

What a Long Strange Trip it's Been

By Jim Rue

"Any sufficiently advanced technology is indistinguishable from magic." ~ Arthur C. Clarke, author of 2001: A Space Odyssey

What a long strange trip it has been. In the last twenty years the computer and electronics industry has transformed again and again. The fields of hardware, software, networking, security and operating systems each have evolved their own rigorous certification process. Computer professionals have emerged from their introverted socially awkward nerd shells to become well-dressed, often well-mannered, even, perhaps, occasionally well-adjusted, management types. Furthermore, advanced features on a new computer or other device are often characterized as 'sexy.' While one hopes this term is hyperbole, its common use nonetheless suggests that computers and technology are viewed very differently today than they were in 1986 when NASPA began.

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THE HARDWARE

The dramatic and exponential increase in both the population and the power of desktop computers insured that we would come to think differently about them. A PC sold in 1986 typically addressed no more than 640KB of memory, and under no circumstance more than 1MB. It sported an Intel 808x processor executing perhaps 8 million instructions per second and a 10MB hard disk. The \$15 million Cray X-MP available in 1986 had 128MB of memory and a 125MHz processor clock rate. By way of contrast, a new top of the line 3.2GHz Pentium 4 desktop today might be equipped with as much as 4GB of memory, (about 7000 times as much memory as a desktop twenty years ago), and running fifty times as fast. The capacity of hard disks has doubled again and again also. A modern desktop contains about 250GB of storage space, packing 25,000 times more capacity into a device less than half the size of the original Seagate 10MB. One Dell desktop model ships with eight times that much disk space. At about \$3250, the 2TB box costs a little more than you would have paid in 1986 for an IBM AT personal computer.

THE INSTALLED BASE

In 1986 twenty-five percent of the nine million computers sold worldwide were Commodore 64s, a hobby machine that used a MOSTEK 6510 processor similar to the one used in the Apple II. But by 1994 the Commodore had been superseded by the IBM personal computer and its large family of clones. Commodore went out of business. In 1989 there were 100 million computers worldwide. Today over one billion internet users worldwide, representing about 12% of the

total world population, use more than 700 million computers to check their email and download jokes.

THE BAD GUYS

1986 also heralded the arrival of the first virus written for the IBM personal computer. The Brain would write itself to the boot sector of a floppy disk and then fill any unused space on the diskette. Twenty years hence we see dubious progress. Common antivirus software searches for over 100,000 variants of a pantheon of viruses that displays uncanny intelligence. Viruses might imbed new advertising materials on a hard drive, search for passwords or credit card numbers, log keystrokes for later uploading during a period of inactivity, or cause the infected PC to become a 'zombie,' recruited to the cause of attacking another computer on cue.

THE BIG GUYS

To the surprise of many PC enthusiasts, IBM remains the largest computer company in the world. It has offices in 170 countries and 330,000 employees worldwide. After the hardware wars of the eighties, IBM stunned the world last year by spinning off their PC division, selling it to Lenovo, a Chinese company that is partially owned by the Chinese government. Moreover, the corporate values of this 120-year-old company have changed in twenty years. IBM is a more inclusive, humane company now, one that embraces every nuance of affirmative action. Periodic intensive 'jams,' short online skull sessions involving as many as 50,000 employees, result in company-wide policy changes. In a matrix-like portent of the future, IBM in 2005 became the first computer company to announce a new HR policy not to take genetic information into account when making hiring decisions.

Other massive corporations whose names were once synonymous with the computer industry have not fared so well. They have become ancillary to a much larger market, or even disappeared altogether. Minicomputers don't exist anymore, and so Prime and Data General don't either. Newer firms have burst into being to replace them or to dominate new technology. Many entrepreneurs and engineers flourished, too, over 20 years, but success is never total and failure is rarely permanent. Many of the same individuals went bust again. Some of those left the field, but some have stayed and flourished again, and so on.

