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Inter@ctive Week News

Tim O'Reilly: The Web Is A Giant Supercomputer

August 28, 2000 8:22 AM ET

By Mike Dempster

Tim O'Reilly is founder and president of O'Reilly & Associates, one of the world's leading publishers of computer books that pioneers and champions Web content development. O'Reilly is an ardent defender of open source software, an activist for Internet standards, an author and an editor. His company also produces travel books and guides that help patients navigate the medical system.

You have said that a major change in the next few years will be people's realization that what we've done with the Web is build one giant computer. Can you explain?

Well, actually, the realization is coming now. What we'll see in 2004 is the fulfillment of that realization. Right now, the Internet is still dominated by the client-server paradigm, which assumes that some sites - servers - are well-connected and on all the time, and others - clients - contact them for services on an intermittent basis.

But as we move to an always-on network, any computer can act in a variety of roles, and we'll see new kinds of applications emerge.

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Is Napster's peer-to-peer file sharing the kind of application we can expect?

It shows elements of that future. Rather than centralizing all the data in one place, it simply centralizes "metadata" - data about who has the data, their connection speed and their availability.

The actual data transfer is done on a peer-to-peer basis. Where this gets really interesting is when you start thinking about what other things can be shared besides data.

Peer-to-peer will eventually be used for sharing computation, for things like search engines and for new applications we haven't thought of yet.

Our devices will talk to each other on an ad hoc basis, in ever-shifting configurations as we move through our connected world, and what will be possible will depend on which other computers are around. Managing metadata is going to be a huge part of the future of network

services.

SETI@home is a project you like. Why?

SETI@home is a project at the Space Sciences Lab at [the University of California at] Berkeley. They have approximately 1 million people running a screen saver that analyzes radio telescope signals looking for signs of extraterrestrial intelligence.

This is a huge compute operation, something that would take years and millions of dollars to accomplish otherwise, but by using the network and spare compute cycles on everyday PCs, they've effectively built the world's largest supercomputer.

It's a very specialized supercomputer, but a variety of companies, including United Devices - co-founded by the creator of SETI@home - and Popular Power, are building generalized systems for this kind of shared computing. As Marc Hedlund, chief executive of Popular Power, said to me: "What we're really doing is building an operating system [OS] for the Net." An operating system doles out tasks to various subsystems. If Napster is a sign of what the file system of the future "network as computer" looks like, SETI@home is a preview of its CPU [central processing unit].

Table with 3 columns: Index (Dow, Nasdaq, @Net), Value, and Change. Includes timestamp 11/17/00 4:30:00 PM EST and note 'Data delayed at least 20 minutes'.

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Another project that seems important to me is SOAP [Standard Object Access Protocol], which allows Web sites to use each other as if they were large-scale software components. SOAP was originally developed by a group of companies, including UserLand Software, DevelopMentor and Microsoft, and is a key component of Microsoft's .Net [Microsoft.Net Framework] vision.

I'm also fascinated by Jabber, the XML [eXtensible Markup Language]-based open source chat program. Jeremie Miller, the creator of Jabber, echoes Marc Hedlund's OS for the Net comment when he says: "We're not just building a chat program, we're building a generalized XML routing infrastructure." Invisible Worlds, with its BXXP [Blocks eXtensible eXchange Protocol], is another company working on the same thing. SOAP, Jabber and BXXP all point to the role of what we might call "data-level APIs [Application Programming Interfaces]" in the Net of the future.

How does Palm technology fit into this new model?

Paradigm shifts always require us to think in new ways. Windows CE - and many other early handhelds - tried to compress a complete PC into a small footprint. The genius of Palm was that they realized that the handheld was a peripheral, not a stand-alone computer. Palm applications synch with another computer - which is typically on the Net - and they are ideal as access points for this new "network operating system."

Technologies like Sun [Microsystems]' Jini, which allow devices to find and learn about each other, will be an important part of the next generation.

Instead of having handhelds that are tethered to a PC for synching, we'll do ad hoc synching with the network through a variety of access points.

Fraud is a problem for e-tailers. People are leery about banking services. Will that be solved soon?

Our government has been extremely short-sighted, or conflicted, about authentication on the Net. That's been a terrible hang-up for e-commerce of all kinds . . . there have been a number of restrictions that have kept companies from widely implementing digital signatures. I think that will be put in place. If it hasn't by the year 2004, we're hosed.

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