desktop metaphor. The systems that exemplified a desktop
>metaphor have been: Star, Lisa, Mac, HP New Wave, and Windows 95.

I recall the original Interleaf product using a desktop metaphor
so similar to Star that I thought it *was* Star when I first saw it.
The document and folder icons were nearly identical to Xerox's.

Back in those days, Interleaf sold an integrated hardware-software
combination, although the hardware might have been a rebranded
Sun. Anyone else remember this? Did Interleaf license that GUI
from Xerox, or just rip it off?

>> Ben Shneiderman coined the term "direct manipulation" years before the
>> Star, and it wasn't a new idea, just a new term.
>
>Ben Shneiderman's article coining the term "direct manipulation" was first
>published in 1983 (IEEE Computer, August), after Star, Lisa, and perhaps
>even Mac had made their debut.

Lisa came out in 1983. Macintosh came out in 1984.

If you want to see some really annoying and inaccurate claims,
take a look at this page, entitled "Apple Advantage: Apple Firsts":

http://training.apple.com/fast/spfast/apadv/apadv1st.html

The page claims that

Apple Firsts

*** 1984 - Graphical User Interface**

Wrong, it wasn't even the first *Apple* GUI! That would be the Lisa in 1983.

*** 1984 - Built-in LAN networking**

Wasn't Ethernet "built-in" to the Star hardware?

*** 1984 - Desktop metaphor**

Snort.

*** 1988 - Multitasking**

I suppose this is a matter of definition. The Star hardware and operating system were fully multitasking, but the Star user interface took little or no advantage of this, at least by 1984 when I left Xerox. Maybe this changed in subsequent Star releases?

*** 1991 - 32 bit Operating System**

I'm not sure exactly how to define how many "bits" an operating system has, but I thought Mesa/Pilot was a 32-bit system. Of course, Unix was a 32-bit operating system long before 1991. So was VAX/VMS.

*** 1991 - Built-in file sharing**

Star had file sharing, if by that you mean remote access to files on servers as if they were local. SunNFS is also much older than 1991.

*** 1993 - Built-in electronic mail**

Built into Star from the very beginning.

*** 1994 - RISC microprocessors**

Can't give Xerox credit for this one, but IBM and Sun and MIPS and who knows how many other companies sold computers with RISC chips long before the PowerPC. I helped put the X Window System on IBM's "RT-PC" RISC machine at MIT some time around 1986!

*** 1994 - Multilingual support**

Hey! One of the last things I worked on at Xerox before I left was support for multiple languages, including intermixing right-to-left Hebrew and Arabic text with ordinary left-to-right Latin text. Did that work ever get into the Star? Even without it, I'd say we had multilingual support long before Apple.

I don't have a grudge against Apple; I'm writing this on a Mac, I owned another Mac before this one and I'm going to buy a third one later this summer. But if we're going to discuss "rewriting history", I had to get my licks in.

--

Ron Newman rnewman@thecia.net
Web: http://www2.thecia.net/users/rnewman/

*** Charlie Levy (upon some of the significance multitasking has to users, and the success of Documentor)**

Date: Thu, 4 Jun 1998 10:37:00 -0700 (PDT)
From: Charlie Levy <charlie@maui.net>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

At 09:30 AM 6/4/98 -0700, Ron Newman wrote:
>
> * 1988 - Multitasking
>
>I suppose this is a matter of definition. The Star hardware and
>operating system were fully multitasking, but the Star user interface
>took little or no advantage of this, at least by 1984 when I left
>Xerox. Maybe this changed in subsequent Star releases?
==========

Yes, but on Viewpoint on Daybreak (6085), not Star. In 1986, not 1988.

In June 1986, we SHIPPED Documenter, which was Local Laser Printing truly running in the background, with user set-able priorities of High, Low and Very Low. In Very Low, the print processes (10 or so) would go to sleep until 20 seconds after the last keystroke, allowing the user to get swapped in and grab all of main memory. We also used page-at-a-time decomposing, which made everything work better.

