GO & PenPoint
From the Revolutionary Idea to a Venture Capital Fail

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This presentation follows largely...

• Jerry Kaplan’s (CEO of GO) own 1995 book “Startup: A Silicon Valley Adventure”
  – which is very readable
  – and a good book on how startups work
  – and which (surprisingly) is not translated to German...
Chapter 1, Scene 1: In a Plane

Mitch Kapor
- Former Head of Development of VisiCorp (VisiCalc)
- Co-founder of Lotus (Lotus 1-2-3)

Jerry Kaplan
- Stanford PhD graduate
- Hired as a free-lance programmer for Lotus Agenda
- Hitches a ride and wants Mitch to show some new features

Mitch’s Compaq III Portable Computer

February 1987
Chapter 1, Scene 1: In a Plane

February 1987

I wish there was some way for me to get all this stuff directly into the computer and skip the paper.
Chapter 1, Scene 1: In a Plane

Instead of typing in text, you could write with a **pen** directly on the screen.

The trick is to turn the handwriting into regular text or numbers.

A device like that would be more like a notebook or pad of paper than a laptop. In fact, the thing would be so different, you’d need a **whole new approach to software**.

A whole **new operating system**, a whole **new model of how a user will work with the system**.

February 1987
Chapter 1, Scene 1: In a Plane

February 1987

But I never managed squat...

Why don’t you try to do this project yourself?

C’mon, I’ll introduce you to some Venture Capitalists...
How new was that Idea?

- Clearly, that idea was new to Jerry and Mitch. But how new was that idea?
- OCR (Optical Character Recognition) was not new neither as a problem nor algorithm-wise (in fact, Kapor did his PhD thesis on this topic)
- Using written language to interact with a computer was also a very old idea
- Using (pen) gestures was also known before
- Bill Gates (in the 1988 email concluding his meeting with Kapor) notes (content re-phrased):
  - machines with no keyboard, no disc, static memory using a stylus with handwriting recognition are currently built by a few people and even discussed in the WSJ
- However, GO at the very least
  - popularized the idea and created a lot of market attention
  - actually went on and implemented both the hardware and software
  - aimed at the purest realization of the idea without taking care about backwards compatibility
GO Corporation incorporates

August 1987

• 3 founding members:
  – Jerry Kaplan (CEO)
  – Robert Carr
  – Kevin Doren

Vinod Khosla
• Co-Founder of Sun
• First CEO of Sun (82-84)
• Partner at Kleiner Perkins

Kleiner Perkins
Mitch Kapor
Vinod Khosla
GO’s Goals

• develop a mobile, **pen-based computer** (as there is none on the market at that time)

• develop an **operating system** for that computer
  – for GO, the operating system is more important as it allows to control the ecosystem
Chapter 2, Scene 1: At Apple

Jean-Louis Gassée
• at that time Fellow at Apple
• he ordered to start the Newton project
• in 1988, he became head of Apple's advanced product development and worldwide marketing

John Sculley
• CEO at Apple
Chapter 2, Scene 1: At Apple

We want to show you a video on some new concept, the Knowledge Navigator

https://www.youtube.com/watch?v=umJsITGzXd0
Chapter 1, Scene 2: At Apple

This is our 10 year vision. What do you think about it?

I don’t think you will solve this problem in the next decade...

But we can give it a try. We start a secret R&D project on that. We offer you the opportunity to be the premier applications developer for this project.

Unfortunately, I must decline. We work on our own project.
and so develops a prototype hardware and software
Demo to the Board of GO

July 1988

Jerry Kaplan, CEO

Kevin Doren, HW

Robert Carr, SW

Mitch Kapor, Lotus

John Doerr, K&P

Vinod Khosla
Demo is also presented to Microsoft in July 1988 by Jerry Kaplan, CEO, Kevin Doren, HW, Robert Carr, SW, and Bill Gates, Microsoft (and Lotus and Ashton-Tate) in order to look for future investors and providers of application software.
PenPoint’s Interface Metaphor

early impression (cited after Bill Gates’ Email in July 1988):

- a set of named folders with tabs on the right hand side each containing any number of numbered pages and

