The World Wide World:
IT Ain't Just the Web Anymore!

BY ESTHER DYSON

This year, we wanted PC Forum to recognize the IT industry's continually closer connection with the real world – with non-techies, with non-Americans, with the pleasures and pains of real life. We're proud to say we have achieved that, with speakers ranging from labor leader Andy Stern to Russia's Arkady Volozh, and topics ranging from health care to the exotic reaches of new search technology and tagging tools. As Howard Gardner would say, we honor multiple intelligences, from Stanley Zdonik's to Emily Levine's.

We have always liked IT because it's intellectually exciting and commercially rewarding. Now it is also relevant to an increasing proportion of the world's population. . .and that outside world matters more to the IT community. Not only must Americans pay attention to Washington; we must also heed doings in the halls of Beijing. Our customers may speak Tagalog and use cell phones, or they may be our neighbors who have grown too old to read fine print.

All this means an unusually challenging if promising market for any IT-related business. Competition is greater, and new customers in new markets gain in importance as US domestic markets grow more slowly and become saturated. Companies face the challenge of scale on the one hand and continued innovation on the other, as Johns Hagel and Brown point out. IBM is addressing this challenge with "emerging business opportunity" units such as Carol Kovac's Life Sciences group; started from scratch but within IBM's protective nest, they are measured (like a dot-com) not on profits but on growth and other metrics during their infancy. (Organic growth doesn't necessarily mean plodding growth; it may mean growing new organs.)

Indeed, more companies need to focus more on where opportunities *will* be rather than where they are now. . .even as they must pay diligent attention to current customers to keep them satisfied. It's a world where the consumer has a voice, but the little guy still has trouble being heard.

Over the next few days, we encourage you to pay close attention to the people around you, big shots and little guys both. Like you, they have come to learn and to mingle – just as in real life, but more so. Welcome to the World Wide World!

PC FORUM ONLINE ACTIVITIES AND TOOLS

LinkedIn, the social networking company (SEE **RELEASE 1.0**, NOVEMBER 2003), is providing its group-networking tool, LinkedIn For Groups, again at this year's Forum. Open exclusively to Forum attendees, it will help you introduce yourself to other attendees before the conference, set up meetings during the event, and maintain your relationships afterward.

IntroNetworks, which helps members of "gated communities" discover mutual and complementary interests, will provide its networking service for PC Forum attendees.

Visit the Forum event space wiki (provided by **Socialtext**) for details on how to participate. In fact, our event space is the hub of all information and online activities at PC Forum. We invite you to visit it at:

www.socialtext.com/pcforum

PRESENTATIONS – The World Wide World

Howard Gardner, Harvard Graduate School of Education: Singular integrity

When Howard Gardner was just a child, the US-born son of Holocaust refugees, his parents took him for a pricey (in those days) $300 aptitude test at Stevens Institute. "Your son is very good at lots of things, but his greatest gifts are in the clerical area," they were told. "He has a bright future." Most likely the testers were thinking of the kind of tasks that are automated by e-commerce websites today. The test totally missed the burning intelligence and insatiable curiosity that have made Gardner so revered as a thinker, rather than a clever phrase-maker.

To the public, Gardner is best-known for his theory of multiple intelligences: "The fact that somebody is good in one thing is no indication of whether they'll be good at something else." He adds, "I would never have pursued this intuition if I hadn't been doing two separate kinds of research as a young scholar in the 1970s. I was working partly with brain-damaged adults, 'Oliver Sacks style,' and partly with gifted children. The leap was to call different capabilities – such as facility with words, musical talent, spatial manipulation – 'separate intelligences'."

"Most people instinctively understand it," he says. "The people who like my work the least are the testmakers, because they have so much invested in the notion of IQ as covering virtually all intelligence and they are constrained to certain kinds of instruments. But if I want to find out if you have what I call 'interpersonal intelligence,' I'm not going to ask you 20 multiple-choice questions; I'm going to put you in a group and see who's taking orders from whom two hours later."

As he grows older and wiser (he is 61), Gardner has started thinking about the uses to which intelligence is put. "I'm very influenced by A.O. Hirschman's book *Exit, Voice and Loyalty: Responses to Decline in Firms, Organizations, and States*, written in 1970. As he says, if you're in an organization, you owe it a certain amount of loyalty. But if you don't like the way things are headed in the organization, you have a duty so speak up, and eventually perhaps to exit. One of the worst states to befall people is to fall out of favor with the group they want to be in. . .yet sometimes it's their duty to undergo that rejection. It's hard for young people to understand. It's loyalty to an abstract notion of what something should be, rather than to the thing itself."

Gardner considers intelligence and morality to be orthogonal: "Morality includes a delineation of to whom or what you feel responsible. You have to understand the principles by which you will abide even – or perhaps especially – when the results go against your interests. Older people tend to be wiser not because they are smarter, but because they are more likely to understand the consequences over time. They can pull up the right inventory of experiences" – or as Jeff Hawkins would say, they have more experience at recognizing patterns and predicting outcomes. Cautions Gardner, "When conditions change in the external world but you are still using the old [mental] maps, it may not work out so well."

He continues: "If intelligence is amoral, so is technology. The challenge is that information technology seems so new, but in many ways it's no different from any other industry." Many in the computing industry – and many of the young people Gardner interviews – say they are concentrating on their careers now so that they can become rich and spend their money on good works later on, pointing to examples from David Rockefeller and Henry Ford to our industry's own Bill Gates.

"But philanthropy doesn't buy you a pass if you're a rat as a business person," says Gardner. "I believe in slippery slopes. I don't believe in instant redemption through a philanthropic donation. Sometimes we need to pass laws that prevent misdeeds. But it's better if people just want to do good work because it feels good and feels right."

Still, he says, sometimes they need help: "At Google, for example, they say, 'Look, we've got a long-term plan. It's not based on the next quarter, but over the long run we'll be a better investment.' The broader point is that you need to have a narrative that you can adhere to and explain why you're not doing what everyone else is." That is, you need courage.

Andrew Stern, Service Employees International Union (SEIU): Disruptive person
While the Internet is liberating and empowering consumers, it's not doing the same for most workers, argues Andy Stern. "Consumers have real choices," he says. "But often a worker's only choice – to quit – isn't realistic. For reasons of education, location, skills. . .the actual choices are limited." The employers have all the power, he argues. Some employers might be amused to hear that, especially in the world of high technology, but hear him out. Stern has been a troublemaker for both business and labor since he graduated from college and joined SEIU Local 668 in Pennsylvania as a state social-service worker. Thinking not just in political but also

in business-model terms, he realized that the old-school union model made no sense in a world of labor surplus.

The old models of power struggle were mass-market: workers against employers, with the government taking the side of one or the other. But in today's modern world, says Stern, the struggles are more granular. Even governments can't hold their own against some modern corporations.

So Stern has been changing the shape of engagement by going after industries as a whole in a region, that is, taking on all the janitorial services in the New York region simultaneously – and after companies as a whole across geographies. Often the employers don't mind paying up – as long as their competition does, too: "There was a time when we literally blocked the bridges leading into Washington, DC, to win raises for SEIU janitors. But we also recognized there was a time to reach out to those same employers and to work with them. We know that many employers care about their workers and want to raise wages; they just need to be able to keep their customers, too."

Likewise, he is using international arbitrage (so to speak) to pursue better wages and standards for the US-based employees of the French company Sodexho. He persuaded labor allies in Europe to put pressure on Sodexho in Paris – where the company's senior executives and board members live – to get the talks started. His message to Sodexho: "We can help one another. Everybody wins when job standards are higher."

In high technology, things are even more complicated when you consider the international aspect. Though Stern has been to China, he doesn't see wages rising there – at least not enough to forestall a corresponding drop in US wages: "The gap is so large. There's nothing to force wages up anytime soon. It could take forever." As Diana Farrell of McKinsey argued last year, Chinese workers are also consumers of US products and the net effect of globalization may be positive, but the impact on some individual US workers may be severe. She mentioned a need for better unemployment insurance and training for US workers in palliation, but no one has risen to that challenge. . .until now.

Stern wants to unionize the IT industry – not to set wages, but to sponsor some kind of industry-wide fund that would deal with the underlying problems: short-term job losses and long-term training needs. "We're not going to come over to your place and set work rules and measure the distances between computers," he says. "But we want to help the industry work together to solve these problems. It's not a short-

term thing. It's how we keep and support the next generation of engineers and the next wave of invention."

But he's no starry-eyed idealist: "Suppose, say, Hewlett-Packard hired McKinsey to help figure this out. IBM would immediately be suspicious. We play a useful role as the outsider, the unifying force. No one is going to suspect *us* of trying to help HP. But if we can get the industry together as a whole to sponsor a relief fund, to provide some kind of cheap, general unemployment and retraining insurance. . . ." In short, he's up to his usual tricks – and challenging the industry itself to come up with a solution. "If you guys can invent phones that let me surf the Net, take pictures, download music, and GPS my way around LA, surely you can figure out how to give your employees the security and skills they need to survive in an industry that changes at warp speed. You figure out how to do it, and we'll give you the arm-twisting to get it generally accepted."

Jerry Yang, Yahoo!: Happy birthday! My how you have grown. . .

Although Jerry Yang and David Filo started Yahoo! with modest ambitions ten years ago, Yang says, "We always assumed that it was a global business. Any undertaking on the Internet is inherently global. We weren't a local bank serving a five-block radius."