Documenter was done partly in response to announcements by Apple and HP. I honestly don't know if they shipped before Xerox, nor whether they used foreground/background, nor whether they used page-at-a-time decomposing. I just knew that we COULD do it, and we just plunged forward.

It's a tribute to the Pilot folks that there was nothing that couldn't be done EFFICIENTLY by mixing together a couple of Pilot functions. It was truly lightweight, fast and reliable, as advertised. We required no changes after the move to the 6085. Seven priorities were quite enough.

Actually, we made bunches of money on it. It may have been Xerox' first experience with what's now called "just in time" delivery, where all components meet at the shipping dock.

Charlie

```
----------------------------------------------------------------------
* Mark Simmons (a current Xeroid speaks up and sets some of the record
straight)

Date:       Thu, 4 Jun 1998 11:03:35 -0700 (PDT)
From:       Mark Simmons <msimmons@xsoft.pa.xerox.com>
To:         Multiple recipients of list <exxerox@whyanext.com>
Subject:    RE: Rewriting history?

Ron had several questions in his note that I can help with.  So for Ron and
anyone else curious, here read the embedded answers below.

--Mark

> -----Original Message-----
> From:     Ron Newman [SMTP:rnewman@theCIA.net]
> Sent: Thursday, June 04, 1998 9:30 AM
> To:               Multiple recipients of list
> Subject:       Re: Rewriting history?
>
> On 6/4/98 at 10:46 AM -0400 , Jeff Johnson wrote:
>
> >>GUI (graphical user interface)?
> >>NLS was all text except the vector drawing app.
> >
> >I've seen several demos and videotapes of NLS, and all of them showed
> >graphics tightly interwoven with text to show hierarchical relationships
> >between text-elements.
>
> Were these true graphics, or just
>                               |
>                               |
>                               ----- creative use of horizontal and
>                                     vertical bar characters?
>
>
> >In the Star Retrospective (Johnson et al, IEEE Computer, 9/'89), I and my
> >co-authors argued that most window-and-mouse based systems (both before
> >Star and after it) did not exemplify a desktop metaphor.  In particular,
> >Smalltalk, Perq, Apollo, Andrew, VisiOn, GEM, Symbolics, Tajo,
> >Cedar, InterLisp, SunView, NeWs, X-windows, Motif, and all versions of
> >Microsoft Windows prior to Windows 95 exemplified a window-based tools
> >metaphor, not the desktop metaphor.  The systems that exemplified a
> desktop
> >metaphor have been:  Star, Lisa, Mac, HP New Wave, and Windows 95.
>
> I recall the original Interleaf product using a desktop metaphor
> so similar to Star that I thought it *was* Star when I first saw it.
> The document and folder icons were nearly identical to Xerox's.
>
> Back in those days, Interleaf sold an integrated hardware-software
> combination, although the hardware might have been a rebranded
> Sun.  Anyone else remember this?  Did Interleaf license that GUI
> from Xerox, or just rip it off?

[Mark Simmons]  I remember this.  It definitely had their labeling,
but I can't say for sure whether or not it was a private-labeled Sun
or not.

> >> Ben Shneiderman coined the term "direct manipulation" years before the
```

> >> Star, and it wasn't a new idea, just a new term.
> >
> >Ben Shneiderman's article coining the term "direct manipulation" was
> first
> >published in 1983 (IEEE Computer, August), after Star, Lisa, and perhaps
> >even Mac had made their debut.
>
> Lisa came out in 1983. Macintosh came out in 1984.
>
> If you want to see some really annoying and inaccurate claims,
> take a look at this page, entitled "Apple Advantage: Apple Firsts":
>
>   http://training.apple.com/fast/spfast/apadv/apadv1st.html
>
> The page claims that
>
>   Apple Firsts
>
>   * 1984 - Graphical User Interface
>
> Wrong, it wasn't even the first *Apple* GUI! That would be the Lisa
> in 1983.
>
>   * 1984 - Built-in LAN networking
>
> Wasn't Ethernet "built-in" to the Star hardware?

