Essay: Xanadu, the Web, and a Little ZigZag

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To any self-respecting hacker, Ted Nelson needs no introduction. Philosopher, showman, genius, and gadfly—Nelson is a Professional Visionary. He sees the future of computing. And he has been remarkably successful—at seeing things. He foresaw word processors, he foresaw the hypertext. And in 1967, he forecast the Web. One day a big, networked structure of information will connect computers, he wrote. And "it will be read from an illuminated screen; the reader may display it; it will respond or branch upon actions by the user." Needless to say, the Web has happened. You might put money on his visions. Well, almost. His business ventures have yet to turn with success. Especially his greatest vision, the vision of a global, hypertext system. A lifetime's obsession of computing. And he has been remarkably successful—at seeing things.

But despite years of criticism from the degenerate, Xanadu refuses to die. It has become an image of potential within the hypertext community. And owner of the future of the all, we have all of Xanadu is its erotic simulation, its ideal, its idea. A computer filing system which would store and deliver the great body of human thought, and we can lay out and with all its many interconnections, acknowledging authorship and ownership, Anollinear writing system. Like the Web, but much better.

I want to write to you about Nelson's crazy vision. But not the story of how it happened—has been told elsewhere, with more points for historical scholarship. I want to look at how Xanadu works. And at Nelson's new project, ZigZag. Because I'm not an historian—I'm a geek.

The Xanadu System

In our interview, Nelson hit upon the sentence he had "been looking for years" to explain the design in a nutshell. "Xanadu is a system. A lifetime's obsession wrapped up in one massive program. A program that has been in development for over 40 years, causing Wired magazine to label it "the longest-running vaporware project in the history of computing." Much to Nelson's dismay.

This is becaused because we wish to assure the author. In Xanadu, links of any type will attach themselves not to a space but to specific characters—the text itself. Nelson calls this a "span." Hence, because objects are not identified as a whole and owned but by what they are across a vast address space, links would update automatically as its position changed. No dead ends. No error 404s. Every document would be uniquely identified characteristic of whatsoever, whenever it is.

This is not to say that only one copy of a document exists on the Xanadu server, but that there would be numerous "instances" units of information throughout the network. These disparate instances are collected into a single virtual object—and the way to do this, as I have explained, is to identify not by just where they are, but by what they are. Integral to this is the concept of pointing at bits of a document rather than storing multiple copies of it in memory. It is the concept of transclusion. Transclusion is a term introduced by Nelson to describe the process of including something by reference rather than by copying. When however an author wishes to quote, he uses transclusion to "virtually include" the passage in her own document. As Nelson is fond of saying, all this means is making and maintaining connections between things that are the same.

Remote instances remain part of the same virtual object. This concept underpins Nelson's most famous commercial feature: hypercopying. Hypercopying allows broad re-use of multiple objects in exchange for automatic tracking of ownership. Payment goes to the original publisher and credit to the original author. In other words, transclusion reframes the question "How do we prevent infringement of copyright?" as "How can we allow re-use?" The question the Web has ignored.

ZigZag and n-Spaces

In our interview, Nelson remarked, "People ask me why I carry a stinger. Photographers carry cameras, gunfighters carry guns. 1 CONNECT THINGS!" ZigZag is Nelson's new baby, the satellite project of a bigger vision. It is also his first "deliverable."—a term he likes great points to emphasize. Although he is now working it into Xanadu, ZigZag is a much smaller program designed for use on a PC, without the universal aspirations of Xanadu.

ZigZag is like hypertext in that it utilizes a spatial metaphor to organize information. But it is more revolutionary, in that it functions in n-space, not 2- or 3-space. As with Xanadu, the idea is that the information creates its own structure, not vice versa. According to Nelson, "It is not constrained by what you expect in 2- or 3 space. It has relationships of its own which are generated by multidimensional lists." As with Xanadu, the idea is to create a non-hierarchical thought-space.

Like spreadsheets or business databases, ZigZag works with cells, rows, and columns. Each cell—a unit of text, audio or visual information—can be allocated its own dimension, which is interconnected with any or all others. In other words, each idea can have many different contextual fields, and they do not have to interconnect and behave in an exclusive fashion. Unlike spreadsheets, which require that each cell's information "have an connection, a down connection, a left connection, and a right connection." Nelson explains that "each cell's connections are to its own business." For example, in one dimension of ZigZag space, Nelson's name appears for a list of interviews I have archived (Ted Nelson 12/12/99, Doug Engelbart 2/5/1999, Andy van Dam 05/11/99, etc.). In another dimension, these same names and dates are part of my financial chart (list of phone calls and computer maintenance prices, telephone call costs, and other expenses).

In another dimension, this cell is the beginning of an elaborate article on Xanadu and how it fits into the history of the Web. It is being evolutionarily, in that it functions in n-space, not 2- or 3-space. As with Xanadu, the idea is that the information creates its own structure, not vice versa. According to Nelson, "It is not constrained by what you expect in 2- or 3 space. It has relationships of its own which are generated by multidimensional lists." As with Xanadu, the idea is to create a non-hierarchical thought-space.