- each page has on it just ink (writing) or rectangles that contain application sessions (which can be zoomed/unzoomed)
GO Corporation Update

- GO has 30 employees

Fall 1988
March 1989

+ 6M$
Demo to State Farm

- big US insurance and finance company
- main business: car insurance
- one of the top 100 biggest companies
- about half the size of the Allianz

- We need a system that helps our employees record car accident claims
- We ask only HP, IBM, Wang, and GO

Norm Vincent
- Vice President Data Processing
Demo to State Farm

- big US insurance and finance company
- main business: car insurance
- one of the top 100 biggest companies
- about half the size of the Allianz

Norm Vincent
- Vice President Data Processing

First mobile prototype

June 1989
Demo to State Farm

- big US insurance and finance company
- main business: car insurance
- one of the top 100 biggest companies
- about half the size of the Allianz

You won the request
Would you like to partner up with either IBM or HP?

Yes. We choose IBM because they have the power to make PenPoint a standard OS!

Norm Vincent
- Vice President
  - Data Processing
Corporation Update

• After learning of Farm State’s decision to work with GO, IBM agrees to license GO’s PenPoint operating system

• GO announces a partnership with IBM
What we omit here...

(read the book)
You should really use Windows!

Windows is a mouse-and-keyboard OS. We want to create a better suited operating system: PenPoint®
Corporation Update

June 1990

- so far the GO prototype uses an Intel 80286 processor
- Intel invests under the conditions that
  - they switch to 80386 soon
  - new software versions are first released on Intel CPUs

State Farm: 5 M$
Intel: 3 M$

+ 15.3 M$
PenPoint Developer’s Release

Meridien Hotel, San Francisco

PenPoint Licensees
- IBM
- Grid
- NCR

https://www.youtube.com/watch?v=OLGswHSIIQGo
Basic UI Elements
1991 UI Design Guidelines

**Notebook Metaphor**

- A Table of Contents instead of a directory of files
- Notebook pages instead of application windows
- Turning to pages in the Notebook instead of launching/ quitting applications and opening/saving files
UI Elements
1991 UI Design Guidelines

- Edit pad
- Option sheets
- Command buttons
- Check lists
- Menus
There are 11 core PenPoint gestures:

- **Tap.** This is the most basic gesture. Typically tapping selects an object or pushes a button.
- **Press-Hold.** (Touch the pen to the screen and pause for a moment.) Initiate drag move when made over icons or selected application objects. Initiate drag area select when made over background or unselected objects in application.
- **Tap-Hold.** (Tap the screen once, then touch the pen to the screen again and pause for a moment.) Initiate drag copy.
- **Flick.** (Four directions) Flicking is used throughout PenPoint to bring more information into view. The user model is that the flick gesture shoves the object in the direction of the flick. Examples include scrolling text, turning notebook pages, and exposing overlapping tabs.
- **X.** The basic deletion gesture.
- **Caret.** Insert or create.
- **Circle.** Edit.
- **Checkmark.** Display the object's option sheet.
- **Brackets.** Adjust an existing selection in contexts that support the selection of a span of objects (such as text, lists and tables).
- **Pigtail.** Delete a single character in text.
- **Down-Right.** Insert a space in text.

**Bonus Fact**

PenPoint required the tablet to be hold in portrait mode while (Pen)Windows required landscape mode.
PenPoint as an Operating System

- Priority-based, preemptive multitasking with processes and threads
- Interprocess communication and semaphores
- 32-bit flat memory model
- Ability to run on RAM-only as well as disk-based computers
- Support of DLLs
- Heap memory allocation with transparent relocation and compaction (no fixed-length buffers)
- Object-oriented message passing and subclass inheritance
- Detachable networking and deferred data transfer
- All hardware dependencies are isolated into a “machine interface layer” to facilitate porting to a wide variety of hardware and processor architectures
- Kernel runs on both PC and pen-based machines
Application instances are Documents

- dormant
  - document’s state is written to disk
  - no thread is running for this document