The underlying model has morphed over the years (SEE **RELEASE 1.0**, JANUARY 2003), but Yahoo! has always had a focus on content. In the early days, Filo and Yang were the editors themselves, annotating and classifying a list of bookmarks. For better or worse, it was not (just) a search engine. The company now has a profusion of different content, communications, and commerce services ranging from online news to messenger to Web-hosting for small businesses and online job boards; it also offers personalization, RSS tools and various other "community" functions.

Over the last couple of years, since the arrival of CEO Terry Semel and COO Dan Rosensweig, the company has started integrating these capabilities more tightly, offering a more seamless experience for users and a more pleasant experience for advertisers, the source of roughly 80 percent of its revenues. Many of its current management team are former CEOs or senior executives of companies that Yahoo! bought, such as Ted Meisel from Overture and chief product officer Geoff Ralston from Four11 – no mean achievement in the quick-turn Bay Area. Now Yahoo! also wants to be a more accommodating partner for developers: "We see ourselves as a platform, not just a destination," says Yang. "And for us, search is not something in itself, but something that can enrich our content or enhance our services."

Meanwhile, with his title of Chief Yahoo, Yang remains in charge of a corporate culture that tries not to take itself too seriously. "We work hard and play hard. We have introduced business discipline to the way we operate, but our recent birthday celebrations show that we know how to stop and smell the roses occasionally," says Yang.

Yet Yahoo!'s culture is also local in many parts of the world. Its non-US audience makes up about two-thirds of its total users, and the developing markets are growing faster. "We're all talking about China, India, certain parts of Europe," he says. By following its strategy of build, buy or partner, over the past 12 months Yahoo! has launched global search, mail and messenger platforms; made significant investments in Europe through the acquisition of Kelkoo and its access relationship with British Telecom; and strengthened its presence in China through the acquisition of 3721, the launch of Yisou and the creation of a joint auction platform with Sina. Also, it offers locally developed blogging tools in Japan and Korea, and it is watching the development of virtual economies and how people use avatars online, especially in Korea.

Yahoo! currently operates in 18 languages. But there's more than just languages and culture to operating globally; users' technology infrastructure also varies, Yang points out: "In China, for example, there are more than 100 million Internet users, with a rate of growth higher than in the US. Much of the growth is coming from the 300 million Chinese who use mobile phones and wireless handheld devices."

Most of the surrounding Asian countries, Yang adds, "are looking at the more established economies and trying to put that same infrastructure in place. They see it as a foundation of their economies and their educational systems. It doesn't take that long. Ten years ago [just as Yahoo! was starting], Korea was talking about broadband. Now they have it everywhere."

Because Yahoo! is a set of content-rich services rather than just a search tool, it develops much of its content in local markets. Its international revenue now accounts for 22 percent of its total. That doesn't quite match the customer breakdown, but it's a lot more "global" than your typical Silicon Valley online service.

Yang himself is also ten years older. Now a new father, he's newly conscious of Yahoo!'s connection to the real world: "Our industry has gotten better at responding to events in the world. It's not just something that's novel, but something that changes the way we work, play and raise our families."

PANEL – Tales from the Worldwide Trenches: How IT Companies Operate Globally

What does it mean for an IT company to be global? IBM generates about 60 percent of its revenue outside the US; for both Xerox (depending on how you count) and Sun, it's about half. For Dell, the number is about 40 percent (and for worldwide-famous brand Coca-Cola it's around 70 percent). For all of the IT companies mentioned, the non-US share is increasing.

But being global means more than just where you sell your products or services. It means where you source them, where you design them, and who your people are. A strong corporate culture is good, but can it also be geography-neutral? Or can a culture be interpreted (rather than translated) in local ways around the world?

Certainly, being global is tough for a US company in a world riven with political and economic rivalries, where the US is no longer revered as a political or a business leader. Yet that creates the impetus to go global: Growth is much faster outside the developed markets of the US and Western Europe; increasingly, innovation is coming from outside the US as well.

Going global is a clear trend for growing companies, but it interacts with other long-term changes. Those include the locus of the value created, which is shifting towards the customer – whether that customer is an empowered consumer, a value-added reseller or a do-it-yourself enterprise. More and more, the value (added) is at the customer, whether it's custom programming to build a differentiating application or after-sale support delivered by phone or through the Web. When IT was sold to experts, it was safe to assume that IT customers anywhere could read (if not speak) English; that's not the case anymore.

Another trend is increased corporate visibility: Shareholders, customers and the public at large all want a say in corporations' behavior – but they don't all agree. Everything from labor practices and pay scales (especially equity packages for executives) to environmental concerns and the definition of ethical behavior varies from country to country. How can a company satisfy all its constituencies in an age of increasing transparency?

Our panelists bring different perspectives. All three see developing markets in general and China in particular as a key source of growth. Steve Ward, IBM senior VP and

CEO-designate of Lenovo, faces the challenges of integrating two separate companies and cultures while assuring two customer bases that nothing good will be lost. In some ways, wrenching change can help people adjust, since there's no question of the necessity; part of the challenge of globalizing a corporate culture is getting the folks at home to realize that change is a must. Anne Mulcahy of Xerox, who has spent more time with her current employer than any other speaker on the roster save Bruce Holmes (and probably than most of the audience), was also "lucky" enough to get clear signals of the need for change from the worldwide market as she brought Xerox through a wrenching turn-around. For Xerox, the culture change has been back toward its roots of innovation and informality – roots that had been somewhat obscured during a long period of success. Likewise, Jonathan Schwartz of Sun still faces a challenging market, but Sun has suc-cessfully spread its R&D as well as its sales efforts across the world.

Anne Mulcahy, Xerox: It's the (global) culture, stupid!

Anne Mulcahy joined Xerox in 1976 – around the time PC Forum was created, she notes. "I don't know what the first PC Forum was like," she says, "but Xerox is very different from the company that trained me to sell copiers 29 years ago. The growth of global markets has been one of the most powerful forces for change at Xerox."

Xerox has 58,100 employees worldwide. About half the company's nearly $16 billion in revenues comes from the US, and the other half mostly from Europe and develop-ing markets. In addition, the Fuji-Xerox joint venture in Asia generates about $9.5 billion. Yet, Mulcahy notes, "There's a big difference between being 'international' and being 'global.' We're still not where we need to be in that journey, but we're mak-ing progress. It's not enough to say you operate in more than 140 countries around the world. You have to change the way you think about everything from R&D to manufacturing, from your supply chain to sales and marketing, from service to billing. Talking about it is a lot easier than doing it."

She's proud of Xerox's history: "Xerox technology democratized publishing and made it easy and inexpensive for businesses, organizations and communities of any size to reproduce information, customize it and personalize it. Behind the Iron Curtain, Xerox machines were literally locked up and guarded to prevent unautho-rized publishing. When AlphaGraphics opened the first quick-print shop in Moscow in the early 1990s, that was big news." (We were there and it was indeed a big deal.)

Mulcahy had some experience overseas in the mid-1990s when she ran customer operations outside the US. But, she adds, "The global nature of our business really hit

home when I was named president of Xerox in May 2000. We were facing the biggest crisis in our history. The bottom fell out of the economy in Brazil. We uncovered accounting improprieties in Mexico, with a resulting SEC investigation. We were also taking on too much change too fast in North America and Europe. The multinational scope of the crisis compounded its significance. We saw first-hand just how 'global' our business had become. Problems spread fast, but solutions take time."

However, Mulcahy resolutely refused to cut R&D, although, she says, "We did start thinking in terms of market-ready innovation. We focused on technology platforms. We launched 40 new products in 2004 alone. Two-thirds of our equipment revenue comes from products launched over the past two years."

But innovation is more than just new products. "We were the first to add anthropologists to our R&D teams. We were also one of the first to really leverage the opportunity of having an international innovation network, which provides us with a diversity of new technologies, ideas and perspectives. We have major research labs in the US, Canada and Europe."

And finally, she says, "We are no longer a hierarchical company. You can't maintain that structure and culture and have the kind of agility required in today's world. I very much value the informality and candor that have emerged as a result. We don't have a lot of perks. We don't do as many ex-pat assignments as we used to – mostly for cost reasons. But we do encourage mobility: Most of our senior managers have had assignments overseas. The general manager of Xerox Mexico is French. The general manager of Xerox Turkey is Russian. Our newest US-based brand manager is moving over from the UK."

In fact, she concludes, "I absolutely love Xerox culture. It's one of our greatest – and most underrated – strengths. It's what got us through the last few years. Our people have proven to be not only incredibly dedicated, but also smart and hard-driving with a realistic but steely optimism."

Jonathan Schwartz, Sun Microsystems: Onshore around the world

Jonathan Schwartz got his first job at Sun the hard way: He sold his company to Sun in 1996. That company, Lighthouse Design, originally built applications for the NeXT platform and by 1996 it was working extensively with Java. Since then, Schwartz has toured through numerous roles at the company including M&A, new

ventures, marketing, software development, planning and his current role as president & COO.

Life outside the US is not new to him; more than half of Sun's revenue comes from outside North America, and in the late 80s he lived in Scandinavia working for McKinsey. The statute of limitations has still not expired and he cannot name the clients, but he gained a certain familiarity with Europe and its incipient cell-phone culture. At Sun, he started out in 1996 reporting to (then) CTO Eric Schmidt and making acquisitions. One of those was NetBeans, based in Prague (we were an investor), which now lives on as Sun's Czech development center. It is one of just a few growth locations at Sun these days; others include R&D and engineering facilities in St. Petersburg, Beijing and Bangalore, along with Austin, TX, and Burlington, MA.