[Mark Simmons] Yes absolutely!

>   * 1984 - Desktop metaphor
>
> Snort.
>
>   * 1988 - Multitasking
>
> I suppose this is a matter of definition. The Star hardware and
> operating system were fully multitasking, but the Star user interface
> took little or no advantage of this, at least by 1984 when I left
> Xerox.   Maybe this changed in subsequent Star releases?

[Mark Simmons] This definitely changed. A few "background
operations" were added in ViewPoint 1.1, but it was the Vela release (VP 2.0)
that really started taking advantage of multitasking from a UI standpoint.
After we users 'retrained' ourselves, it wasn't unusual to have four to 7 explicit
user functions going on at the same time. Of course, we also found out the
original dandelion hardware started running out of gas on some of these
combinations.

>   * 1991 - 32 bit Operating System
>
> I'm not sure exactly how to define how many "bits" an operating
> system has, but I thought Mesa/Pilot was a 32-bit system.
> Of course, Unix was a 32-bit operating system long before 1991.
> So was VAX/VMS.

[Mark Simmons] Four 4-bit processors were used in what was
called bit-sliced architecture. Essentially, this was a 16-bit
machine.

>   * 1991 - Built-in file sharing
>

> Star had file sharing, if by that you mean remote access
> to files on servers as if they were local. SunNFS is also
> much older than 1991.
>
>   * 1993 - Built-in electronic mail
>
> Built into Star from the very beginning.
>
>   * 1994 - RISC microprocessors
>
> Can't give Xerox credit for this one, but IBM and Sun and MIPS
> and who knows how many other companies sold computers with
> RISC chips long before the PowerPC.   I helped put the
> X Window System on IBM's "RT-PC" RISC machine at MIT
> some time around 1986!
>
>   * 1994 - Multilingual support
>
> Hey! One of the last things I worked on at Xerox before I left
> was support for multiple languages, including intermixing
> right-to-left Hebrew and Arabic text with ordinary
> left-to-right Latin text. Did that work ever get into the Star?
> Even without it, I'd say we had multilingual support long
> before Apple.

[Mark Simmons] Not only did it make it into Star. It made
a big splash. While the market for multilingual publishing
systems isn't very large, we really owned it for awhile. It is
still the best multilingual system on the market according to
our multilingual customers. This has been the hardest customer
segment to migrate. Unicode-based operating systems such as
NT hold the promise for the future once the applications start
taking full advantage of what is there. BTW, Unicode is based in
large part on XCCS, and the Unicode Consortium pioneered by
Joe Becker, who still guides this effort as their VP of Technology.

> I don't have a grudge against Apple; I'm writing this on
> a Mac, I owned another Mac before this one and I'm going to
> buy a third one later this summer. But if we're going to
> discuss "rewriting history", I had to get my licks in.
>
> --
> Ron Newman   rnewman@thecia.net
> Web: http://www2.thecia.net/users/rnewman/

---

* Larry Garlick (more clarifications on who did what when)

Date: Thu, 4 Jun 1998 15:11:56 -0700 (PDT)
From: Larry Garlick <larry@Remedy.COM>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

On the Network Services front:

Clearinghouse, the Directory Service for Star, which was the first commercial directory service implementation. Gave Star the dynamic binding capability to find things, such as your desktop at login, printer, ... Banyan (Jim Alchin) copied Clearinghouse in creating StreetTalk, their primary advantage for many years.

The Authentication Service was the first commercial service of it's kind for user authentication.

The Internetwork Routing Service was among the first, if not the first, commercial products of it's kind, that is, routing between Ethernets over telephone lines. (Obviously, routing protocols and point-to-point protocols (PPP) have advanced within the TCP/IP framework since then.) Obviously it would have been smarter for me to start cisco than to start Remedy!.

Network FAX Server may have been a first.

---

* Robert Purvy (you all were the best folks to work with, miss you)

Date: Thu, 4 Jun 1998 23:05:02 -0700 (PDT)
From: Robert Purvy <bpurvy@mindspring.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

hi Larry, hi David, hi Ron, hi ....

