In All Possible Worlds

A radical new technology has arrived and the world will never be the same

By Max Borders

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"I pictured it perfect and inviolate on the secret summit of a mountain; I pictured its outlines blurred by rice paddies, or underwater; I pictured it as infinite--a labyrinth not of octagonal Pavilions and paths that turn back upon themselves, but of rivers and provinces and kingdoms.... I imagined a labyrinth of labyrinths, a maze of mazes, a twisting, turning, ever-widening labyrinth that contained both past and future and somehow implied the stars."

-Jorge Luis Borges, from The Garden of Forking Paths

Imagine the alpha-version of the Matrix or the Metaverse. In this environment, we could build anything we wanted. You might be in Hong Kong and I might be in London, but we could both walk around in Xanadu—caves of ice and all. We could meet, date, collaborate, explore, shop, conduct science and/or do Japanese gardening. How close are we to such a world? The ingredients for it are cooking in an open source movement called Croquet. Within ten years, it will swallow the Internet. Why? Because Croquet is the answer to a fundamentally different question: *If we were to create a new operating system and user interface knowing what we know today, how far could we go?*

When I met Julian Lombardi, it was a different era. It was a time before we had lost our innocence about the potential of technology. Sure, we were waiting for Armageddon, the Millennium Bug, or whatever—but we were ready.

The Internet was in full swing and people had figured out how to make a lot of money using HTML, XML, and various other letter clusters that are now firmly in our lexicon. In many ways, we were high on possibility, and even writers who had never typed anything like `borderColor=#999933 height=168 cellSpacing=0 cellPadding=3 width=404 bgColor=white border=1` understood that the world had fundamentally changed. Many of us even let our techno-wonder guide our 401k plans. As it will, reality set in.

The bubble burst. The buzz had been killed and the herd had trampled back to down to earth to invest in things made out of good, solid atoms. And just when we thought hard reality had taught us a lesson about the way we invest and the limits of optimism, just one year later we were dealt another blow. Fortunately, no one fiddled while New York burned. But the experience dragged us the rest of the way out of our euphoria into a world in which imagining the possibilities of things to come meant anticipating all the bad things that could happen in the hope of avoiding them.

Still, before the stock market and the jihadi pilots had taken their respective

dives, ViOS was alive and well. Its creator, Julian Lombardi, had assembled a team of techies in Research Triangle, NC. ViOS, like many other startups at the time, was scurrying around trying to make things happen. Julian and his team weren't building some nameless data-mining or e-business dotcom; they were building a world that would parallel our own. At its most basic level, ViOS was a project pitched as a way to experience the Internet in 3D. After all, the links-pages-pictures model of the Internet was not amenable to what Julian calls "serendipitous experience."

So this pitch was a good place to start with investors. Julian had designed a system in which you could walk around and explore and meet your friends much like you can do in a video game such as the Sims. You could also visit Web pages by clicking on objects in the 3D landscape. ViOS had tremendous potential, but the company's second round of venture financing, needed to take the wonderful technology to market, became elusive after the tech-bubble was pricked by spooked investors. Like everything else dotcom, ViOS was dead. But the concept behind ViOS did not die with the company. And though the project was moribund, Julian Lombardi's vision has simply been hibernating during the long winter since 2000.

Recently I had begun to think about Julian again and decided to give him a quick ring. The quick ring turned into a two-hour-long phone conversation, culminating in plans for another visit with Julian and his wife Marilyn—this time at their home in Madison, Wisconsin. And what I saw there let me know that the world is about to change.

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Julian Lombardi is an American of Italian extract. When he shares his vision for Croquet, he has the same warmth in his expression as when he offers you a traditional prosciutto and cantaloupe. Neither geek nor mad scientist, Julian has the eyes of a mystic and the smile of one you would think never failed at anything.

During a meal of spaghetti replete with calamata olives, I got the story of how Julian had met up with so many other stars that formed the Croquet constellation: Alan Kay – an ex-Xerox PARC genius who'd developed the familiar "windowing" interface (GUI); 3D games and graphics wizard David Smith; David P. Reed, father of Reed's Law (a scaling law for group-forming network architectures); Andreas Raab, a 3D prodigy and Squeak developer; and Mark P. McCahill, the guy who coined the phrase *"surfing the Net,"* among other things. By all appearances, Julian had gotten mixed up with the Dream Team of computer geeks. All that was left was for me to see what they had created.

We sat down before our respective laptops – I on my PC, he on his Mac, and we began to explore the environments of Croquet together. At first, the terrain was

simple. A blue sky with clouds floating overhead. In this gridlike, 3D landscape, there were objects of various sizes placed in the foreground and back, all seemingly subject to the laws of perspective.

"I designed this area to look like the Holodeck," he said. *"This lets the user know he's at a starting place."* Julian's avatar – a white rabbit – approached, and Julian's voice could be heard from one of the computer's speakers.

"Hear my voice? That's voice-over IP."

He took me to one of the objects in the landscape. It looked to be a floating window or picture.

"Watch this," said Julian and a beam of light shot from his avatar to land on the picture-window, representing his interaction with it. He moved the window back and forth as if it were spinning on an invisible axis. Then, on his computer, he gave it a spin and it turned. As I got closer to the picture-window, on my computer, I could see the image being presented – pillars of some classical civilization overgrown by vines.

"Why don't you give it a try?" said Julian.