SURVIVOR

There is no better example of such a whack-a-mole leader than Apple CEO Steve Jobs. Pundits have lost track of the mistakes and

business losses of Jobs, each time followed by some equally dramatic recovery and new triumph. Jobs was the exec who brought the Macintosh into being. Then, in 1986, Jobs was shown the door at Apple Computers by John Sculley (whom Jobs had hired) as much because of Jobs' imperious, mercurial nature as anything else. As a result, Jobs sold all his stock in a huff and founded NeXT Computer, where he strove to design the perfect computer and continued to drive his engineering staff to distraction. While very expensive, the NeXT workstation and its operating system, NeXTStep, were well received. Jobs' street creds rose with the technical community even while his new company floundered financially. When Apple began to swallow water in 1993, John Sculley left. Apple went through more CEOs. In 1997 the firm was awash with problems. The board of Apple bought NeXT from Jobs for \$400 million. Somewhat reluctantly thereafter (but also somewhat vindicated), Jobs resumed at Apple as interim CEO. Jobs cut jobs, and began developing a new operating system for the Macintosh based on NeXTStep and hence, on Unix. That product turned out to be OSX. Jobs has officially been compensated \$1 per year since his return to Apple, but the firm makes up for it (now that Apple is profitable again) with annual perqs. In 1999 they gave him a \$90 million Gulfstream V personal jet. Jobs had been busy with other enterprises as well. In 1986 after his firing from Apple, he bought Pixar Corporation from filmmaker George Lucas. After seven years of work on hardware and development systems, and then 21 terabytes of graphical development work for the film, "Toy Story" was released. The first-ever all computer animated feature movie cost \$30 million to make but ultimately grossed nearly \$200 million. Jobs was vindicated again. Most recently Jobs has won a smackdown contest with Pixar's distribution company, Disney. The result: Disney bought Pixar for over \$7 billion, making Jobs the largest stockholder in Disney.

THE APPRENTICES

Jobs is famous for his up-again down-again career, but his fortunes have trended upward, amounting to somewhere north of \$6 billion today. He is hardly the only computer pioneer to amass a ten digit fortune. Bill Gates, Paul Allen, Larry Ellison, Steve Ballmer, Azim Premji of India, and Pierre Omidyar of eBay are all technologists appearing on the Fortune 100 list of the worlds' wealthiest people. Larry Page and Sergei Brin, founders of Google, are, at ages 32 and 33, the youngest in the top 100.

THE BIG KAHUNA

When NaSPA began Microsoft had been around for ten years. The command line oriented operating system CP/M had been on the scene since the mid-seventies but by 1986 MSDOS, a knock off of CP/M, dominated the industry. Microsoft got to the point of having 500 shareholders in that year, and so they were required to register with the SEC. It was clear that they had to go public. Gawky, geeky Bill Gates rejected conventional wisdom about the proper methods of conducting a public offering, just as Google has done more recently. Gates won big as a result. Within three months of Microsoft's IPO, Gates' shares were worth \$350 million. By 1992 his fortune had grown to over \$6 billion, and Fortune Magazine named him as the richest man in the world. Through diversification of his personal assets and the continued growth of Microsoft, his

fortune grew to \$85 billion in 1999. He retains his title today with more than \$50 billion in assets despite having given roughly \$30 billion away over the years to charitable and philanthropic causes. Here's a recent news item that could never have been foretold in 1986—in 2005 Bill Gates was dubbed a Knight Commander of the British Empire.

Meanwhile, the Microsoft flagship product, Windows, has gone from a gleam in the eye of its founder to bug-ridden comedy fodder to Machiavellian threat to easy mastery of the realm, increasingly self-installing, self-configuring and self-healing, and with no natural enemies. Would that drivers, applications software and utility programs performed as well. The conviction of Microsoft on charges of federal antitrust law violations is largely forgotten, and Bill Gates works daily with his father at the Gates Foundation on his legacy.

THE SIN OF PRIDE

Many individuals and firms have not fared so well. In fact, some high tech firms of the eighties no longer exist as anything more than a memory. Digital Equipment Corporation is one example. In an effort to forestall the passage of time and appear more trendy, DEC changed their name to Digital. In the early eighties they offered the DEC Rainbow to compete against the IBM PC. Shortsightedly, they included 'features' that prevented the expensive device from being wholly compatible with IBM and the rest of the PC industry. Meanwhile the market for their expensive PDP-11 minicomputer continued to erode, mainly because of the rise of personal computers. When the World Wide Web made its debut Digital founded the first successful search engine, AltaVista, but the web was growing very quickly and Digital couldn't keep up. Altavista.com still exists today as a shell of its former self. In 1998 Compaq bought Digital. Three years later HP bought Compaq, and then the HP CEO who engineered the merger, Carly Fiorina, was ousted. The result: another pioneering computer company has become an historical artifact.