I knew there was SOME reason I was on Victor's exxerox mailing list. Couldn't have been all those boring announcements about what Xerox is up to nowadays!

This whole thread really makes me smile. Not because of the technical merits; because you all were the best, smartest, and funnest folks it's ever been my privilege to work with. I miss you all.

---
* Larry Tesler (stands corrected and provides clarifications)

Date: Fri, 5 Jun 1998 08:24:19 -0700 (PDT)
From: Larry Tesler <tesler@pobox.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

At 7:46 AM -0700 6/4/98, Jeff Johnson wrote:
>It's good to see discussion coming out of this. I have a few comments on
>Larry's message to augment those of Ron Newman:
>
>>Pull-down menus, are, by definition, menus pulled down from a menu bar high
>>on the screen. They first appeared in the Lisa.
>...
>Pull-down menus are menus invoked by (left-mouse) clicking on a visible
>target. To avoid using pop-up menus, Star had pull-down menus: on each
>window title-bar, in property sheets, and elsewhere. There is no
>requirement that the menu targets be on menubars positioned "high on the
>screen".

I explained my point poorly. Yes, both Star's single menu and Lisa's multiple menus were invoked by mousing on visible targets. What I meant by "by definition" was this. The term "pull-down menus" was coined by Bill Atkinson to describe the system he implemented for the Lisa, with a menu bar containing multiple menu titles. It had the ability to sweep across the menu titles to view all the available menus. If Star used the term "pull-down menus" before that, it is news to me, and I stand corrected.

I said "high on the screen" not "on top of the screen", but I'll even retract that in the interest of precision.

>I would distinguish between minimized windows (a window-management
>artifact) and desktop icons (a file-management artifact). My recollection
>of Smalltalk is that it, like Tajo, Cedar, and InterLisp, had the former,
>not the latter.

That is true. I do not dispute that file management icons first appeared in Star. But the announcement said "icons" were "invented an introduced" in Star.

>>Smalltalk (Kay) and Woodstock (Swinehart) used a desktop metaphor years
>>before.
>
>In the Star Retrospective (Johnson et al, IEEE Computer, 9/'89), I and my
>co-authors argued that most window-and-mouse based systems (both before
>Star and after it) did not exemplify a desktop metaphor. In particular,
>Smalltalk, Perq, Apollo, Andrew, VisiOn, GEM, Symbolics, Tajo,
>Cedar, InterLisp, SunView, NeWs, X-windows, Motif, and all versions of
>Microsoft Windows prior to Windows 95 exemplified a window-based tools
>metaphor, not the desktop metaphor. The systems that exemplified a desktop
>metaphor have been: Star, Lisa, Mac, HP New Wave, and Windows 95. I am
>not familiar with Woodstock.

Woodstock was originally called "Desktop".

Alan Kay invented the desktop metaphor around 1970. The desktop metaphor was, by the definition of the inventor, the use of overlapping windows resembling pieces of paper on a desktop. Woodstock/Desktop, Smalltalk, OfficeTalk, etc. retained that common sense definition.

In a memo that Jeff Rulifson and I wrote in 1973, we proposed an "office metaphor" with icons representing file cabinets, desks, folders, etc., rather like the infamous Microsoft Bob.

Beginning with the Star, the term "desktop metaphor" was broadened to the poiint where its connection with the surface of a material desk became tenuous at best. I don't keep numerous file cabinets and printers on my desk. I doubt many people do.

I think your grouping of systems into categories is insightful. But to deny that systems based on the original desktop metaphor were not what they were would be like saying that Star was not a GUI because today's GUI's use hierarchical menus, color, dragging, and 2.5-D effects.

>> Ben Shneiderman coined the term "direct manipulation" years before the
>> Star, and it wasn't a new idea, just a new term.
>
>Ben Shneiderman's article coining the term "direct manipulation" was first
>published in 1983 (IEEE Computer, August), after Star, Lisa, and perhaps
>even Mac had made their debut. In fact, my impression is that Ben coined
>the term largely in *response* to the GUI-based systems he had seen.