- activated
  - threads are running for this document

- created
  - document is given access to display

- interactive
Developing PenPoint Applications

• development platform: MS-DOS with ANSI-C compiler

• run-and-test platform:
  – either some PCs (i.e. PenPoint runs also on this hardware):
    • Compaq 386/20E, Dell 325P, IBM PS2/70, IBM PS2/80, IBM PS2/90, IBM PS2/95, NCR 386sx/MC20,...
  – or the target PenPoint device

• PenPoint uses a (proprietary) Object-Oriented Framework

• ... on top of ANSI-C
Microsoft presents Pen Windows

- add-on for Windows 3.1
- contains handwriting recognition
- but, all in all, "it was literally Windows 3.1 with some tablet-centric add-ons slapped on top of it. Because of that, Windows still retained its mouse-and-keyboard centric interface with elements that were far too small to hit with a pen."
- from 1997, Microsoft published Windows CE
- by and large, all MS pen attempts fail
NCR presents NCR 3125

- one of the few mobile computers designed in Germany (in Augsburg)
- “iF product design award 1992 – Best Of Category”
- NCR was bought 1991 by AT&T
- probably as a result, the computer was never successful

<table>
<thead>
<tr>
<th></th>
<th>NCR 3125</th>
</tr>
</thead>
<tbody>
<tr>
<td>cpu</td>
<td>80386SL@20MHz</td>
</tr>
<tr>
<td>display</td>
<td>LCD 640 x 480, 16 gray shades</td>
</tr>
<tr>
<td>ram</td>
<td>4 MB</td>
</tr>
<tr>
<td>ports</td>
<td>VGA, keyboard, RS232C, Centronics, all via a “I/O Connector Adapter”</td>
</tr>
<tr>
<td>hd</td>
<td>20 MB</td>
</tr>
<tr>
<td>weight</td>
<td>1.5 Kg</td>
</tr>
<tr>
<td>OS</td>
<td>MS-DOS+PenOS, PenPoint or PenWindows</td>
</tr>
<tr>
<td>price</td>
<td>$4795</td>
</tr>
</tbody>
</table>
What we omit here...
(read the book)
Well, we could switch our hardware to a RISC CPU. There are two possibilities, ARM or Hobbit.

Ok, let's see what we can do...

Microsoft is playing unfair; with their PC market power they choke us when we want to offer PenPoint on PC platforms.

AT&T has no customers for their Hobbit chip. If we choose it, we can get money from AT&T!
AT&T; EO splits from GO

Here’s the deal: AT&T will invest in a company that aims at producing a Hobbit-based Pen Computer. We will contribute our hardware department. Hermann Hauser’s Active Book company will be also part of the new company...

Yes, but they also need money... The name of the new company is EO...

GO in Latin... And we get 10 M$ from AT&T!

I thought they want to use ARM?

What does that mean?

Chris Curry
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Acorn Risc Machine

The founders of Acorn, Cambridge

Chris Curry

GO in Latin...
Corporation Update

July 1991

- GO has 130 employees
- 10 of them move to EO

**Investors:**
- IBM: 7 M$
- AT&T: 10 M$
- + 40 M$
Corporation Update

- PenPoint 1.0 is released
- IBM presents its ThinkPad pen computer
  - original name: IBM 2521 ThinkPad, later on ThinkPad 700T

<table>
<thead>
<tr>
<th>Feature</th>
<th>IBM 2521 ThinkPad</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>80386SX @ 20MHz</td>
</tr>
<tr>
<td>Display</td>
<td>10”, 640 * 480, 8 grey scales</td>
</tr>
<tr>
<td>RAM</td>
<td>4 MB</td>
</tr>
<tr>
<td>HDD</td>
<td>20 MB SSD-precursor</td>
</tr>
<tr>
<td>Ports</td>
<td>serial, parallel, PS/2, VGA, port replicator, disk drive, modem</td>
</tr>
<tr>
<td>Weight</td>
<td>2.8 Kg</td>
</tr>
<tr>
<td>Price</td>
<td>$???</td>
</tr>
</tbody>
</table>