Actually, two have. Compaq of Texas was only three years old in 1986, but the firm was virtually born public, having their IPO in their first year. They sold \$500 million worth of computers in 1986, becoming part of the Fortune 500 faster than any firm had previously. Compaq had the first successful 'portable' computer. Quickly dubbed the Compaq 'luggable,' it was about the size and heft of a portable sewing machine—about 35 pounds. It had a nine-inch-diagonal green display that faced downward when the computer was being moved. Upon arriving, the case was turned on its side and plugged into the wall. The keyboard comprised the base of the unit when it was stowed and snapped into place. The 'Ultra' model of luggable for sale in 1986 included a 5 1/2-inch 10MB hard drive that was three inches thick. By 1996 Compaq was the fifth largest computer manufacturer in the world, and dominated the personal computer market worldwide as well. They also introduced their line of Armada laptops, and dominated that field for a while. While Compaq products still appear on retail shelves, Compaq is now owned by HP.

THE AVANT GARDE

There was a new kid in town. Also, in 1986, Michael Dell, a University of Austin dropout, had introduced his own model of an IBM compatible desktop computer. Called the PC's Limited (sic)

Turbo PC, his computer ran on the Intel 8088 chip. It had a clock speed of 7.33MHz and would accommodate as much as 640KB of memory on the motherboard. His specifications were very similar to the Compaq and to most other 'IBM-compatibles at the time. Michael Dell turned out to be a natural at making money selling PCs. His firm grossed \$6 million in its first year. In 1988 the company became Dell Computer Corporation and went public, its IPO peaking at \$80 million. By 1999 Dell was selling more PCs than Compaq. Today Dell is #7 on the Fortune Magazine list of most-admired American companies, and the 28th largest company in the US. In other news, Dell has faced criticism from some quarters for the quality of their technical and customer support and for the offshoring of telephone support. Also, at one time the company was slapped down for selling returned PCs as new, a development that resulted in their discount website, delloutlet.com. Dell was rated number one in customer satisfaction for several years running but has been superceded since 2003 by HP, IBM, and Apple.

THE NEW, NEW THING

But a new state-of-the-art Dell desktop, like the other brands, comes with a 100Mbit network card built into the motherboard. This is substantially more efficient than the 9600bps dialup modem used in 1985, making a routine task of downloading media files or software upgrades of many megabytes. The typical desktop includes a host of other new technologies too. Not only is it possible to display DVD output on our screens. We can create new double-sided, double-density DVDs, each one good for 8GB of mass storage. We can attach our sound cards (which were only making their debut in 1986) to high fidelity sound systems. We can carry up to a gigabyte of data around on an inexpensive, tiny keychain device and, thanks to USB 2.0 transferring data at 400MB/sec, we can read and the write that data fast enough to display it in full screen video with stereo sound even as the data arrives. AGP video cards are also built in, lending massive computing power to the discrete task of drawing images on the display. Physics chips, to simplify the calculations of trajectories, acceleration and gravitational are right around the corner. We have web-based software to map a driving route from pretty much anywhere to anywhere else (free, too), and satellite views available on any desktop (also free) with enough detail to make out cars sitting in the driveway of a house observed from an orbiting camera 22,000 miles away from earth.

Speech recognition software works so well now that cellphones, car dashboards and household appliances are increasingly offering it as a feature. Laptops scan fingerprints instead of prompting for passwords, self-navigating robotic cars have been proven viable, cybernetic surgery is increasingly common and holographic data storage, in which gigabytes of data can be written in a single clock cycle, is on its way.

Our most pervasive problems seem to be preventing global warming or politics from destroying civilization, and figuring out what to do with all of these old, obsolete computers. 

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