

CyberAll: Everywhere and Forever

(Ubiquity Interview with Gordon Bell)

C. Gordon Bell has been a leader in information technology for three decades, and has been senior research consultant at Microsoft since 1995. He was an assistant director for computing at the National Science Foundation from 1986 to 1988, and vice president for research and development at the Digital Equipment Corporation from 1972 to 1983 when it developed timesharing, the minicomputer, VAX/VMS and the VAX computing environment.

Gordon Bell sees the future -- and wants it memorialized.

UBIQUITY: Has the nature of your interests in information technology changed over the years in any large way?

GORDON BELL: Yes and no. I still love hardware. I'm on the board of a company making a high-performance chip and on the board of another that's making a compiler to go directly from C++ to hardware -- something we've always dreamed of. I also just invested in a power supply company -- it's hard to get much more fundamental and lower-level than power supplies. But then at the higher end of my interests are projects like CyberAll, which is "a personal storehouse for everything."

UBIQUITY: To be used how?

BELL: Well, for example, I'm scanning my books, papers, photographs, and so forth. What CyberAll can offer is a sort of immortality, by being able to preserve all of your bits and videos and things like that. Just about everything. I've been told that within 20 years my entire DNA can be stored.

UBIQUITY: Some people would be horrified at the notion of collecting just about everything.

BELL: I can understand that. There are a number of security issues that have to be considered, but right now I'm concentrating on the technical feasibility. To answer your question of how my interests have changed, I'd have to say they've gotten broader. I'm fascinated by the tremendous range of applications that are now possible with extended hardware and with the infrastructure offered by the Web.

UBIQUITY: CyberAll assumes what cost of storage?

BELL: Right now it's roughly only \$10 per gigabyte. If you don't include video and CDs, most people would be hard-pressed to use up ten gigabytes even if they gathered every bit they could -- every photograph in their home, every document that they've ever kept, every Christmas card they've ever received -- and scanned all of that for CyberAll. That's just one hundred bucks for storage.

UBIQUITY: How do you make sense out of that volume of data?

BELL: In a way you can't, any more than you can make sense of a whole life, which is what we're ultimately talking about. But it's very interesting trying to do the best you can. One of

CyberAll: Everywhere and Forever (Ubiquity Interview with Gordon Bell)

the nastiest problems is having enough information about photographs, because typically you've got shoeboxes full of photos to be scanned. You don't want to put that kind of stuff in a database because you'll waste an eternity trying to figure out dates, locations, and even the identity of people for everything.

UBIQUITY: What's the alternative?

BELL: The computer ought to be able to read all of these documents -- letters, photos, everything -- and then make sense out of them and say things like, "Here's a letter to so-and-so that was written at a certain time" -- even though the file may not say that. I've been using long file names, which usually include as much information as possible, so that with a little pawing around I can generally pull a document or a photo up in five minutes or so.

UBIQUITY: Is the searching is focused on words?

BELL: Yes, for letters, memos, things like that, but for photos you have to focus the search on people or places or events in time and that's where there's a big jumble right now. I'm making PowerPoint albums to hold photos, because PowerPoint doesn't introduce overhead and then adding labels that can be read and searched. Alternatively, you can take a jpeg photo and quickly add attributes that make it easy to find again, provided the attributes are coded.

UBIQUITY: You said that you're now focused mainly on the technical possibilities of CyberAll, but presumably you've thought about how this might be used in, let's say, an organization like Microsoft or the State Department or whatever?

BELL: No. My feeling is that others worry about that part already, so I'm not going to worry about it because it's part of a very large problem. Even just the question of company mail and how that gets used in an organization raises pretty worrisome issues. For now, I'm thinking of CyberAll as something for my personal use and for use as a prototype of tools that might be useful to others. After all, my company is interested in "personal" computers.

UBIQUITY: CyberAll sounds like an historian's dream.

BELL: No question about it.

UBIQUITY: Do you see this as a commercial product eventually?