Indeed, Sun is a leader in dispersed development. "We've been at this now for a decade," says Schwartz. "We have a developed a set of best practices for a development center. The first question is finding a leader who'll be there for ten years. It has to be a known exec from within Sun. Nationality isn't the issue, but we want to make sure to extend our culture. . . . We're not looking for a random offshoot in an off-shore location. For example, the new head of development efforts in China is a Bay Area industry veteran with deep contacts in Asia. In fact," he muses, "that term 'off-shore' is anachronistic. Offshore to what?"

Second, he says, "You have to give any location a serious charter. If you just want a job shop, you should talk to Satyam, Infosys or Wipro. But otherwise, you have to move the charter: Which of your product lines are you going to move to France? On the receiving end, if you make good people work on pieces and parts, they get tremendously dissatisfied and then they quit."

For each "charter," he adds, you shouldn't span too many time zones. "There's this myth, especially in open source, that you can do development across 50 locations. If you want something coherent, then you have to have a coherent organization and look at each other across the table. [SEE PAGE 40 ON OPEN SOURCE.] For example, Bangalore does Web services infrastructure; Austin does microprocessor design and identity management [based around Waveset, acquired in 2004]. Austin also benefits from the presence of the University of Texas. If you're on the faculty you get to pick out the best students and recruit – hence our tight relationship with Beijing Tsinghua University."

In addition, adds Schwartz, "When you put a development center somewhere, you get expertise in the local culture – including local technology. What used to be a uniform technology across the world has been obliterated into massive differentiation. In the Philippines they SMS; the virtual girlfriend and other gaming applications [created on central servers and instantiated via cell-phone] are big in Asia. Mobile handsets are an extension of yourself in Europe. DSL is strong in Latin America."

There's less diversity in business than in consumer culture, but, Schwartz notes, "Businesses are losing their ability to control what technology is used. No CIOs picked Google; their employees did. AT&T was a service provider. Now so are Wal-Mart and Bank of America. Consumers are forcing their hand. Businesses need to focus on how they can spot these trends early and align their processes to take advantage of them."

Steve Ward, IBM: Pacific overtures

To hear CEO-designate Steve Ward tell it, everything about the new Lenovo is yin and yang. Indeed, the two merging halves are unusually complementary. Although Lenovo and IBM were once business partners and more recently became competitors before Lenovo's move to buy IBM's Personal Computing division, the overlap is minimal: IBM is big in notebooks; Lenovo is big in desktops. IBM is big in enterprises, selling to CIOs; Lenovo sells to individuals and small businesses. The combined market shares of Lenovo plus ThinkPad in China are larger than the market share of Dell in the US. Lenovo is the No. 1 PC company in China and indeed in all of Asia (even though it sells only in China), whereas IBM is big worldwide. In fact, Ward points out, "When customers [worried about the impact of the reorganization] ask, 'Who's going to cover my account?' in 160 countries out of the 161 we work in it's the IBM guy." All that, he notes without naming names, is in direct contrast to the Hewlett-Packard/Compaq situation, where there was great redundancy – and huge layoffs to achieve cost savings.

The rationale for the Lenovo/IBM deal (which should close next quarter) is quite different. Although the single biggest fear at Lenovo is that all the jobs will move to the US, that notion makes Ward smile. Lenovo has about 10,000 employees in its PC business and 7000 in its cell-phone business, almost all of them in China. IBM's PC division also has about 10,000 employees, about 4000 of them in China. Although some of Lenovo's senior execs will move to the world headquarters in Westchester, NY, most employees on all sides will stay put. "We'll run it just like any global company," says Ward. "There will be domestic operations in China and a world-trade

division that will be mostly the former IBM operations. We're starting with the integration of back office and procurement activities."

Ward has relevant experience for the job. Although he is not a China expert, he is a transformation expert: Ward served as IBM's chief information officer and VP, business transformation, under former IBM CEO Lou Gerstner. That is, he directed IBM's internal IT and process investments, and he set the strategy for re-engineering the company's internal processes, including its own e-business activities that have made IBM one of the few large-scale IT success stories of the last decade.

But beyond that, he has had a global remit since three months after joining IBM in 1976, shortly after graduating from Cal Poly (although he had also worked part-time as a mechanical engineer at Peterbilt Motors while a student). "I have never had a job in a single geography. Each of my assignments was global in scope. It's very different from running a single geography; you have to be thinking around the clock. I know people who have lived and managed big operations in lots of different regions, but they don't get the skills from that to run a global business. There are good parts and bad parts. One advantage is that you have a 12-cylinder engine: For example, you may have four product lines across three regions; they won't all have problems at the same time, so that diversity can help you. The cost of that diversity is lots of time on the phone and e-mail. You have to adjust to other people's priorities and time zones. You have to trust people on the other side of the world to run the business on their time. You have to think about how other people think. Diversity isn't just race and sex: It's much broader and deeper than that."

PANEL – Security and Identity: You Talkin' to *Me*?

Security and identity are inextricably tied, since security is no longer (if it ever was) a mere question of keeping "bad" people "outside." In the new world of permeable borders and partnerships, there's no more inside-outside. There is instead a need to know whom you are dealing with and to audit individuals' behavior after the fact if something goes wrong.

All this has consequences. We're building ever more secure hardware and software, usable only by specific individuals. Everything will be locked down and traceable. Yet there is no real solution to security online, just as there is no solution offline. People can steal identi-

ties, and good people can go bad. And the moment you start keeping people's identities on file, you create the risk of releasing confidential information; just ask ChoicePoint!

Yet that doesn't mean we should all give up. All parties – vendors, access/service providers, consumers, educators, governments – have a responsibility and a role to play. Yes, we're talking to you! If the private sector doesn't take the initiative, government will. But as we argued in the November 2004 issue of **Release 1.0** *on the accountable Net, the Net's tools themselves give individuals the means to protect themselves, while a variety of services will let them outsource tasks such as filtering spam or managing firewalls with as much personalization or specificity as they care to pay for. Of course, it's not easy, but the very visibility of the Net's security problems are leading the way to a solution since they make people aware of the problem and more conscious of the need to protect themselves.*

The question of responsibility for security isn't just government vs. private sector; it's also "which vendor?" Microsoft's Scott Charney represents perhaps the leading vendor in terms of basic infrastructure; he also has experience as a government law-enforcer. Symantec's John Thompson represents the leading formerly pure-play IT security vendor – unless you redefine security more broadly, which is the point. Cisco's Jayshree Ullal serves the part of the market that links everyone, secure or not; she sees security happening in layers, from the depths of the network infrastructure to the top of the stack. May they all compete vigorously to ensure our safety!

Scott Charney, Microsoft: Security from the source

"I was hired as chief security strategist originally," says Scott Charney, now VP of trustworthy computing for Microsoft. "Microsoft ascribes to the philosophy of, 'Get the right people on the bus without telling them where to steer.'" Over time, he figured out his mission, which was not so much a corporate function, though he still has that role, but rather "to change the very rhythm of the business – how products get designed and tested, and how they get sold and installed."

Charney got his training in security offline, as an English and History major with a law degree working as a prosecutor in Bronx County. In 1991, as one of the only guys around who knew how to program a computer, he was charged with taking on online investigations. Within seven months he became chief of the newly created Computer Crime Unit in the US Department of Justice (DoJ). As the leading federal prosecutor for computer crimes, he helped prosecute nearly every major cybercrime case in the US from 1991 to 1999. He co-authored the original Federal Guidelines

for Searching and Seizing Computers, the Federal Computer Fraud and Abuse Act, federal computer crime sentencing guidelines, and the DoJ Criminal Division's policy on appropriate computer use and workplace monitoring.

Ultimately, his role at Microsoft could be equally influential, especially if you believe that vendors can play a major role in security and that forestalling crimes is even better than prosecuting them.

"If you ask who's responsible for security, it's everyone, but not everyone equally," says Charney. "The bulk of the burden is on vendors and access providers to make more secure products and deliver more secure services. Consumers don't want to be educated on security. My mom is 75; I can't tell her to read about firewalls. She is not ever going to write code and she doesn't want error messages about general protection faults. But we do have to educate consumers to behave responsibly – for example, not to send out their social security number in response to unsolicited e-mail."

He's optimistic that vendors can rise to the task. "First of all," he points out, "there's now synergy between market forces and safety, which makes it much easier to do certain things as a vendor than before 9/11." Microsoft, for example, now defaults more of its products to "safe" rather than "convenient" modes. . .and it is getting into security in a big way with a variety of new products that will compete with Symantec among other vendors.

But vendors cannot do everything, Charney says: "Government should work with industry to figure out how much security the markets will deliver. If it's not enough, they need to identify the gaps and help close them. The fix could be the dreaded 'R' word [regulation], but it could be purchasing power or the adoption of sound government policies. For example, two-factor authentication clearly makes sense, yet few are using it. It's moving in the right direction, but it needs a catalyst. Right now, there's no agreement on a standard, and there's no real consumer demand; no bank is going to go first. But government could spur this in novel and interesting ways. The government could make it a requirement for electronic tax filing, and could use the post office to do in-person proofing to ensure that the person receiving a token or digital certificate is well authenticated." Of course, someone may say this is not a good idea. . .so let them come up with something better!