I stand corrected. And I am glad to hear it. I thought he told me he had coined it in 1973. That had always puzzled me.

Larry

---

* Larry Tesler (Xerox did sue Apple, but screwed that up too)

Date: Fri, 5 Jun 1998 08:24:32 -0700 (PDT)
From: Larry Tesler <tesler@pobox.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Rewriting history?

At 7:47 AM -0700 6/4/98, Phil Burton wrote:
>When I was at Xerox, I used to wonder why we didn't take a more aggresive
>stance towards Apple for those claims.

Xerox did sue Apple, but on such a bizarre legal theory that the judge tossed the case out.

---

* Ron Newman's query about "Pilot 13 was after my Xerox tenure, mind filling me in on what all occured?"

Date: Thu, 4 Jun 1998 08:56:30 -0700 (PDT)
From: Ron Newman <rnewman@theCIA.net>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Pilot 13.0; Xerox Star history after 1984?

On 6/4/98 at 10:47 AM -0400 , Alan O. Freier wrote:

>> >- we designed an astonishingly slow file system (in counterpoint
>> >to the astonishingly fast user interface). the file system had
>> >a very clean design, and being able to simultaneously support
>> >multiple file systems was very nice. but, the disk label structure
>> >forced too many reliability-induced synchronous writes that hurt
>> >performance.

>> We could have recovered from this one and done it right in a
>> subsequent release.
>
>We did. Pilot 13.0. Labelless Pilot. Took out all dependencies on
>labels so we could go with industry standard disks.

When did Pilot 13.0 come out? When did the last version of Pilot come out?

I've pretty much lost track of the history of Star (and whatever name it later got) *after* I left Xerox in late 1984. If anyone has a complete history of this product line on a web page, or can email one to me (or to the mailing list), I'd highly appreciate it. Does any remnant of the product still exist as something that Xerox now sells?

--
Ron Newman rnewman@thecia.net
Web: http://www2.thecia.net/users/rnewman/

---

* Mark Simmons (a short sketchy history of Pilot 13, ViewPoint, etc.)

Date: Thu, 4 Jun 1998 11:47:36 -0700 (PDT)
From: Mark Simmons <msimmons@xsoft.pa.xerox.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: RE: Pilot 13.0; Xerox Star history after 1984?

On 6/4/98 at 8:56 AM Ron Newman wrote:
I've pretty much lost track of the history of Star (and whatever name it later got) *after* I left Xerox in late 1984. If anyone has a complete history of this product line on a web page, or can email one to me (or to the mailing list), I'd highly appreciate it. Does any remnant of the product still exist as something that Xerox now sells?
[Mark Simmons] Here is a short sketchy history.
Star was renamed ViewPoint around 1983/84 coincident with the release of VP 1.0 which was actually the next update of Star.

This continued until around 1990 when the name was changed again to GlobalView. This is also the time when Xerox began putting the software on open platforms -- Sun's and PCs. There was Xerox GlobalView or XGV which ran on Sun and basically took over the environment when it ran. It was replaced by GlobalView for X-Windows which as the name implies made GlobalView into a suite of X-Window applications. It also appeared on IBM RS6000 and Silicon Graphic workstations. On the PC side there was XGV PC and GlobalView for Windows or GVWin.
We also had limited function PC clients called XNS-PC, XNS-PC Plus, and Connects. They primarily allowed a PC client to access XNS mail, print and file services.

Services also went through a name change. XNS Network Services became Shared Document Services when these services appeared on the Sun platform and there was XNS Services for the PC running on SCO UNIX.

There were many other solutions and products as well, but these were

the main product lines.
If you'd like to see some recent information, there is a GlobalView web site at: http://www.xerox.com/globalview There is a retirement schedule on that site which should answer your last question.

