IBM MAKING A COMMITMENT TO NEXT PHASE OF THE INTERNET

FEATURES AND COMMENTARY

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Steve Lohr reported: IBM is announcing a new initiative to support and exploit a technology known as grid computing, which the company and much of the computer research community say is the next evolutionary step in the development of the Internet.

The grid vision is that everyone at a desktop machine or hand-held computer could eventually have the power of a supercomputer at his or her fingertips, by amassing the processing power and information resources attached to networks. Although the idea has been around for some time, the types of computer hardware and software to achieve it are only now coming within reach.

IBM is placing no dollar figure on its grid initiative. But the company is comparing the program to its earlier move to support the Linux operating system, an effort that it announced at the start of 2000 and later said it would spend $1 billion on over the next couple of years, and its backing is expected to push interest to new heights.

As part of its campaign, IBM is also announcing today that it has won two national grid projects in Europe, one in Britain and another in the Netherlands. The IBM grid initiative will be led by Irving Wladawsky-Berger, an executive with a research background who has close ties to university and government laboratories. Mr. Wladawsky-Berger is also heading the company's major support for Linux, a freely distributed operating system that is increasingly used to power data-serving computers on the Internet and inside corporations.

Grid computing -- a concept that originated in supercomputing centers -- holds the promise of transforming the Internet, according to some computer scientists. At present, the Internet is used for communication, mainly e- mail and instant messaging, while the Web is the Internet's multimedia retrieval system, enabling computer users to have access to text, images and music.

The grid would add a new dimension."The goal is that grid becomes the computing engine for the Internet in the way that the Web is the information engine," said Ken Kennedy, a professor at Rice University. "The real long term is that this becomes the problem-solving mechanism for society."

The dream of computing power as an electricity-like utility, available anytime and anywhere, to help solve all manner of human problems is both decades old and not likely to be fully realized anytime soon. The grid takes its name from the utility analogy, which first surfaced in the 1950's.

The notion of computer resource- sharing to augment human intelligence dates back at least four decades to J. C. R. Licklider, who in 1960 wrote a classic paper, "Man-Machine Symbiosis," and to the time- shared computing experiments of the early 1960's at the Massachusetts Institute of Technology and elsewhere.

But what is new about grid computing is that the vision is now within reach, at least for some government and university research labs, because of continuing advances in processing power, network capacity and software.

One grid technology is distributed computing, whose best-known application is probably the SETI@home program, begun in 1999, which harnesses the power of a couple of million personal computers worldwide to help look for signs of extraterrestrial intelligence.

But grid technology extends beyond harvesting unused computing cycles. It also involves sharing big database files and application programs across high-speed network connections, so that researchers in far-flung locations can collaborate on complex projects including climate modeling, high-energy physics, genetic research and earthquake simulations. The early test bed for grid projects is in research labs, as it was for the Web and browsing software.

In the United States, the Departments of Defense and Energy, the National Science Foundation and the National Aeronautics and Space Administration are all financing grid projects. In Europe, a flurry of ambitious grid programs are under way or in the works.

Britain is building a national grid, linking nine research centers from Southampton to Edinburgh to Belfast, and IBM is supplying key parts of the grid including a sophisticated data storage operation at Oxford. The British government recently allocated roughly $170 million for its national grid, and the applications will include exploring the mysteries of particle physics, genome research and medical informatics.

The biology applications, according to Tony Hey, a computer scientist and architect of the British grid, range from exploring the phenomenon of protein folding to devising less-invasive methods of surgery. "The last thing a hospital wants to do is run its own supercomputer center," Mr. Hey said. "But the grid allows you to set up dynamic virtual organizations to move quickly to solve deep problems requiring a lot of computing resources."

Perhaps the most important enabling technology for grid computing -- and its biggest hurdle -- is the software. It must manage and coordinate the sharing of databases, applications and computing power across the network, and do so reliably and securely.

What is emerging as the de facto standard for this layer of communications and collaboration software comes from the Globus project, a development effort led by Ian Foster, a senior scientist at the Argonne National Laboratory, and Carl Kesselman, director of the center for

grid technologies at the University of Southern California's Information Sciences Institute.

The Globus project, begun in 1996, is developing its software following the open-source model, in which computer code is openly shared, allowing programmers to modify, improve and fix the software. It is the same approach to software development used by the Apache Web server project and Linux. "We are rather like the Linux community, open source and open standards, with more and more people cooperating," Mr. Foster said.

As a business strategy, IBM has become an enthusiastic supporter of open source projects like Linux. The company sees its competitive advantage in computer services and specialized software instead of at the operating system level, where Microsoft's Windows and Sun Microsystem's Solaris are the leaders.

But Microsoft and Sun are embracing grid initiatives as well. Microsoft has just contributed $1 million to the Globus project for research on putting grid tools in Microsoft's software like Windows and its .Net Web services software. And Sun has a grid software offering for use within corporations, and last week it announced that it was making the software an open source project.

Speaking of grid technology, Peter Jeffcock, a Sun manager, said, "The productivity gains are huge and we think it's inevitable."

Indeed, companies like Pfizer, Ericsson, Hitachi, BMW, Glaxo, Smith-Kline and Unilever are experimenting with internal grids at the moment. Only big companies with deep pockets and high-speed Internet connections are likely to be interested at first. And they are awaiting a more robust grid infrastructure, which will require more software development in particular.

But IBM certainly is betting that will happen, and with its initiative it is hoping to take a leadership position. "As grids go commercial use, we think everyone will jump in," Mr. Wladawsky-Berger said.

The grid community, it seems, is welcoming the attentions -- and money -- that business can bring. "The grid concept has really captured mindshare in the academic science and engineering community," Mr. Foster said. "But we have to get the commercial interests to get involved with resources and investment."

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