**Technology Fail:**

**Apple Maps**

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***Introduction***

In this literary report, the requirements issues that arose from the attempt of Apple Inc. to produce a functional application on their IOS platform will be discussed. Once the understanding of who Apple as a company is, and a brief history of what has gotten Apple to this point in history, a problem definition will be expressed. It is the attempt of the solution section to outline the steps necessary to resolve this problem in it’s most basic format, and create a road map to conducive and proper requirements process implementation and execution.

***Who is Apple?***

Apple Inc. (Apple) designs, manufactures and markets mobile communication and media devices, personal computers, and portable digital music players, and sells a variety of related software, services, peripherals, networking solutions, and third-party digital content and applications. The Company's products and services include iPhone, iPad, Mac, iPod, Apple TV, a portfolio of consumer and professional software applications, the iOS and OS X operating systems, iCloud, and a variety of accessory, service and support offerings. The Company also sells and delivers digital content and applications through the iTunes Store, App StoreSM, iBookstoreSM, and Mac App Store. It sells its products worldwide through its retail stores, online stores, and direct sales force, as well as through third-party cellular network carriers, wholesalers, retailers, and value-added resellers. In March 2013, it acquired a Silicon Valley startup, WiFiSlam, which makes mapping applications for smart phones.

***Apple History High Notes***

**1976:** The Apple I personal computing system is released with a market price of $666.66. The following year, Steve Jobs, Steve Wozniak and Ronald Wayne incorporate Apple Inc..

**December 1979:** Several Apple employees, including Jobs and Jeff Raskin, were granted access to Xerox Park facilities to see the Xerox Alto. Jobs was convinced that all future computers would use a graphical user interface (GUI), a belief that inspires his work in the development of the Apple Lisa.

**1980:** Apple goes public with 4.6 million shares. Apple III is released to disappointing sales in an attempt to compete with IBM and Microsoft in the corporate computing market.

**1981:** Steve Jobs becomes Apple's chairman, and Markkula becomes the company's president. The European headquarters open in Paris and Slough, England.

**1982:** The Company hits the $1 billion-mark in annual sales. Jeff Raskin resigns, and Jobs takes over his lower-cost computer project, the Macintosh, after Jobs was squeezed out of the Lisa computer development team due to infighting over whether the Lisa or the Macintosh would be the first personal computer sold to the public with a GUI.

**1983:** The Lisa won out: it was marketed to the public and the Lisa and Macintosh divisions were combined. But its high prices and limited software capabilities made it a commercial failure. John Sculley is named president and CEO of Apple.

**January 22, 1984:** The Macintosh is released, announced by the landmark $1.5 million Super bowl commercial, "1984," directed by Ridley Scott:

The Macintosh sold well initially, but sales faltered for the same reasons as the Lisa. Later that year, the addition of the LaserWriter and PageMaker software helped reinvigorate sales. Andy Hertzfeld, one of the main authors of the Macintosh system software, leaves the company.

**1985:** The infighting between Jobs and Sculley escalates. The Board of Directors tells Sculley to limit Jobs' role; Jobs in turn attempts a coup, for which he's dismissed from his role at the company. After he leaves, Jobs founds NeXT Software. Wozniak resigns from Apple as well. The same year, President Reagan presents Jobs and Wozniak with the National Technology Medal.

**1986:** Jobs establishes Pixar, buying Lucas Film’s computer graphics group for $10 million. The Apple Programmers and Developers Association forms. The Macintosh Plus is released

**1987:** Mac II and Mac SE are released.

**1988:** Jean-Louis Gassee is named president of Apple. The company sues Microsoft over its GUI.

**1989:** The Mac Portable is released. The company is sued by both the Beatles' Apple Corps and by Xerox.

**1990:** Jean-Louis Gassee resigns, and Mac LC is released. The company is listed on the Tokyo SE.

**1991:** Apple releases the PowerBook 100, which set the standard for the modern laptop. It weighed 17 pounds and had a 12-hour battery life. The company also introduced System 7, an upgraded operating system that added color to the interface and introduced new networking capabilities. System 7 would remain the architectural basis for Mac OS until 2001. The magazine MacAddict named the period between 1989 and 1991 the "first golden age" of the Macintosh.

**1996:** Gil Amelio replaces Michael Spindler as CEO and implements massive layoffs. The company acquires Jobs' NeXT Software Company. Apple's fourth-quarter results in $25 million profit.

**1997:** Amelio is ousted by the Board of Directors from the CEO position after overseeing a three-year record-low stock price and major financial losses. Jobs is named the interim replacement. At the 1997 MacWorld Expo, Jobs announces that Apple will join Microsoft to release new versions of Microsoft Office for the Macintosh, and that Microsoft would make a $150 million investment in non-voting Apple stock.