--Mark

---

* Ron Newman (yet more questions)

Date: Thu, 4 Jun 1998 11:58:20 -0700 (PDT)
From: Ron Newman <rnewman@thecia.net>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: RE: Pilot 13.0; Xerox Star history after 1984?

On Thu, 4 Jun 1998, Mark Simmons wrote:

> [Mark Simmons] Here is a short sketchy history.
> Star was renamed ViewPoint around 1983/84 coincident
> with the release of VP 1.0 which was actually the next update
> of Star.

I think it was later than that, because it was still "Star"
when I left Xerox in September of 1984. Or is my memory fading?

> This continued until around 1990 when the name was changed
> again to GlobalView. This is also the time when Xerox began
> putting the software on open platforms -- Sun's and PCs.

I assume that the Pilot operating system was abandoned at this point,
or were parts of it brought over? Were the products rewritten
in C, or was Mesa brought over to the new platforms? Is Mesa
still in use anywhere at Xerox (either on product development
or at PARC)?

It's cool to have a Xeroid on the ex-xerox list....

--
Ron Newman rnewman@thecia.net
URL: http://www2.thecia.net/users/rnewman/

---

* Martin Cooper (weighs in with Pilot 13 info, and yet more questions...)

Date: Thu, 4 Jun 1998 12:23:20 -0700 (PDT)
From: "Martin Cooper" <cooper@worldtalk.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Pilot 13.0; Xerox Star history after 1984?

At 08:56 AM 6/4/98 , Ron Newman wrote:
>>
>>We did. Pilot 13.0. Labelless Pilot. Took out all dependencies on
>>labels so we could go with industry standard disks.
>
>When did Pilot 13.0 come out? When did the last version of
>Pilot come out?

If I recall correctly, Pilot 13.0 was used only on the Services side of the world. The Workstation side went from Pilot 12.0 (or was it 12.1?) to Pilot 14.0, which I don't believe was labelless. Pilot 14.0 is the last version I remember.

Martin Cooper
Worldtalk Corporation

---

* Alan Freier (the scoop on Pilot 13)

Date: Thu, 4 Jun 1998 23:07:01 -0700 (PDT)
From: "Alan O. Freier" <freier@hamilton.com>
To: Multiple recipients of list <exxerox@whyanext.com>
Subject: Re: Pilot 13.0; Xerox Star history after 1984?

Martin Cooper wrote:
>
> At 08:56 AM 6/4/98 , Ron Newman wrote:
> >>
> >>We did. Pilot 13.0. Labelless Pilot. Took out all dependencies on
> >>labels so we could go with industry standard disks.
> > >
> > >When did Pilot 13.0 come out? When did the last version of
> > >Pilot come out?
> >
> > If I recall correctly, Pilot 13.0 was used only on the Services side of the
> > world. The Workstation side went from Pilot 12.0 (or was it 12.1?) to Pilot
> > 14.0, which I don't believe was labelless. Pilot 14.0 is the last version I
> > remember.

Pilot/Mesa (aka, Tajo) 12.3 was a mainstay for some time. The label-less Pilot (Pilot 13.0) was intended for just Services. But as you probably recall, the most significant form of system test at the time was having all the developers run the current system as their development system. Consequently, there were label-less Tajos - it was then (and might still be) my favorite system.

For instance, if you look a few lines down and notice the URL in my signature file. That's a web server running on a Dandelion label-less Tajo. It's a late model DLion, probably manufactured around '83. That means it's been running 15 years! It does crash every now and then. If the power doesn't fail, I'd say about every month. I rarely get a chance to debug it - it doesn't have any other DLions around for remote debugging - but the few times I've chance to look at it in a failed state, I suspect that memory dropped a bit or something. I'm looking to upgrade to a DLight. That's a Fuji Xerox built cost reduced DLion w/ a SCSI interface. I'm going to have ~1 GByte of disk space and 4 MByte of real memory! What luxury.

AO
--
Alan O. Freier http://wildflower.meer.net
Day job mailto:freier@netscape.com

Jeff.Hodges@Stanford.edu
Last updated: 5-Jun-1998