John Thompson, Symantec: Architect of adjacency

John Thompson is a very methodical guy. When he came to Symantec nearly six years ago, he says, "I had spent the last ten years fixing things." That's what he proceeded to do at Symantec, but this time as CEO. "I found a company whose core competence was shipping things in yellow boxes. It was a technology company optimized around distribution." Its business was also 60 percent consumer-based. Starting not from scratch but with a successful $632-million-revenues business, Thompson proceeded to remold it to reflect the industry around him – 65 percent enterprise – and to shift its core back to security. "My question to the team was, 'What is our strongest and most relevant technology?' The answer was anti-virus. The near adjacencies were content filtering and intrusion detection. Better yet, there were no big players – no IBM, no Microsoft. . . . If we ran fast, we could be the biggest dog in the pound." (At least until recently!)

So the company shed everything else to focus on security. Thompson got a curve ball of sorts in the last few years. The consumer business suddenly grew 50 percent a quarter as consumers finally reacted to the virus threat and started buying antivirus product in droves. That threw things off balance, though in a positive way.

But there was more to it than customer mix. "We did a postmortem after the 'slammer' worm and realized that it could have been stopped dead in its tracks if corporate users had only patched their systems according to what they had been warned of six months earlier. We realized that a lot of security isn't just the tools; it's how you use them. So we bought Powerquest, with Windows imaging, provisioning and disaster recovery tools, and On Technology, which provided key infrastructure-management tools."

More recently, the company's pending acquisition of Veritas is in part a move to redress the balance of the company towards the enterprise, and in part a way to address problems that can't be as easily solved as mere virus threats. "It's also a recognition that security isn't just intrusion detection and exclusion; it's the reliability and integrity of what you have inside," says Thompson.

He continues, "Security for the enterprise covers other issues such as inclusion [identity management and provisioning] and compliance. Right now we don't have anything that focuses on compliance, Sarbanes-Oxley, Graham-Leach Bliley or other regulatory initiatives. But technically, you can instantiate all those compliance rules in our software, whether it requires an internal development or the integration of some third-party capability."

But that's within Symantec. On a broader scale, Thompson agrees with Charney that government has a role, but he is more focused on public education. "There's only so much that vendors can do," he says, especially in an environment where price and convenience seem to overcome security as a sales message every time. He adds, "We must all be responsible for the security and safety of our own little piece of the Internet. We should integrate computer safety into basic computer training in elementary and secondary schools. We also have to educate businesses on the need to implement multiple security technologies throughout the network and to maintain a balance between the security and the availability of their information assets."

Jayshree Ullal, Cisco Systems: The network knows

Jayshree Ullal has worked at Cisco for 11 years and took on her current role as VP and general manager of security technology just eight months ago; thus she went to her first RSA (security) conference at Moscone Center only last month. It brought back what were probably unique memories: Twenty-five years earlier, she was working in that same location as an engineering intern for PG&E: "It was an empty construction lot then, and I was crawling in and out of manholes to check to transformer ratings. I wore a hard hat and was driven to the construction site because the unions said engineers couldn't drive."

A lot has changed since then, both at Moscone Center and for Ullal. She long ago decided she preferred being out in the field, whether at Moscone Center or with customers. Since starting as an engineer at such companies as Fairchild and Advanced Micro Devices, she moved into a strategy role at networking vendor Ungermann-Bass. She was "acquired" by Cisco in 1993 when it made its first acquisition – Crescendo Communications, a high-speed networking vendor where she was VP, marketing. At Cisco, she moved through a variety of roles, and is now in charge of engineering and business strategy for Cisco's security products.

"Until now, our approach was how to add security into the network. Now we are building a secure network from the start. It used to be that security was anti-V, or anti-virus. Now it's anti-X, where the threat could be anything – spyware, malware, spam, trojans or worms. So we have to deal with very sophisticated blended threats. We are creating tremendous innovations making the network look deeper into the application flows, not just the protocols. It has to make policy decisions about things such as IM traffic or a peer-to-peer flow from Kazaa. It can look and see who's calling a particular app or what application is using a certain database."

But security is no longer – if it ever was – just technology. "There are critical policy and business discussions around security," she says. "And we have to serve three communities with the tools to implement policy – and to negotiate it with the other two: the network operations people, the applications people, and the ones who control the desktops. They are three silos, but their decisions on security affect one another, on everything from who gets accessed and what gets logged, to what kinds of facilities are available and how users are authenticated."

Ullal enjoys the broader range of concerns – from human factors to technology – that come with her current job. "The early problems in networking were performance and bandwidth and how to make the Internet happen. But I'm more excited about solving what is now the dead-center problem for CIOs and CTOs. I'm not an engineer that engineers products anymore, but I like to look at engineering solutions that solve business problems. I like things that are creative, not mature." But as security co-evolves with new forms of threats, it will be a long time before it gets predictable or boring.

PRESENTATION – Jeff Hawkins, Redwood Neuroscience Institute: Prediction and Intelligence

If the proper study of mankind is man, then the proper study of Jeff Hawkins is the brain. It's always fun to watch Jeff Hawkins' brain work; that brain produced the PalmPilot, the product that revived the handheld-device market a decade ago, and more recently Handspring's Treo, the product that has defined the emerging smartphone space. As he says himself, "Sometimes I see things ahead of other people."

In August 2002, Hawkins founded the Redwood Neuroscience Institute, where he works in a small office over Kepler's Books in Menlo Park. He also still serves part-time as CTO of palmOne, the company resulting from the merger of Palm and Handspring, itself founded by Hawkins and longtime business partner Donna Dubinsky after they had left Palm. Hawkins is now working on creating software from the puzzle he's been teasing at for the last few years and indeed for the last few decades: How do we think? His conclusion (as outlined in his new book, *On Intelligence*, which will be distributed at PC Forum) is that it's turtles all the way down. That is, intelligence is the ability to recognize and predict things by analogy; more intelligence is the ability to recognize and predict increasingly complex or abstract patterns more quickly. Most people can understand, say, the relationship of

a rectangle to a parallelogram or a square; Einstein could "understand" relativity in the same familiar, non-abstract way.

In practical terms, Hawkins spent years studying neuroscience – the brain and its structure of neurons and synapses. It's pretty much the same material everywhere, yet the brain's intricate structures comprise the five senses, language (several for some people) and huge amounts of learned knowledge. "Different parts of the brain do different things depending on what they are connected to," says Hawkins, "whether it's sensory organs or just other parts of the brain." Much of the brain is organized in hierarchical structures: details at the bottom, generalizations at the top. At the bottom layer of the hierarchy, for example, an apple is perceived as color, taste, shape and size, while at a higher level of the hierarchy it is a generalized "apple," and at a higher level yet is a generalized "fruit." On the other hand, an apple can also be one of several "objects in a still life." The hierarchies overlap.

The neuronal system that recognizes apples – and everything else – is basically a belief propagation network, says Hawkins. You see a red object in the right shape and size, and your brain starts to predict "apple." If this prediction is supported by new data, such as the smell and feel of the apple, the brain's hypothesis is confirmed, and the belief is sent back through the hierarchy that "apple" has been identified.

Working with a colleague at the Institute, Dileep George, Hawkins is figuring out how to apply the concepts of his brain theory to software, and how to represent the theories in working algorithms. There are substantial challenges, but also substantial potential benefits and applications, if they can get it right.

One of the more intriguing questions raised by Hawkins' work as applied to computers is how to think about the senses. As humans, we have five senses that send digital streams of input into our brains. A computer can have some of the same senses – such as vision – but it could have more, such as radar or sonar or air pressure or temperature sensors or just various kinds of data. These inputs also could stream into a hierarchy. At the lowest level of the hierarchy, they would appear as fragments of data – mere measurements. But with the right software and algorithms and context, these data streams could be recognized at the highest levels of the hierarchy as broad patterns that allow us to understand complex problems in a way we haven't been able to do before – whether it's weather, stock markets, the spread of cancer through a body or the adoption curve of a new technology.

PANEL – Health Care: No Patient Left Behind?

Everyone agrees that US health care – both as a market and as a social service – is a mess. Many of the problems are clear, but they're all inter-related. We can't – as a nation – agree on who should pay for health care, and many players are waiting for some such consensus to start fixing their own problems. Yet one way or another the focus will change from paying for care to paying for health, everyone agrees. IT will play an important role in that transformation: It will help us monitor health, deliver care, and assess risks and results. Meanwhile, individuals will become more active in managing their own health, assisted by personal health records and related tools and applications. (You can read about all this at length in the January 2005 issue of **Release 1.0***, which also covers ActiveHealth in greater depth, and mentions the work of the Markle Foundation and IBM's health care group.)*

When will this happen? It is increasingly apparent that sick people, beleaguered employers, aging baby boomers and even medical professionals themselves are tired of waiting. Some people are even starting to address the problems without waiting for a general solution, hoping they can get others to join in or get out of the way.

Specifically, Carol Diamond leads Markle's Connecting for Health Initiative, an activist collection of health-care organizations (private and public) working to foster a better-connected and more interoperable health-care system. Its members include IBM, represented here by Carol Kovac, which generates $1.25 billion in revenues from the sector and is pushing actively to get its clients to automate clinical as well as financial processes. Lonny Reisman's ActiveHealth Management is not waiting for data interoperability to aggregate individuals' data (with permission), de facto reverse-engineering mostly financial data to figure out their conditions and send alerts to their physicians when some transaction – such as the purchase of a contraindicated drug – triggers an alert. But in an ideal world, ActiveHealth would have access (with permission) to clinical as well as transaction data. And it should have more competition! This kind of capability should be widespread.