later on the name for all IBM notebooks
EO & AT&T present EO 440

- at Comdex 1992
- available from April 1993

<table>
<thead>
<tr>
<th></th>
<th>EO 440</th>
<th>EO 880</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Hobbit @20MHz</td>
<td>Hobbit @30MHz</td>
</tr>
<tr>
<td>Display</td>
<td>7.5”, 480*640</td>
<td>9.4” backlit</td>
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<tr>
<td>RAM</td>
<td>4 – 12 MB</td>
<td></td>
</tr>
<tr>
<td>Ports</td>
<td>serial, parallel, PCMCIA, PS/2 keyboard</td>
<td>SCSI, VGA</td>
</tr>
<tr>
<td>HD (opt)</td>
<td>20 MB</td>
<td>64 MB</td>
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<tr>
<td>Weight</td>
<td>1 Kg</td>
<td>1.8 Kg</td>
</tr>
<tr>
<td>Price</td>
<td>$1999</td>
<td>$2499</td>
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</table>

Optional mobile phone module $799

Batteries last 3h

The ears exist because the designers wanted them.

Designed by Frog Design.
Apple starts selling Newton

• has been presented already in May 1992

<table>
<thead>
<tr>
<th>Newton (OMP)</th>
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<tbody>
<tr>
<td>cpu</td>
<td>ARM610 @ 20 MHz</td>
</tr>
<tr>
<td>display</td>
<td>5.2”, 336*240</td>
</tr>
<tr>
<td>ram</td>
<td>0.64 MB</td>
</tr>
<tr>
<td>ports</td>
<td>PCMCIA, RS422</td>
</tr>
<tr>
<td>weight</td>
<td>0.4 Kg</td>
</tr>
<tr>
<td>price</td>
<td>$699</td>
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</tbody>
</table>

batteries last 5-10h
Last Chapter, last Scene: The Merger

William Campbell
- VP of Marketing at Apple
- ran Apple's Claris software division
- CEO of GO from 1991-1993
- CEO of Intuit 1994-1998
- since 1997: Corporate Director at Apple

Robert Carr
- Head of Software Development

Randy Komisar
- CFO
I’ve come to a difficult decision. There is no way we’re going to pull this through. We’re spending two million a month with no revenue in sight. I think we’re going to have to put the company up for adoption.

You’re saying we should sell the company.

Can you guys get comfortable with that?
Last Chapter, last Scene: The Merger

Do what you have to do. We’ll back you up all the way.

The most obvious buyer is AT&T

Unfortunately, our own GO stock will be worth nothing.
Corporation Update

• GO agrees to merge with EO (that mainly belongs to AT&T)

• EO – GO merger is completed
• from the former combined 350 employees only 230 work in the merged company
Corporation Update

AT&T decides to close down EO

- because the Hobbit is not produced any further
Computers that can run PenPoint

- NCR 3125 (1991) 1,5Kg $4795
- NCR 3130 (1993) 2Kg $5400
- IBM 2521 Thinkpad / Thinkpad 700T (1992) 2,8Kg $2000
- EO 440/880 (1993) 1Kg $4395
- IBM Thinkpad 710T (1993) 2,6Kg $3699
- Gridpad SL (1993) 2,5Kg $2999
- Toshiba T100X (1993) 1,5Kg

+ some PCs

NCR 3130 (1993)
the founders of Go had the idea of realizing a pen-based mobile computer using a pen-centric user interface

they were not the first who had this idea, but they were the ones that popularized this idea widely

they build up a company that created such a system after a long development phase

the company burnt 75 M$ and failed as a product in the end

the reasons for this failure are quite diverse and typical for start-up companies
If you like to see PenPoint running...

• you’ll find that’s not that easy:
  – you cannot use an emulator as there is none
  – although PenPoint (up to a certain version) can run on 386 computers, you need
    • a very specific hardware configuration
    • a PenPoint installation (which seems not to exist)
  – PenPoint-capable computers are quite scarce, and very often they do not have PenPoint with them
If you are interested in other computer history bits and do not bother reading new posts only every half a year, please visit my blog: www.randoc.wordpress.com
Resources

Books
- Kaplan, Jerry (1999). Startup: A Silicon Valley Adventure

Videos
- https://www.youtube.com/watch?v=4xnqKdWMa_8&feature=youtu.be

Web Pages
- EO 440: http://oldcomputers.net/eo-440.html
- Lot of documentation: http://ohlandl.ipv7.net/2524/PenPoint_OS.html