**1998:** The iMac/233 is released. The iMac design team was led by Jonathan Ive, who would later be the designer of the iPod and the iPhone. The iMac sold nearly 800,000 units in its first five months. The Newton Operating System is scrapped.

**1999:** The Company invests $100 million in Samsung and sues eMachines over an iMac lookalike.

**2000:** PowerMac Cube launches. Jobs becomes Apple's permanent CEO, and chief sales exec Mitch Mandich steps down.

**2001:** The iPod launches, as well as OS X. The company opens its first retail store in MacLean, Virginia.

**2002:** iMac G4 launches. Retail stores go overseas.

**2003:** Jobs is diagnosed with cancer in his pancreas and tries to treat the illness by switching to a special diet, according to a 2008 Fortune magazine article. Apple does not tell investors. iTunes music store opens and hits 25 million downloads.

**2004:** iMac G5 launches. Jobs, now 49, discloses his cancer to the public when he announces that he had successful surgery to extract a tumor. The ad campaign featuring U2 kicks off.

**2005:** The Video iPod and iPod Nano launch. Jeff Raskin dies at 61. iTunes downloads top 500 million. Jobs talks about his fight with cancer during a commencement speech at Stanford, saying that his surgery had been a success "and I'm fine now."

**2006:** The iMac Core Duo launches. Disney buys Pixar, putting Jobs on the board at Disney. Software development leader Avie Tevanian leaves Apple. The PowerMac, iBook and PowerBook brands are retired, replaced by the Mac Pro, MacBook and MacBook Pro. Between early 2003 and 2006, the price of Apple's stock increased more than tenfold, from around $6 per share to over $80.

**2007:** Apple Computer, Inc., becomes Apple Inc., because computers are no longer the company's singular focus. The iPhone and Apple TV are announced. The following day, Apple shares hit an all-time high (at that point) at $97.80.

**2008:** Apple launches the App store to sell third-party applications for the iPhone and iPod Touch. Within a month, the store sold 60 million apps and brought in $1 million daily on average. Apple becomes the third largest mobile handset supplier in the world due to the iPhone's popularity. Apple also releases MacBook Air, a slimmed-down portable computer.

**December 16, 2008:** After 20 years of attending MacWorld, the company announces that 2009 will be its final year of doing so. And, instead of the expected Jobs, Phil Schiller would deliver the final keynote.

**January 14, 2009:** Jobs announces in an internal memo that he would be taking a six-month leave to focus on his health.

**June 29, 2009:** Apple announces Jobs' return to work. At the time, Apple shares have risen 70 percent since January 15.

**2009:** Apple releases the iPhone 3GS.

**January 27, 2010:** Apple announces the impending launch of the iPad.

**April 3, 2010:** The iPad launches in the U.S., and more than 300,000 units are sold on that day, reaching 500,000 by the end of the first week.

**May 2010:** Apple's market cap exceeds that of competitor Microsoft for the first time since 1989.

**June 2010:** Apple releases the fourth generation iPhone, with video calling, multitasking and a new un insulated stainless steel design, which acts as the phone's antenna. Some users report a reduction in signal strength due to the new antenna.

**October 2010:** Apple shares hit an all-time high, surpassing $300.

**November 2010:** For the first time, The Beatles' 13 albums are up for sale on iTunes, ending years of talks among Jobs, The Beatles' management company Apple Corps and The Beatles' label EMI Group. The group sells more than 2 million songs and more than 450,000 albums in its first week on iTunes.

**January 17, 2011:** An internal memo from Jobs, now 55, announces he will once again take a medical leave for an indeterminate time period. COO Tim Cook will take up Jobs' day-to-day operations at the company.

**January 18, 2011:** Apple's stock opens for trading at $327.05 per share, down more than five percent from its close on the previous trading day.

***Steve Jobs passes away on October 5th, 2011***

***What is Apple Maps?***

Apple Maps was going to be the answer to Google Maps. Apple Maps was designed by Apple Inc. from the ground up, and all development and sustaining was an in house effort. “Maps” was designed to give you turn-by-turn spoken directions, interactive 3D views, and a flyover feature.

“Maps” was going to utilize a vector-based interface that scales and zooms providing the end user an Apple based product that had the functionality of other map programs on the market.

***The Problem with Apple Maps***

Apple Maps did in fact debut to customers; however, there were serious errors in both the presentation and functionality of the product. Apple had relied to heavily on algorithm and code to assure quality in their product. In short, Apple cut out the human element of the development and requirement life cycle; thus, creating an automated product that was schedule driven and efficient, but lacked end user feed back and ultimately failed.

To fully develop a product, a development architect or group must consider the hardware, software, and the people ware.

One of the real issues at Apple at this time was the fact that Steve Jobs and Jeff Raskin had both died and were no longer influential in the efforts of new product development at Apple. Gone were the two visionaries, who had learned and conducted development to address the needs of the end users, many times before the end users knew what they desired in a product.