In a complementary business, Dawn Lepore at drugstore.com is exploring what it will mean when more and more consumers start purchasing their drugs online and looking for more personalized health-care information in that context. Finally, Larry Augustin recently took over as CEO at Medsphere with the mission to commercialize its open-source clinical information system and roll it out to the thousands of community hospitals who could make good use of it. Other health-care companies represented at the Forum include Epocrates (PAGE 66), Medstory (PAGE 50) and NetMesh (PAGE 35).

None of the players here provide a personal health care record tool per se, but all could use data from such a tool and contribute data to it in their own particular efforts. After all, the central focus of health care should be the patients.

Larry Augustin, Medsphere: VA man

In our January issue we wrote: "Many academics and researchers look to the Veterans Affairs administration as a potential source of [standard] software, but the private-sector people we spoke to were not so enthusiastic, since it's open-source and unsupported."

Larry Augustin to the rescue! Since then, venture capitalist Augustin has helped a start-up called Medsphere raise $7.5 million in series B financing led by Azure Capital Partners to commercialize the VA's clinical application suite, called Vista. And he has provided it with an experienced CEO – himself. Augustin previously founded and ran VA Linux (now VA Software), a leader in open-source related services such as SourceForge.net and Slashdot.

"I got to Medsphere because I was looking at open source," says Augustin. "I had this thesis that the next wave of open source will be large-scale, typically expensive application suites that address a large market – things such as CRM and ERP. I was looking around for such an opportunity when my friend Martin Fink [VP Linux at HP] called me and said he had found it. . .but he wouldn't tell me about it. After about a week he relented and sent me to Medsphere. It fit my model perfectly." Basically, Medsphere does for a health-care organization what SAP does for a regular enterprise, with modules for accounting but more focus on clinical functions including scheduling, computerized physician order-entry, image recording and archiving, pharmacy dispensing, drug interactions and bar-code medicine administration.

Initially, Augustin looked at the company as an investor for Azure Capital. Medsphere had been started in 2002 by Steve Shreeve, who was trained both as a doctor and an engineer but never got his MD because he started Medsphere instead. As Augustin relates it, Steve Shreeve and his brother Scott, like about 80 percent of US doctors, did some of their training at a VA hospital using Vista. After Scott moved on to practice as an emergency room physician, he asked, "Dude, why don't we have this software at our place?" Indeed, asks Augustin rhetorically, "Why doesn't every community hospital in the US have it? It's free, but they don't know how to get it, and there's no support."

Steve Shreeve decided to answer that question, and wrote to the VA to ask for copy of the Vista software under the Freedom of Information Act. He eventually received a CD in the mail, and that was the start of Medsphere. Shreeve raised $1.7 million in angel money from some doctor friends and proceeded to port the software from its old Digital Equipment VAX VMS platform to Linux. He also recruited some key people from the VA who shared the vision, and raised a further $4 million in A-round money from Wasatch Ventures and Thomas Weisel Venture Partners. Now the company has two hospital customers, in Oklahoma and Texas, with a total of about 1400 beds. Augustin plans to build out the sales and support teams and grow a big business, he says. "Only 5 to 10 percent of hospitals can ever afford a high-end proprietary system, he says. We want to serve the remaining 90 percent."

But he's well aware of the challenges. "My deepest experience with medicine is with my father who was in intensive care after a stroke. I now have a stack of papers two feet high. It's the bills and reports and it's completely incomprehensible. I don't know why they send them to me. I'm supposed to have some clue that what I'm being billed for is correct, but the whole system is completely broken and incomprehensible. Health care is one of few cases where people don't make cost-benefit trade-offs. The whole industry is deathly afraid of benchmarking itself on quality."

He continues, "At Medsphere we want baselines in order to show improvements in ROI and quality based on our installations. But can you imagine finding a customer who's willing to have us say, 'Last year you killed 39 people and this year it was only 10'? Yet you can't reduce something unless you are willing to measure and report it."

Carol Diamond, Markle Foundation: The power to transform

For Carol Diamond, medical school and internship were "a harsh cold shower. I discovered that the system was really really broken. This kind of medicine was not what you saw on TV. I had the bug to make it better, and somehow I knew it had something to do with information systems. Right now in health care, you're flying blind. You don't know who else your patients have been seeing, you have no information about their prior care, yet you have to make major decisions about treatment. Beyond that, the way you are trained is often somewhat tribal: The specific practices can be different in each medical center."

Yes, she continues, "We are trained to make decisions based on what we know, but there's a lot of unknowns in health care. Physicians aren't trained to discuss this with patients and it's not easy just to say 'I don't know.' It's not just vanity or bravado:

You're in this position where the patient wants you to know, and you don't want to disappoint her. We have let patients live in a fantasy world thinking that we are omniscient. They often don't realize how important it is to be involved in understanding their own treatment. We convey the message that we can take care of it and we don't tell them how much they have to contribute."

She left practice to get a master's degree in public health and prevention, which gave her an ability to understand the current medical literature that her medical education had not. Four years after joining Cigna as a researcher a week before it announced its merger with Aetna, she was running its "agile" IT development group (as opposed to its 5,000 person IT operations group) – which had grown partly through four acquisitions to 450 people in less than four years.

"I learned simultaneously about the potential of IT to improve health-care quality and the challenge of doing it from the health-plan perch," she says. "Managed care was under fire in those days, and even with a quality mission there was always some underlying suspicion about what we might be doing with people's data. That was really heavy baggage and it was hard to achieve a transformation."

But when she got a recruiter's call about a job at the Markle Foundation, she demurred: "All I heard was the word foundation, and I said, 'Not interested.' What could a foundation do in this space, making grants?" But she discovered it wanted someone for an activist role, leading a team of industry players who could both design and implement policies. Markle Foundation's Connecting for Health program now comprises physicians, insurers, government agencies, vendors, consumer groups and others; under Diamond it has developed both technical and policy architectures for creating a decentralized, networked health-care information infrastructure. Members include the American College of Physicians, Blue Cross/Blue Shield Association, Computer Sciences Corporation, RxHub, Surescripts, IBM, Siemens, American Medical Association, Agency For Healthcare Quality and Research and the Centers for Disease Control.

"Almost five years later," says Diamond, "I know I couldn't be effective in this role if I hadn't had five years in the guts of a company building these systems. On the other hand, we had a real company mentality [at Aetna]. We knew our own metrics, but we rarely thought about the policy environment. At my level, for example, operating within a large, integrated system, I hadn't appreciated how much the problem needs to be solved in a way that deals with the competitive nature of data. Moving a patient's data across competitive lines creates real challenges that require careful

solutions. Even research is highly competitive; people hoard their study until it's published – or keep things back altogether. We have a system that encourages holding onto data rather than collaboration. Now I've learned how important policy is. Health care is so fragmented – and broken – that no one player can fix it by itself."

But mostly, she says, "The challenge is how far we have to go as individual consumers of health care. Consumers have the power to transform the health system and their own situation – if they only used that power."

Caroline Kovac, IBM: Tough love for health care

"If even a low-margin, highly competitive industry such as retailing can afford highly sophisticated technology, why can't health care? People say that doctors can't figure out how to use technology. . . . How come the clerks at Wal-Mart can learn to use technology, but highly educated doctors cannot?" asks Carol Kovac somewhat rhetorically. Of course, the Wal-Mart clerks have no choice. . .but pretty soon the doctors may have little choice either. Kovac lists ways the world is changing: The baby boom generation is moving into its health-conscious years. Normal people are adopting the Web for day-to-day tasks that will ultimately include health care.

"People ask, 'But how can we pay for it?' Most businesses figure out how to use technology; they assess the return on investment, and they figure it out," she answers herself. "In other words, we're not talking about spending so much as about investment."

Now general manager of IBM healthcare and life sciences, Kovac began her career as a chemist at IBM Research, working on challenges such as the ion-transfer behavior of semiconductor materials. "The delightful thing about IBM Research is that you could really do interdisciplinary work. Universities are still very siloed. At IBM Research you get this rich ferment of engineers of all stripes, chemists, physicists, biologists. . .I hired our first economist back in the early days of the Web to do experimental economics and game theory about people's online behavior."

Over the years she broadened her brief to managing scientists, and in the early '90s she moved out of research to apply scientific optimization techniques to IBM's supply-chain management business. She returned a few years later to IBM Research to run strategy. In 2001, on the principle of lying in the bed you make, she followed the strategic opportunity she saw in the life sciences: She launched IBM's life sciences "emerging business opportunity." (To gauge what that means, consider this: Another EBO at IBM is China. The idea is basically a large-scale start-up within IBM.) The

unit is now called Healthcare and Life Sciences, and comprises more than 1300 people worldwide. It generated $1.25 billion in revenues last year.

"Originally health care for IBM meant transaction processing and back-office operations. Let's say it: There's a lot of paper there! But now we're seeing huge opportunities on the clinical side, what we call information-based medicine," she says. "The big challenge is creating interoperability across diverse operations. Money flows easily around the business systems, but clinical information is harder to transfer." Yet move it must, so that relevant information can follow patients as they move from doctor to doctor and from one geography to another.

IBM has led a number of pilot projects showing the benefits of integrated health systems (SEE RELEASE 1.0, JANUARY 2005), and it provides consulting services as well as equipment and software to a number of large hospitals. It's also an active member of the Markle Foundation's Connecting for Health program. In April, IBM's Almaden Research Center will host an invitation-only conference, "Transforming Healthcare with Information," which will focus on the ideas of health record banks and "health information liquidity." And yes, on the roster of speakers will be economists as well as technologists and business people.

