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## Cover Story

May 26, 2008

Volume 86, Number 21

pp. 13-18

## Up From Desktops

**The leading suppliers of personal and business information technology—Microsoft, Google, Dell—are making a move in the life sciences laboratory**

[Rick Mullin](#)

**INFORMATION TECHNOLOGY** (IT) for pharmaceutical research has long been the purview of specialty software suppliers and in-house systems developers. But seeing an opportunity to provide researchers with technology that can collect and analyze growing amounts of data, a handful of generalist IT companies are stepping up their activity in the field—very big companies with very familiar names.



Symyx

Middle Layer Desktop operating systems are vying for a position between the lab bench and the database at large drug companies.

Personal computing giants [Microsoft](#), [Dell](#), and [Google](#) are moving beyond their traditional roles of providing desktop tools to researchers in drug discovery and development. In recent months, all three companies have introduced products designed to enable collaborative research.

These products range from basic electronic laboratory notebooks (ELNs) to searching tools attuned to the language and data-processing requirements of health care and pharmaceutical scientists. Each company has launched a new marketing division specifically for the sector in hopes of building on a base of desktop computing systems.

The market's attraction is obvious, according to John Reynders, chief information officer for pharmaceutical R&D at [Johnson & Johnson](#). "Remember what Willie Sutton said about robbing banks?" he asks. "That's where the money is." Well, this is where the data are. More and more players are seeing the opportunity, and Microsoft, Dell, and Google are exploring to see where they will fit in."

Reynders, who was previously an IT manager for drug discovery at [Eli Lilly & Co.](#), says he has had "a variety of conversations with these companies. I am reaching out to them; they are reaching out to me. We are discovering what we can learn from each other."

Hussain Mooraj, research director for life sciences and health care at technology analyst [AMR Research](#), says Reynders' experience is typical. "There is an absolutely huge amount of activity from these companies," he says. And they are stepping up to similarly huge and chronic problems in the sector. "Drug research is a siloed environment where information is hard to find and manage," Mooraj says. "Processes are not standardized for collaboration, and processes are inefficient where standards do exist." At the root of the problem is the heterogeneous nature of commercial research software.

The large general computing firms would seem to be in an ideal position to take the problem on. "Microsoft and Google are best positioned to be able to retrieve this information, structured and unstructured, in a manner that provides business value and insight," Mooraj says. "Why? Because they are on every desktop. They are on every document that opens."

Mooraj says that beyond the desktop tools these companies have traditionally provided, they have identified life sciences research as a major growth market and have begun developing products targeted for more direct roles in actual research, such as managing databases in more collaborative ways. One example is Scientist Workbench, a data and knowledge management system developed by Microsoft in partnership with Infosys using Microsoft's business software and Web applications. A version of the product, called Biologist Workbench, has been installed at [Pfizer](#).

The partnership behind Scientist Workbench illustrates the importance of alliances between specialty software companies and the more broad-based firms coming into the research market. Most of the specialists say they see the encroachment of Microsoft and others into ELNs and data processing and visualization as an opportunity rather than a threat. Most say there will always be a need for software applications deeply rooted in the language and processes of research activity.

"Microsoft will not shake up the ELN market," says Alan Louie, research director with market analysis firm [Health Industry Insights](#). "We are talking about a really high level of technology to make that software go. Specialty players have a distinct advantage. Unless you have no money or are pursuing some sort of academic project, you'll need the specialist software." Among those specialty products are imaging software and instrument control systems.

**THE QUESTION IS** how much of an IT network for science needs to focus on the science? Microsoft system installers claim that new versions of the firm's software can cover much of the ground that specialty ELNs do. Industry observers see less of a chance for the company to cut into laboratory information management systems (LIMS), which automate laboratories and manage centralized data.

Mooraj notes that specialized software is complicit in the data sequestering that large drug companies want to eliminate. The emphasis in system development is likely to swing in the direction of collaborative search and data management, in turn playing to the favor of Microsoft, Dell, and Google, Mooraj says. "But there is that old adage," he adds. "If you can't beat them, join them."