BELL: Yes, because it will become necessary in so many ways. As the media get more and more rich over time, paper becomes poorer and poorer as a way of recording. For example, as books become electronic and allow dynamic interaction and have movies and simulations and things like that, we get into this real problem of reading them in 10 years, let alone in 20 or 50 years. I don't know how that's going to play out. It's a hard question. Almost nothing that people created 20 years ago can be read today, without doing a lot of fooling around.

UBIQUITY: Well, is that another entrepreneurial opportunity for somebody?

CyberAll: Everywhere and Forever (Ubiquity Interview with Gordon Bell)

BELL: Oh, yes, I think there are entrepreneurial opportunities here. For example, the reason for cemetery mausoleums is that people want some kind of permanence. Well, this would be a lot more useful than cemeteries, taking up all that real estate. So I think there may be a market there. I'm not going to start a company for that purpose, but I would probably invest in one and advise people if they wanted to do something like that. I'm not ready to recommend a product development activity yet at Microsoft, but I could see it as a significant part of MSN!

UBIQUITY: How many different companies have you participated in?

BELL: I've invested as first round seed investor in 60 or 70.

UBIQUITY: Tell us the secret of entrepreneurship.

BELL: I wrote a book called *High Tech Ventures* in 1991 that has sold about 20,000 copies. It goes into what I think is the essence of a high tech venture and what you have to do.

UBIQUITY: What's the general idea?

BELL: It is based on a four-stage model of how a startup company evolves in twelve dimensions. Three of the dimensions are focused on technology and engineering. The first has to do with the company's ability to build a product. The second is the product itself: i.e., what its characteristics are, what its price is, and how the product fits into a larger marketplace. The third dimension is the ability to deliver that product or service, and may include manufacturing for hardware things, but it's really the company's ability to produce the product and to deliver it.

UBIQUITY: Take us all the way.

BELL: Then there are three business dimensions: one is the business plan, second is marketing, and the third is the sales. And then there are three people dimensions: the CEO, the high-level team responsible for building and making the company successful, and the board. And the last three are financial dimensions: one is cash; one is the ability to get more cash through financing, and the third is control -- the ability of the company to do what it says it's going to do.

UBIQUITY: How do you think of the model as a whole?

BELL: Basically, it's a time model of how a company evolves, much the way a child evolves, which describes what capabilities each of those dimensions should reach at a given stage. So it's about stages and dimensions.

UBIQUITY: In your experience, which of the dimensions give the companies the most trouble?

BELL: First, the CEO. And then second, marketing.

UBIQUITY: Not technology?

CyberAll: Everywhere and Forever (Ubiquity Interview with Gordon Bell)

BELL: No. You know, engineers now have an extraordinary ability to design and build systems. Of course, there are some failures where people try to do too much and can't really do it, but those are not the main problems. And most likely, the product will be late to market. But it's really the first two that cause the most problems.

UBIQUITY: On that point, what is the common denominator in CEO failure? Why do CEOs most often fail?

BELL: Either they're totally inexperienced and incapable of learning fast enough, or they're arrogant and think they know a lot more than they really do. And then sometimes they're just inherently incompetent.

UBIQUITY: The natural question that arises is: how are these incompetent people able to get CEO jobs?

BELL: A few months ago, three or four hundred Silicon Valley CEO jobs were vacant, and people were searching for just as many marketing VPs. So basically you'll take less than what you need, simply because there just aren't enough people with CEO talent, even though they may have plenty of other kinds of talent. When that's the case, it's good if they follow the example of the guys who founded Yahoo!, and quickly realize they can't run the company themselves, and immediately get venture help to bring in real CEO talent from the start.

UBIQUITY: What about the marketing side of things? Is there one particular thing that marketing people always seem to have a hard time understanding?

BELL: They often don't understand that much of marketing is just as disciplined as engineering, and if you don't deal with the discipline of it and instead treat it as sort of an artistic thing, you're destined to fail as a marketer.

UBIQUITY: Let's now talk a little about your telepresence project at Microsoft. What does it take to make telecommuting and remote work in organizations?

BELL: Almost the first problem for telepresence is tele-support. You want a rich computing environment, so how do you build and support that environment? Then there is all of the administrative support that is lacking. A telecommuter is his or her own computer and administrative support staff.

UBIQUITY: For example?