Dawn Lepore, drugstore.com: New kid on the block

Dawn Lepore recently joined drugstore.com as CEO after 21 years at CharlesSchwab, where she worked her way up to vice chairman of technology, operations and administration (SEE RELEASE 1.0, MARCH 2004). At drugstore.com, she faces interesting opportunities. Strategically, the company divides its business into three segments: "over-the-counter" or non-prescription products, including both price-sensitive everyday essentials that people order online to get the best price (reliably) and convenience, and "long-tail" products such as UltraSwim anti-chlorine shampoo (our favorite) or make-up in hard-to-find colors; a vision business, which sells prescription contact lenses and other eye-care items; and – our interest here – a licensed mail-order pharmacy.

In many ways, drugstore.com is a typical online retailer, but if the health-care market embraces IT as much as seems likely, drugstore.com's pharmacy operation stands to become a key player in prescription fulfillment and possibly in the treatment cycle. It already provides mail-order services for several pharmacy benefits managers including Envision Pharmaceutical Services, AmeriScript, US Script and others. Drugstore.com customers can order online for direct delivery, or they can pick up

their prescriptions at any of 3400 Rite-Aid stores. It has processed about 7 million prescriptions since 1999, and did $18 million in mail-order pharmacy sales in the fourth quarter of 2004 and more than $25 million through the local pick-up option in the same quarter. Those are small numbers, but they are growing. . .and can only grow further as doctors eventually give up those illegible scribbles in favor of more reliable, less error-prone electronic prescriptions, and as consumers learn to trust online pharmacies as they trust everything else online.

Lepore was brought in to take a hard look at the company's operations and strategy. She isn't ready to make announcements yet, but she has already learned a lot. She says, "Since coming here I ghost-phone on the customer care lines from time to time, and it's amazing what I hear. There are people calling in who say, 'It's a choice between eating and buying my medication.' The average person 65 years or older is on eight prescriptions. We're concerned about safety, but not everyone cares as much. They'll say, 'I'll die without it; so I'll take a risk.'"

The company offers 24/7 phone support, with a pharmacist on call. "I was surprised how much phone business we do, especially with seniors," she says. "Many of them are savvy enough to go online, get to our website. . .and then they just call. Unlike a lot of online retailers, we don't hide our phone numbers. Prescriptions are a pretty personal thing and they want to call someone."

She adds, "The boomers are more willing to do everything online. I was visiting some family friends last week and we went on line to check prices [for a medication]. The transparency is not quite at the level of financial services! But you could compare prices quite easily. . .and fortunately, we were cheaper. This particular medication was not covered by their insurance, and they promised they would move their business over."

Like all pharmacy operations, drugstore.com pharmacy staff spend a lot of time on the phone checking with doctors about illegible prescriptions; it also maintains an interaction database for its own clientele – but it could probably be a good partner for ActiveHealth (PAGE 27). The company is exploring the use of digital signatures so that technology-savvy physicians could send in prescriptions electronically, but it's difficult to figure out where to start, says Lepore: "It's like herding cats to get everyone to agree to e-standards."

She sees a big role for drugstore.com as the industry expands, and certain advantages. As one of few online pharmacies to receive the Verified Internet Pharmacy

Practice Sites designation administered by the National Association of Boards of Pharmacy and as a brand name affiliated with Amazon.com, drugstore.com looks like a haven of safety for people who want the convenience or cost savings of buying online, but who are concerned about the (perceived) risks.

Lonny Reisman, ActiveHealth Management: Leverage in the machine
"I was Jewish growing up in Queens," says Lonny Reisman, "and so I was supposed to be a doctor." He resisted for a while but eventually became a cardiologist. However, he says, "I wanted leverage. I never wanted 2000 patients who revered me; I wanted to fix the whole system."

His experiences as a doctor and, simultaneously, as a health-care consultant for Mercer Consulting gave him the insights and connections to achieve precisely the kind of leverage he dreamed of. He founded ActiveHealth Management in 1998 (SEE **RELEASE 1.0**, JANUARY 2005). It uses patient-specific information (under HIPAA privacy guidelines) to provide almost-real-time (same-day) alerts for potentially harmful situations, such as when a patient fills a prescription for a drug that may be dangerous or contraindicated for that particular patient. It does this by sifting through the continuous stream of data on the 8 million-odd patients currently enrolled in its service by their health plans or employers. For each event for each patient, ActiveHealth's CareEngine software assembles the data it has on that patient – drugs purchased, diagnoses and other information – and runs it through a set of clinical best-practice rules (what we used to call an expert system before that term became déclassé). If it discovers any problems – inappropriate treatments for a certain condition or even lack of treatment – it notifies the relevant physician and (if the patient is so enrolled) the patient herself.

"We don't practice medicine," says Reisman, who like all doctors is sensitive to liability issues. "These aren't recommendations; they are 'care considerations.' The doctor may know something we don't. . .but we do point out things she may not know. The idea came from my own insecurities as a doctor. Despite my best efforts, I simply couldn't keep up with all the literature. And I couldn't talk to all the other doctors my patients might have visited. I would have been glad for some help, some actionable background data on each patient."

He continues, "Much of the talk now is about *assembling* all the data on a patient – dealing with data standards and getting all the data into a single record. But that's not enough. What's the difference if I have piles of paper in a folder, or a fancy Web

interface, or even nothing at all? If I don't have the time to look at it for each patient, it might as well not be there. You need to analyze and apply the data as well – the patient-specific information matched to the best-practice rules that not every doctor can know in every specialty."

There is also, he acknowledges, the well-known phenomena of simple procedures – such as administering beta-blockers to heart-attack patients – that are routinely ignored. "We figure those rules are like a speed limit. In most places, it's not even posted. Even when it is posted, it's routinely ignored. But in some places, they now have signs that monitor your speed and flash up a message: 'The speed limit is 60. *You* are going 68!' Not many people ignore those. They aren't a traffic cop, and we aren't practicing medicine. We're both just providing specific information that sensible people would rarely ignore."

DINNER SPEECH – Emily Levine: Court Jester

Emily Levine is one of those people who cross boundaries easily; she's at PC Forum to remind how us how we look to the outside world. A humorist and commentator, she has performed for the JASONs, a secretive advisory group of scientists funded mostly by the Defense Department, as well as for a Martha Stewart company meeting. She started acting as a student at Harvard, alongside students such as John Lithgow. Her favorite Harvard memory is the UnRest (for University Restaurant) on Harvard Square where, she recalls, "You could sit there all day and everyone would come by and tell you what you had missed. You didn't have to go to a single class."

After college she embarked on a typical actor's career: "I went to Rome and dubbed spaghetti Westerns." After that wore off, she returned to New York to teach autistic children. "I was naturally good because of my performing abilities. But I didn't want to turn the classroom into my own personal stage." So she joined the New York Stickball Team, an improvisational comedy group directed by luminaries such as Robert Klein, Peter Boyle and David Brenner. "We fought all the time, and you couldn't make a cent. But although I wanted to act, at the time I was cast only as cute and ditzy. I knew if I went that route, I'd become cute and ditzy in real life."

Instead she co-wrote and performed a series of Emmy-award-winning commercial satire segments for WNET's "Fifty-first State." From that came a stand-up act and a career as a television writer and screenwriter in Los Angeles, but ultimately none of

these arenas satisfied her. It wasn't until she was invited to join a think tank session at the University of Southern California, looking at issues such as porn and surrogate parenting, that she found her métier: "People kept laughing when I said what I thought. But suddenly I realized it wasn't derision. It was the shock of recognition. That made such a difference -understanding that people took me seriously."

At that point she was still writing for television and being courted by Disney for an overall deal. "The problem with Disney," she says, "was that they treated the TV writer like a screenwriter who, in Hollywood, is a surrogate parent: The producer impregnates the writer with the seed of an idea, the writer brings it to term and then it's taken away. Eisner would give the same idea to five writers and they would compete to win his favor. Then, when I finally capitulated and signed with Disney, they said they were so excited they were sending me a present. I was thinking, maybe a Lalique vase; I could do with one of those. I looked out the window and saw the guy coming up the walk with a three-foot-high stuffed mouse. I looked it up in the catalogue and it was $60. And they called it 'life-size.'" (Indeed, you cannot make this stuff up, but you can recount it so other people will recognize it.)

Now she works full-time developing and performing her own material. Though she was disappointed to discover that the MacArthur "genius" prize she was expecting to finance this venture was 1) being given to actual geniuses and 2) wasn't enough money to finance her dog's acupuncture sessions, still she's committed to her new career. "It's the same skill I had in college," she says, "bullshitting on bluebook exams. Just give me three pieces of information and I can weave a convincing narrative." She likes to deal with "hard" topics, such as economics, physics and the like, which, she says, "makes me either the Spinoza of comedy or the Lou Abbott of philosophy." Her current work-in-progress, "Common Cent$," dealing with intellectual property, pirates and privateers, closed proprietary systems and open source, would be of interest to the PC Forum audience – but she will listen hard and make up some new material especially for us. The shock of recognition may not be comfortable.

PRESENTATION – John Seely Brown and John Hagel: Friction Can Be Good!