***Scenario “A”***

A family takes a trip from the city out to the country. They are a family that utilized the IPhone on IOS, and has recently down loaded Apple Maps from the App store. All seems to go well except they see this:



Why is this the case? Was there not end user testing, or hands on quality applied to the product? How is any reasonable user expected to use this tool to navigate to their destination? What level of incompetency and oversight could yield such a costly and immature product from a respected technology manufacturer?

***Solution***

The issue is a lack of traceability and validation in requirements. Google also had issues on initial launch with their map application; however, they utilized focus groups and understood that quality control was hinged not only on the quality of code, but the satisfaction of the end user involved in using the application.

For such a complex issue, the most obvious solution is the best. Incorporate the feedback from the end user to help control quality; thus, providing a product that is both stable and acceptable to the end user.

Apple will have to understand that stand up meetings, and agile methodology is not always the answer. An information system requires feedback from the end user to continually evolve and stay relevant and stable. To achieve this, I would line out and suggest the following:

1. Utilize the feedback from end users, and solicit more feedback via focus groups, have users play through predefined scenarios such as a drive from the city to the country, and online survey services.
2. Develop requirements for the initial hardware and environment based on IEEE documentation, the feedback received, and straight descriptive shall statements that remedy the issues found in the original requirements.
3. Create non functional requirements based on the end user feedback
4. Create software requirements, that incorporate the feedback and lessons learned
5. Utilize the objects that are relevant in the new solution for a revision of Apple Maps
6. Prelaunch Apple Maps to a focus group, and trace the end user requirements to the functional requirements.
7. Append/create the non functional requirements again.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement Identifiers** | **Reqs Tested** | **REQ1 UC 1.1** | **REQ1 UC 1.2** | **REQ1 UC 1.3** | **REQ1 UC 2.1** | **REQ1 UC 2.2** | **REQ1 UC 2.3.1** | **REQ1 UC 2.3.2** | **REQ1 UC 2.3.3** | **REQ1 UC 2.4** | **REQ1 UC 3.1** | **REQ1 UC 3.2** | **REQ1 TECH 1.1** | **REQ1 TECH 1.2** | **REQ1 TECH 1.3** |
| **Test Cases** | 321 | 3 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 1 |
| **Tested Implicitly** | 77 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **1.1.1** | 1 | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **1.1.2** | 2 |  | x | x |  |  |  |  |  |  |  |  |  |  |  |
| **1.1.3** | 2 | x |  |  |  |  |  |  |  |  |  |  | x |  |  |
| **1.1.4** | 1 |  |  | x |  |  |  |  |  |  |  |  |  |  |  |
| **1.1.5** | 2 | x |  |  |  |  |  |  |  |  |  |  |  | x |  |
| **1.1.6** | 1 |  | x |  |  |  |  |  |  |  |  |  |  |  |  |
| **1.1.7** | 1 |  |  | x |  |  |  |  |  |  |  |  |  |  |  |
| **1.2.1** | 2 |  |  |  | x |  | x |  |  |  |  |  |  |  |  |
| **1.2.2** | 2 |  |  |  |  | x |  | x |  |  |  |  |  |  |  |
| **1.2.3** | 2 |  |  |  |  |  |  |  | x | x |  |  |  |  |  |
| **1.3.1** | 1 |  |  |  |  |  |  |  |  |  | x |  |  |  |  |
| **1.3.2** | 1 |  |  |  |  |  |  |  |  |  | x |  |  |  |  |
| **1.3.3** | 1 |  |  |  |  |  |  |  |  |  |  | x |  |  |  |
| **1.3.4** | 1 |  |  |  |  |  |  |  |  |  |  | x |  |  |  |
| **1.3.5** | 1 |  |  |  |  |  |  |  |  |  |  | x |  |  |  |
| **etc.…** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **5.6.2** | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  | x |

Something as simple as a traceability matrix would have greatly increased the ability of Apple to utilize the feedback from the end user, creating the ability to correct based on the documented requirements in relation to the people ware involved in the product development. Granted, that Apple never solicited the feedback in the first place, the solution is still warranted. My suggestion would continue along the lines of utilizing traceability in relation to feedback to ensure a higher quality product.

***Conclusion***

The solution to the Apple Maps issue is ridiculously simple in nature, but complex in execution. Apple must utilize the principals of requirements engineering to better document requirements and use traceability to stabilize their application. Regardless of how sound the algorithms, code, hardware, or other aspects of engineering are, if the expectations of the end user are not managed or included, the product is doomed to fail. Requirements satisfy the guidelines to answer a problem. Simply stated, Apple forgot that their product has to answer a need for the end user in a fashion that allows perceived quality in product and experience for the end user.

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