BELL: If I'm working at home I don't want to be filling out forms and making Xerox copies, and that thought is what inspires my interest in CyberAll. I'm on a course to get rid of paper for storage and paper for transmission in the next two years. Although, I pretty paper free.

UBIQUITY: But isn't it true that every year or so popular publications proudly produce cover stories saying what a silly concept the "paperless office" was?

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BELL: Different people can have different opinions, but essentially the only paper that I want to keep is money, checks, stock certificates, and so forth. And by the way, getting rid of stock certificates as paper would be a significant boom to the stock market and the economy and everything else, because keeping track of paper stock certificates is a completely unproductive use of time. I spent probably two weeks in the last year -- in other words, four or five percent of my time -- dealing with various things having to do with stock for companies going public.

UBIQUITY: So you think there's still hope for completely eliminating almost all paper for such purposes?

BELL: Well, the fact is that at the present time most people can't read from a computer screen as well as they can read from a book or paper, but personally I think this is already changing. Last weekend I reviewed a 1000-page book manuscript and it was just too inconvenient to work with, because I couldn't search it, and I found it hard to turn the pages. So I scanned it electronically, and now I can read it on an extra-large screen with very good resolution. I use paper to print an occasional e-mail message that I have to do something about, but I basically destroy all paper that I come in contact with, because you've got to file it, and filing anything is just prohibitively expensive. Worse yet, I may not be able to find it.

UBIQUITY: Are there times when people force you to deal with hard copy? Maybe to get your signature?

BELL: If people insist on faxing me a hard copy for signature, I say OK, fax it to my gateway, and when I get it I sign it electronically and then I electronically fax it back to them, and they're happy. And I'm happy, too, because I've never touched the document!

UBIQUITY: Before we conclude this interview, talk a little about another issue you've always been interested in: scalability of computing?

BELL: That's been an absolutely long-term fascination of mine. I'd say a huge a reason for coming to Microsoft was my belief that the PC is the component out of which we will build all future computers. I'm having trouble seeing scores of networked appliances that do anything very complex or useful.

UBIQUITY: Network appliances aren't going to be practical?

BELL: Until I see a network appliance, I'm not sure I believe in them. I'm not sure what they are, or where you need them. Certainly Microsoft, like others, is working on them, but what are they really? Is the Palm Pilot a network appliance? I don't know. But whether the proverbial toaster is or isn't a part of a network is a real question -- why would you want your toaster to be a network appliance in the first place? Why introduce any complexity into something where complexity is unnecessary, where there's no reason for having your toaster connected? Even though I say IP on everything, that's unlikely, because building the network in some of these environments will be very, very hard. Building a home network for all these appliances will be nontrivial and I have yet to see one for anything other than for computers or television sets.

CyberAll: Everywhere and Forever (Ubiquity Interview with Gordon Bell)

UBIQUITY: What do you see now as the most exciting thing on the horizon?

BELL: I see exciting things everywhere: the Sandia machine is still, I think, about the world's fastest computer, with 10,000 PCs running at three or four teraflops, as a large scaleable system. The Grid extends that to a fully distributed computing environment. So I think high performance computing is very exciting. I am excited about the home media server based on the PC. Within five years the PC disk will hold a terabyte of information, and a terabyte is well beyond what most of us need to store, and so CyberAll and the home multimedia machines will become very practical, because a terabyte can store all of the conversations of your lifetime.

UBIQUITY: We'll need to do more interviews.

BELL: That's right. The trick is going to be finding out how do you really use some of the new technologies? It's the old technology story: does anybody want it, does anybody care if you want it? I just keep trying to do things that I myself want and could use. I think this is typical of most of us who work and build things in computing, and that's how computing has gotten to where it is. We like to build things mostly for ourselves.

UBIQUITY: And that works pretty well?

BELL: Sometimes it's a good model for doing things, and sometimes it's a bad model. If you find that you can use it, but nobody else can, that's okay, but it's a small market. On the other hand, sometimes things work out just fine for everybody -- for the consumer, the company, and the engineers and programmers who created the product. Everybody's happy, and we can go on to the next idea and the next project.