As it turns out, Microsoft is looking for joiners. With its conquest of desktop computing accomplished in the laboratory, the company is now focused on providing a platform on which users can configure other vendors' systems into a Web-based network. The company is emphasizing several products and programming features that have been available for five years or more, as well as several new products.

Basic to the company's strategy is its .NET Framework—a suite of precoded programming protocols Microsoft introduced in 2002 for user interface, data access, database connectivity, Web applications, and network communications. The latest version, released last year, includes Windows Workflow Foundation, which designs and coordinates work processes.

Programs more familiar to researchers, such as Excel spreadsheets, are also being brought to bear in customizing research IT. Microsoft Office 2007 includes features such as "ribbons," which are user-programmed menus that can be customized, usually by a Microsoft-affiliated service company.

Eight years ago, Microsoft launched vertical marketing teams that included about five people working in life sciences, according to Mike Naimoli, industry solutions director for life sciences at the company. "Now there are multiple hundreds," he says.



Symyx

Plugged In Desktop computing systems are moving closer to the action in health care science research.

According to Les Jordan, Microsoft's industry technology strategist for life sciences, through partnerships with IT suppliers such as [Thermo Fisher Scientific](#) and [Accelrys](#), the company aims to adapt its basic products so scientists can access databases and IT functions across large research organizations. "Thermo Fisher has announced that their lab equipment will output information in Open XML format, which is the format of Microsoft Office," Jordan says. "The implication is that we can take information from a Thermo Fisher mass spectrometer and pull it directly into Excel. It lets the researcher leverage stuff they already have."

**THE PROBLEM** facing life sciences companies in the laboratory is both a technological and a business-process-management one, Naimoli says. "They need to better manage the movement of projects through the pipeline." He says Microsoft wants to allow standard desktop computer users to get a "NASDAQ view of their pipeline"???"a real-time stock-market-like display of data. "First and foremost, we want to provide a platform in which people naturally migrate through a Microsoft infrastructure."

According to Naimoli, Microsoft's health care division has \$260 million in annual sales and is expanding at about 13% per year, making it one of the company's fastest growing vertical markets. He notes that products such as HealthVault, a recently introduced health care records management product, will also be linked to the laboratory to help drug companies manage data in translational research, which links the bench to the clinic.

Dell has also beefed up its health care marketing team during the past year, according to August Calhoun, vice president for life sciences. The group, which has primarily supplied computers to hospitals and health care payers, including insurance companies, is now taking on research in pharmaceuticals and biotechnology. "We have life sciences professionals on our team who have worked in pharmaceutical research companies," he says. "They understand the customers."

Calhoun says Dell is also working through partnerships with several firms, not least of which is Microsoft. Dell also works with [Rescentris](#), a supplier of ELNs; [RemedyMD](#), a patient data management software company; and [Stratus Technologies](#), a supplier of data management software used in clinical trials.

Dell's Latitude XT tablet, a thin notebook computer, is also crossing over from nonresearch health care applications, such as pharmaceutical field sales, to laboratory research. "Users move around; they're not tied to a bench," Calhoun says.

Life sciences customers also need high-performance computing for modeling and simulation. "Customers want to do molecular dynamics," Calhoun says. "We can work to understand the class of problems they want to attack and build for it at the factory. We install the software and integrate it with the databases they need to access."

Google is also making some changes in its marketing approach. The provider of the ubiquitous search engine recently began marketing Google Search Appliance, a hardware- and software-based search tool for business. The tool provides what Google calls universal search, a search engine configured to access all internal and external information pertaining to specific business or research requirements.

The aim of universal search, says Nitin Mangtani, enterprise search product manager at Google, is partly to provide intranet-searchable access to all of the data in a business. "Most companies have five to 15 separate content repositories" but lack an efficient means to do a unified search, Mangtani says. Universal search works in any industry.