John Seely Brown and John Hagel embody their own message: They are more productive as a team. Brown, former chief scientist of Xerox and long-time leader of Xerox PARC, has more of a philosophical, scientific bent, while Hagel, a long-time McKinsey consultant now working on his own, has a closer-to-the-metal appreciation of business realities and strategies. Both have written several books and, more significantly, each has written for **Release 1.0** – Brown with Paul Duguid on the social life of documents in October 1995, and together on the service grid and service-oriented architectures in December 2002. Now they have just published an "emergent" book, says Hagel; it emerged from a series of articles they wrote together for the *McKinsey Quarterly* and the *Harvard Business Review* and a broader set of research initiatives they have been pursuing together over the past five years.

"I would have liked to call it *Rethinking Adam Smith and Ronald Coase for the 21st Century*" says Brown, "but the publisher [Harvard Business School Press] would have none of it." It is called *The Only Sustainable Edge*.

The book covers a confluence of ideas, just a few in the steady stream Hagel and Brown produce. Every few years those ideas coalesce into a phrase or two that captures a moment. A few years ago it was the trade-offs between flexibility and efficiency. Now it's that friction can be good and that we're about to enter a new era in corporate structure. It sounds grandiose, but of course it is already happening. We just don't quite see it yet.

Brown does see it, though: "For more than a hundred years we've been driving towards efficiency, creating larger and larger organizations with replicated processes and automation. But we're approaching the end of what efficiencies can give us for most firms. The pursuit of friction-free commerce may turn out to be a dead end. It gives us efficiency, but it doesn't add any value."

Hagel picks up: "Most companies are an unnatural bundle of three different kinds of businesses – customer relationship management, product or service innovation and commercialization, and infrastructure management," says Hagel. "The economics, culture and competences for each of them are entirely different, and it no longer makes sense for them to stay together. The kinds of dislocations and shifts we're see-

ing now – outsourcing and offshoring, partnerships that don't work, diminishing returns on efficiency – are all signs of these shifts."

Specific examples include call centers, the rapid rise of contract manufacturing, the outsourcing of logistics and supply-chain management to UPS and FedEx, of back-office financial-service processing operations to companies such as State Street Bank and of retail presence to Amazon. . .all these are signs of the impending reorganization of the business world.

It's not that the world is going to fragment into nothing, says Brown. "The digerati all talk about e-lance and the lone operator. But it may be that the most productive unit – in itself and as a structure – is the transient project team or the more stable community of practice. And the rationale for the firm may not be as a way to reduce transaction costs, but as a learning environment that accelerates capability building."

"In fact," Hagel adds, "two of the three focused business types we see emerging have very strong economies of scale and economies of scope, leading to new forms of large-scale global enterprises."

What does this all mean? In practical terms, a transaction-based economy retards innovation, because the modules are too tightly defined. Each player can innovate only in its own part of the ecosystem, yet real innovation may require partnership – or friction – across boundaries. "In the modern world," says Brown, "most of the productivity gains have come from specialization and efficiency. But that specialization is static; it forces you into a box. In the typical manufacturing chain, for example, all the parties are competing with one another."

But sometimes you need cooperation: as Hagel observes: "One of the reasons flat-panel display technology advanced so rapidly is that all the major players, including OEM's, equipment suppliers and advanced-materials suppliers, located specialized operations in the Kansai-Tokyo corridor in Japan so that they could work closely together over a decade to improve yields in each new generation of fab facilities. They clashed repeatedly over different approaches to addressing this challenge, but out of this friction came major product and process innovations. That let the manufacturers steadily increase the size of screens while meeting aggressive price-point targets. By moving away from arm's length transactions and instead working shoulder to shoulder, they made friction very productive."

Brown and Hagel are turning a lot of traditional management theory inside out. The same interpersonal dynamics apply in a fluid world as in a corporate hierarchy, but the constraints are different. Within a corporation, prices aren't considered and reporting relationships are (temporarily) fixed, but business happens because people work together. In the friction-free world, prices are everything and contracts determine relationships, yet business happens because people work together through and around routine or automated processes. We have spent a century getting good at those routine and automated processes. Now we need loosely coupled systems to get better at handling the exceptions, since the routine things are becoming vanishingly efficient (and any competitive advantages are quickly competed away).

Hagel and Brown suggest that the real opportunity is to integrate service-oriented architectures with social software so that relevant technology resources and people can be flexibly and quickly mobilized to handle exceptions. "Exception-handling is a fertile ground for rapid business innovation – but you need to bring people back into the equation," says Brown. In short, the players need to be loosely coupled, but they need to be embedded in a fabric of shared meaning and trust, where transactions create reputations and people work together to come up with innovations in products and processes.

PANEL – Presence in the Enterprise

BY RAFE NEEDLEMAN, CNET NETWORKS

Most of today's communication technology is blind and dumb conduits. When you make a call, how does the person you're calling tell you she can't pick up now – but she could in five minutes? When you want to find any one person in the company with specific expertise who can help a customer right now, *how can you find the one who is actually available? When you use a business application, why do you have to tell it what you want, when it would be obvious to a drunken chimpanzee what your next step is and what you need?*

These are problems that can be solved with tools that are aware of presence *and* situation. *We all know the most basic presence-enabled application, instant messaging. One thing that makes IM so effective is that when you send somebody a note, you know if she's at her desk and receiving it. Neither e-mail nor phones offer the capability to know, before you press "send" or dial the phone, if the person on the other end is there to get*

your message. (This month, both Microsoft and AOL announced new e-mail tools that get us part of the way there.)

For presence apps to take hold, it is critical that they become aware of situation, too. For example, if you're in an airport and available on your Treo, you'll want to get trip-related information, but you'll probably appreciate it if your Treo doesn't bother you if a blog you follow is updated, at least not at that moment. You want your Treo to know when you're open to being interrupted, and for what.

To achieve this goal, presence first has to emerge from isolation. If there were more applications that employed presence standards such as session initiation protocol (SIP) and SIP for instant messaging and presence leveraging extensions (SIMPLE), perhaps your e-mail application and my cell phone could both find out my situation from a single central (to me) service. They could manage messages for me better and in concert, saving me from having to do so for each communication system.

Presence also needs some intelligence about what NetMesh CEO Johannes Ernst calls the "semantics of the domain." IM applications can tell whether you're logged in, but they don't use time, location or other cues to decide whether to interrupt you: You could be on the phone, working hard on a deadline or simply engrossed in solitaire. Worse, your boss could be in your office with you. But a system that recognized that you were in a conference room, at what time and with whom (from my calendar), could help us communicate better while blocking all but the most urgent outside interruptions. Bluetooth and RFID may be leveraged for this twist on presence.

Some clever startups are trying to build this technology today, but it's going to take some time to for enterprises to get with the program. Partly it's a lack of vision among enterprise buyers. Partly it's an active (and possibly accurate) imagination: Which CIO really wants to be responsible for telling corporate execs that their computer or cell phone will know exactly what they are doing and when it's a good time to reach them, all the time?

Getting tools to derive presence and situation from applications (are you writing, or just answering routine e-mail?), identity management systems (whom are you talking to now? is she important?) and the like will be difficult enough. Getting the tools to do the right thing for individual users will be even harder. And while it may appear at first glance that presence will cause an awful glut of communications that most of us would rather avoid, it's also true that intelligent situation-aware filters could help solve the overload that we're now experiencing. Presence is whether you're there. Situation is the next step: It's whether you're willing to be virtually somewhere else.

Charles Digate, Convoq: As soon as present

Chuck Digate believes in new forms of communication. Before starting Convoq, he was CEO of MathSoft (now Insightful Corporation), the company that did for mathematics what word processors did for text – made it easy for anyone familiar with the language to record their thoughts and then easily edit them.

Before MathSoft, he founded Beyond Incorporated, an enterprise messaging company. Beyond held the original patents for rules-based messaging that later became a key part of Microsoft Outlook after Microsoft acquired Banyan, which had previously acquired Beyond.

With Convoq (one of our company presenters at PC Forum 2004; SEE **RELEASE 1.0**, MARCH 2004), Digate wants to make online multi-person conferencing as easy as making a phone call or sending an e-mail. He says, "It's a fusion of Web and video conferencing, based on the instant messaging paradigm. The company is centered on presence-enabled applications."

Digate believes the "legacy scheduling model" for Web conferencing is outdated. Convoq uses what he calls the "ASAP" – as soon as present – concept as a more effective method of getting meetings together. "The idea is to create a whole new approach to scheduling meetings, where the system automatically looks for the next slice of time when all required participants or their stand-ins are online and available," explains Digate. "Most interrupt-driven professionals would do their business in real time if they could."

At the small team level, the notion of ad-hoc collaboration using either IM or e-mail to invite others to instant meetings is quite natural, Digate believes. People feel comfortable using instant messaging in and out of the office, so ASAP's design center fits that usage model perfectly. On the other hand, larger meetings typically require some form of advance scheduling, which the product also supports.

In addition to using ASAP to schedule and conduct classic Web and video conferencing, many of Convoq's larger customers are using it to power presence-enabled applications such as help desks. For example, the product's Lifeline technology works with roles; ask for "salesperson" and it will come up with the first person in that role who is available. (The company can rotate people through roles, designating which ones should be on call, or which of all those available should be selected first.) Thus a company can provide links on its website that can immediately put customers or prospects in touch with a sales representative. Once the sales rep accepts the meeting

request, he or she can use all the rich-media tools – from basic text chat to full-power video conferencing – to demonstrate a product or make a presentation.