From my PC, I clicked on the window and suddenly I controlled it. I moved it as Julian had from his machine – pushing it from the left – forward then back – and the picture-window changed proportions as I moved it. Then something quite profound happened: Julian's avatar stopped my movement. You could see the window jump slightly as we wrestled to gain control of the thing.

"What you are seeing now is at the essence of Croquet," he said. Did Julian mean the potential for collaboration or the potential for conflict?

The two computers were able to manipulate the same picture-window at the same time. *"That's David Reed's Teatime architecture at work."* He was talking about David P. Reed, the project team-member working out of the Cambridge, Massachusetts.

"Follow me over here," said Julian. *"Let's look at some more stuff. Just click right there—"*

I clicked on the image of the crumbly columns and we were taken to a new dimension. Before us were lush, green gardens twisted among the architectures of a noble race, long vanished. Columns, some broken, others whole, thrust upward through the vegetation. Off in the distance, mountains rose among mists. In the middle-ground waterfalls cascaded, dispersed in a haze, and then reformed to wind tortuously through the earth.

“Every vine and every tree you see in such spaces will be reposed on the interactivity server. That means, given the right permissions, you can take an object, use it in your own space, or make adjustments to it. Or you can do this—“

Julian had taken a small plant and had begun to duplicate it, planting the duplicates in various places in the natural garden. *“The idea is that if I gave you the right permissions, we could alter the space together.”*

Then he did something really cool: In one of those spinning picture windows, I could see Julian’s Mac screen. The whole interface was there, just as he’d left it. As I approached – like zooming in – his computer interface became superimposed over mine. Suddenly, I was no longer working a PC, but a Mac. My PC had effectively become a Mac. It was like messing with someone else’s finger-painting, but in cyberspace.

“This could represent the death of the operating system as we know it,” I said incredulously. Julian smiled.

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Julian proceeded to show me a host of tricks and capabilities in this brave new world. We played a legacy chess game from the 80s within one of the picture windows. Then he edited a sentence I’d made in a text editor on the other machine. All this was further proof of total interoperability—no, complete independence from the underlying operating system. Due to the “virtual machine” upon which Croquet had been built, the functionality of all applications had become peer-to-peer. In this space, the “client” was no more.

I followed Julian to another dimension—an underwater environment complete with various undersea creatures and aquatic flora. He showed me how to make a 3D shark with a 2D rendering tool so basic a kid could do it (and *“that’s the idea,”* said Julian). He proceeded to program the shark to swim with the other fish. He could have programmed every fish in the environment with very little effort and run a simulation over many days.

In one demonstration, he built a dimension within a dimension within a dimension. He also showed how users could enjoy collaborative CAD (computer aided design) capability in order to construct the several wonders of the next world. Julian illustrated representations of physics data, such as the “neutrino detector.” He and five other guys had built all this in just for demonstration. One can only dream about what a few hundred thousand people would be capable of creating.

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“The Next Big Thing.” These are words we’ve been reluctant to use since 2000.

Back then, the hyperbole got bigger and bigger as the media tried to convince us of some cutting-, no, bleeding-edge technologies that were functionally amazing but also essentially boring unless you could make money with them. But what I saw on those two laptops in Madison, Wisconsin made me ready to dust off such words again to describe technology.

Not just any technology—a technology of possible worlds. Yes, the time for enthusiasm has returned. And not just for investors and entrepreneurs. Croquet is a technology that will change everything for everyone. I guess you could say that – both literally and figuratively – if the Internet is 2D, then this Croquet-based technology is n-D. But what is it? Well, this is the hardest question to answer. In many ways its how Louis Armstrong replied when someone asked him *"what is jazz?"* He said, *"If you gotta ask, you'll never know."*

But maybe the best way to capture some of Croquet's essence is to contrast it with what we're used to. For example: Right now, you're pretty much dependent on an operating system. With Croquet, you're not. You could have a nice display, a graphics card and a glorified mobile phone, and have everything you need at your fingertips. (Imagine how much the price of technology will go down when this becomes ubiquitous.)

Today, most applications sit on your desktop. In the dimensions of Croquet, any application can be shared in the environment, given the appropriate permissions. Currently, our experience of 3D environments is found mostly in games whose surroundings were designed by 15 guys at Sony or Electronic Arts. With the distributed environments that Julian and his colleagues are creating you get radical decentralization. The myriad tastes and cultural perspectives of the real world will be reflected in these dimensions—though not limited by gravity or distance. If you don't like globalization, you're not going to like this technology—it's going to mean "spontaneous order" on steroids.

That is perhaps the most beautiful aspect of this technology. Like the Internet, it will not likely be subject to the control of a central authority. It's a libertarian's paradise. One's dimension is one's property, so anyone can create his own world (or cooperate with others in another).

Nelson Goodman would have been thrilled to see the emergence of Croquet. In his seminal work Ways of Worldmaking, he wrote:

"Since the fact that there are many different world-versions is hardly debatable, and the question how many if any worlds-in-themselves there are is virtually empty, in what nontrivial sense are there, as Cassirer and likeminded pluralists insist, many worlds? Just this, I think: that many different world-versions are of independent interest and importance, without any requirement or presumption of reducibility to a single base."

In this context, Goodman is talking about art, science, knowledge and language. But he could easily have been talking about what will be the content of Croquet--indeed, of society at large. In a sense Croquet could become the space where education, commerce, play and self-exploration are given their fullest expression – the place where worlds are made. And if the technology succeeds, worldmaking will become just as much the province of bits and bytes as atoms and molecules.