Google Search Appliance can, however, be programmed with special ontologies and taxonomies that help researchers perform more targeted searches of both internal and external databases. "It has a lot of algorithms and intelligence built in," he says. "And it can look at a raw document and derive a lot of information through implicit signals as well."

According to Mangtani, life sciences research is an important market for universal search engines. "The volume of information in biotech and pharma is enormous," he says. "There is a lot of human capital. Research information is shared through collaboration, and the importance of search functionality is higher than in other markets. There are millions of documents."

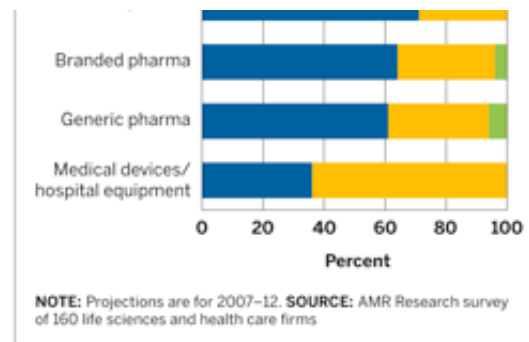
Johnson & Johnson's Reynders sees a trend in research IT toward the development of "community spaces" that permit collaboration between researchers and connectivity between software. This trend, he says, is attracting the second wave of generalist firms into research IT, following the entry of major database companies such as [IBM](#) and [Oracle](#) that are already well established. The new wave accompanies a shift in focus away from physical architecture to Web-based creativity and information sharing.

The impact these companies will have on specialized software research is unclear,



Reynders says. But he doesn't see the more specialized software products being muscled out. "We are doing experiments in a lab somewhere," he says. "It could be down the hall or in Europe or India. The question is in the continuum. Where does the LIMS stop, and where do you start dealing with information processing?"

Specialty software will be secure wherever that line is eventually drawn. "We are seeing a lot more activity from Microsoft in particular," says Trevor Heritage, president of the software division of ELN supplier [Symyx](#). Any software company marketing a desktop application has always had to integrate efficiently with Microsoft Windows, he says, "but what we have seen more and more is an expansion of Microsoft's technology stack from the desktop to the server." Sharepoint, a collaborative document management application, is an example of a new Microsoft product that is leading larger pharmaceutical companies to investigate new ways of organizing and integrating research information, he points out.



According to Heritage, Dell and Google have also been making forays into laboratory architecture. "I actually think all of this is positive and is presenting good opportunities for Symyx," he says.

He notes that Symyx' new Notebook 6 ELN incorporates workflow functions that operate on Microsoft's .NET Framework and an Oracle database. "What this gives us is an environment that is user-friendly from the scientist's perspective," Heritage says. "Most of the instrumentation supporting labs today runs off the Windows server environment. And we have been able to take advantage of Oracle's data and knowledge management capabilities."

The Microsoft and Oracle systems have also allowed Symyx to integrate its ELNs with data management systems such as Isentris, which it acquired as part of MDL Information Systems last year, Heritage says. His take is that Microsoft is developing a middle tier of IT between desktop systems, where it is the predominant supplier, and large data management systems—a layer at which it will integrate with other companies' systems to create research computing networks.

Adel Mikhail, CEO of ELN supplier [Rescentris](#), also sees the big generalists as allies. "Everybody uses Microsoft desktop applications; everybody uses Google applications for searching. You can't deny that Dell is the predominant player in hardware," Mikhail says. "Working together, we can provide a turnkey solution for clients that want an ELN immediately. Our product is installed and can be used in an hour or two. It doesn't require 10 people with blue suits in your facility for six months or a year."

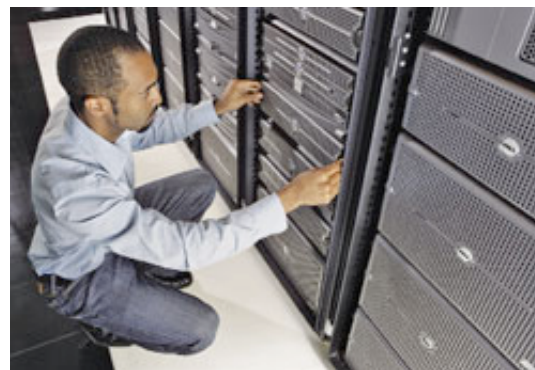
Like Symyx' Heritage, he sees no competitive threat to Rescentris' ELNs from the larger firms. "These companies don't do a really good job focusing on the workflow of a very highly specialized knowledge worker," he says. "Innovation in this kind of software happens in ultrafocused groups of individuals with knowledge of a specific domain. That doesn't happen in the larger companies. It would be much cheaper for them to buy ELN companies than to become competitors."

But Jason Noble, practice director for portals and collaborations at Neudesic, a Microsoft service contractor, says his firm can use Microsoft's Office 2007 and other new or upgraded Microsoft products to cover much of what traditionally had been done by the specialists. "We can leverage Microsoft for 90% of everything you need in an ELN," Noble says.

**MUCH OF WHAT** Microsoft now covers is data formatting, he says, but the desktop suite???including Excel, Sharepoint, and Office 2007's ribbons feature??? also provides a platform for research collaboration. Noble maintains that system installers such as Neudesic help Microsoft tighten its focus on life sciences research and other vertical markets.

Microsoft, Google, and Dell are making no real dent in the LIMS market, according to Ronald S. Kasner, vice president for corporate development at LIMS supplier [LabVantage](#). "LIMS is the critical laboratory backbone, and I don't see the generalists playing," he says. He characterizes the sector as more mature than ELNs. "The notebook market is continuing to struggle toward defining what an ELN is supposed to do."

That balance between business and technical workflow at most large research institutions is shifting with the influx of new



Dell

SLIDING IN Dell is among the personal computing giants with designs on the laboratory IT market.

technology. At [Nationwide Children's Hospital Research Institute](#) in Columbus, Ohio, for example, the business administration offices have gone paperless, and the research organization—800 employees in laboratories—is looking at its options to do the same. Both business and research departments use Microsoft desktop computing software, according to Mary France, director of research information services.

"We looked at research options two years ago. We found there was not much available," France says. Microsoft did not contact the hospital at that time but has been in touch more recently. "They are reaching out quite a bit," she says. "We have informatics cores—particular IT groups integrated into the hospital that specialize in particular areas of scientific research. Microsoft is targeting them. They want to get involved with specific projects."

**ACCORDING TO** France, getting everything to run on a single operating system is a big concern. The hospital chose Rescentris ELNs because they run on multiple operating systems, for example. And imaging is an important IT concern that needs to be better integrated into a general computing infrastructure. "I will wait to see who gets that right," she says.

Although Internet-based software has the Web as a de facto communications protocol, software vendors agree that a dearth of IT standards for research is hampering system development. Microsoft launched an initiative called BioIT Alliance two years ago to use existing Web services to improve integration.

"The purpose of the group is to bring vendors and scientists together in one place to talk about standards we should use," Microsoft's Naimoli says. "We want to work with Macintosh and Linux and, to that end, products like Sharepoint that run on a browser and don't require a client." Microsoft's high-performance computer products also utilize standard Web services, which foster links with other vendors, he says.

Right now, the confusion created by the influx of disparate software into laboratories overwhelmed with data has created a huge opportunity for any company with a way to tie it all together, according to Mikhail at Rescentris. Scientists continue to struggle to achieve an efficient integration of systems for business, data management, and laboratory workflow.

"I've heard from a senior person at one of the large companies that this is a billion-dollar market with 5% penetration," Mikhail says. "And all 5% are unhappy. These software companies constantly need to add revenue streams, and life sciences information is a potential multi-billion-dollar stream."

Chemical & Engineering News  
ISSN 0009-2347  
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[\[Top of Page\]](#)