Does Digate eat his own dog food? Yes, he does. This interview was delightfully easy to arrange, since Digate's blog and e-mails display his dynamically updated online presence via an ASAP personal link. To prevent excessive interruptions, he makes this personal link appear or disappear on his blog based both on his current presence state and on his predetermined "office hours." He has found that presence-enabling his e-mail encourages people to respond in real time and permits them to engage with him in productive live video sessions as well as via e-mail or by phone. He says his business has been accelerated, because when he's around to work with a co-worker or customer, they know it.

Johannes Ernst, NetMesh: Only when I'm ready

Johannes Ernst has a vision of information technology that goes beyond the established concept of applications on the one hand and separate data on the other. He says that as technology becomes pervasive and work habits change, the context of where people are, what they are doing, and whom they are interacting with is becoming central to getting work done. So he's creating "situational software" to meld context into the legacy IT infrastructure and to get the right application (and data) to mobile users proactively instead of waiting for them to ask for it.

Ernst came up with this approach at BMW in Germany, where he was working on the collaborative engineering and design systems that the automotive engineers used to work with each other. He realized that there was no chance that all of them could ever reach all their design information through a single centralized application. What they needed was a way to aggregate information from multiple, incompatible applications in real time, so it would be immediately visible to the right people what impact a proposed design change would have on all parts of the project.

He took his vision with him to Silicon Valley ten years ago, to work for an embedded software company Integrated Systems (since merged with Wind River Systems). He left in 1998 to found Aviatis, a firm based on his vision for seamless real-time engineering. Aviatis didn't make it, but in 2001, Ernst bought back the IP and started NetMesh (formerly R-Objects), with funding from Nokia Innovent. Unlike his previous company, NetMesh doesn't serve the engineering markets; his first customers are in health care.

"Today's reality of rapidly changing work habits, business models and industry partnerships is increasingly held back by a mountain of fragmented technology investments that simply can't evolve at the same rate," Ernst says. The issue isn't simply retrieving data and running applications; it's knowing what information and which functionality should be presented given the needs of the user's immediate situation: lab results as soon as they arrive for a critically ill emergency room patient, or dietary advice for a diabetes patient during an office visit. "Imagine you are a doctor in the emergency room and a critically injured patient comes in. Which applications to run on your mobile device should be the last thing on your mind. Once the nurse has identified the patient, shouldn't you just have to look at your handheld to see the relevant information about this patient, arranged in the way that allows you to make the right decisions quickly? Never mind that there may be half a dozen legacy systems that manage that information and can't be changed just because the ER doctor wants a handheld. That connection between the user's situation and the legacy infrastructure is what we allow companies to do."

Richard Schwartz, SoloMio: Much smarter phones

Richard Schwartz has been working on his relationships for years. After completing his PhD in computer science at UCLA and serving as senior computer scientist at SRI, where he focused on programming language design and automated verification systems, he co-founded Ansa Software, which released the relational database Paradox. Ansa was acquired by Borland, and Paradox sold over 10 million copies. After a run as CTO of Borland, he went on to found his second startup, Diffusion, where he served as senior VP, technology. Vignette acquired Diffusion in 1999.

Schwartz has been working on SoloMio, his third startup, since 2001. (SoloMio was a company presenter at PC Forum 2002; SEE **RELEASE 1.0**, MARCH 2002.) The company was one of the first to extend telephone caller ID with new capabilities – call it "super caller ID" – for improving the relationship between the caller and the person being called. The concept is simple: When one person is calling another, instead of giving the callee just two options – answer or don't answer – SoloMio allows the person being called to choose an option from a menu on the phone. The person being called can, for example, send a canned text message directly back to the caller along the lines of, "I'm in a meeting; if this is urgent, text me." SoloMio offers these applications through cell phone operators. So far, he's having more success in the mobile-mature European market than in the US, and indeed, he spends 30 to 40 percent of his time in Europe now, he says.

Schwartz says the idea started from the basic observation that, thanks to the cell phone, people were reachable all the time no matter where or how occupied they happened to be. This gave rise to a need for more flexible and sophisticated call-management techniques than simply answering or not answering a call. Schwartz saw an opportunity to change the rules and make it easier for people to "take the call" even when unable to talk. "We see a fundamental shift in how people are reachable and when they are available," he says.

This is one of those head-slapper ideas that just seem obvious. He calls it "enhanced reachability." "There's no way people can describe their life in advance," he says, so the next generation of communications tools will need to offer solutions that "capture the situation you're in, and the perceived situation of the person on the other end." But it will take time to get users onboard. "People don't change as quickly as technology," he admits.

Nor do carriers adopt technology as quickly as it changes. SoloMio is not fully available yet on any cellular system, save that of Telefonica in Spain. SoloMio services have to be integrated into a carrier's infrastructure, necessitating both a long sales cycle and an intensive implementation period.

Still, Schwartz is pleased with the progress his company has been making. SoloMio has services either rolling out or being trialed right now with 14 partners, including (thank goodness!) some in the US – although he won't say which. After four years of hard work on the concept, it's paying off. Now that he's getting traction with the mobile carriers, his next goal is to work on landline phone companies, VoIP carriers and the "super-carriers" that control consumer landlines, enterprise phone systems and mobile accounts.

PRESENTATION – Stanley Zdonik, StreamBase Systems:
Fast data in the enterprise

Stan Zdonik's first encounter with databases came long ago, while he was working for BBN in the early 70s. BBN is best-known for having built DARPAnet, precursor to the Internet, for the US Defense Department. But Zdonik, who had just graduated from MIT, was working on Prophet, a data management tool for pharmacologists. "The basic idea was to automate the lab notebook and display data on one of those beautiful [monochrome] Tektronix tubes of the day," he recalls. "A lab notebook

stores data in tables. We dutifully copied that in our software, and we allowed the fields to store complex data, such as molecule conformations. We also supported cells that were functionally related, much like a spreadsheet, but we didn't think much of it. It was just a project NIH was paying for."

BBN also paid for Zdonik to continue his education at MIT, where he took a course from high-level-language and database expert Mike Hammer – yes, *that* Michael Hammer, who went on to become the re-engineering guru. "Hammer got into office automation," says Zdonik, "and he told me I should think about a database system that could deal with office-y things – which ultimately led to object-oriented data-bases." Zdonik joined the board of technical advisors at Object Design, a leading object-oriented-database company of the day (SEE **RELEASE 1.0**, SEPTEMBER 1989), and spent time on the lecture circuit, where he kept running into Michael Stonebraker, now StreamBase CTO and then CEO of Ingres, a leading relational database compa-ny. "Mike and I always found ourselves on opposite sides of aisle in the object vs. relational debates," says Zdonik. "I figured he must hate me. . .but he's a good guy and likes a good argument. We've become good friends and colleagues."

When Stonebraker eventually moved east in 2001, the two men teamed up and even-tually co-founded StreamBase to commercialize a Brown, MIT and Brandeis research project called Aurora. StreamBase has IP licenses from all three universities. Zdonik is senior architect and also continues to teach at Brown University.

The basic idea behind StreamBase is the solution to a problem well-known to people in financial markets – and soon to be known to those dealing with RFID data, user clickstream data, airline schedule and pricing optimization (cf. Flight School) and perhaps drugstore purchase data (SEE ACTIVEHEALTH MANAGEMENT, PAGE 27). There's just too much data out there, and much of it isn't worth storing for analysis. It needs to be looked at it in real time, and then most of it can be discarded. StreamBase does pre-cisely that, performing a kind of instant triage on huge streams of data, reporting out exceptions or whatever values, correlations or other items a programmer might spec-ify, and then storing or discarding what's left. Over time, as the world wide world becomes more and more real time, the ability to react in real time will become key.

INTERVIEW – Ann Livermore, Hewlett-Packard: Strategy in Practice

As general manager of HP's Technology Solutions group, Ann Livermore controls a big share of HP's revenues – about $30 billion, along with 80,000 employees, out of HP's total of about $80 billion and 150,000. Her focus is enterprise customers, but that leads to interesting interactions with HP's consumer-products side. "We may have had a CEO change, but our intent is not to have a strategic change," she says. "For an $80-billion company, strategy is not a one-word thing; there are many interacting directions. Right now, for example, we're seeing some very interesting linkages between enterprise and consumer. Digital entertainment is a consumer business, but for us it means a very strong business with enterprises in such areas as telecom and utility companies and the entertainment industry. They're all trying to figure out how to participate in delivering content to the homes – how value is created, and who gets disintermediated."

She continues, "Suppose you're the Walt Disney Company and you're looking at how you deliver movies into the home. Will you continue to stock DVDs at Wal-Mart? Or will you work with HP to have Wal-Mart press them on demand in the store? Or will you send them right to the home? All these changes are defining new roles for retailers, communications companies and other players. They're leading to a different value chain for the content creator. Our systems offer the capability we have to create [in some cases], manage and distribute the content. There's a pretty interesting play around that...."

In fact, you might even call entertainment an "emerging business opportunity" for HP. (SEE PAGE 24.) For now, HP is less likely than, say, IBM to compete with ISVs; it has fewer vertical-market software products and fewer resources and is more likely to partner with them. But the question of where HP can look for growth beyond its existing markets is a pressing one.

Livermore is relatively new in her role, since May 2004. Previously, and during the time around the merger with Compaq, she was in charge of HP's services business, which is now part of Technology Solutions. In that role, she oversaw the complexities of melding two different operations with two distinct cultures, including high-end consulting as well as call centers, repair engineers, facilities maintenance and data centers. "We doubled our size overnight to 65,000 employees," she says. "I learned that making the tough decisions early and sticking with them is very important. Anytime you do something, hundreds of people will debate whether it was the

right decision, so you have to make the hard calls early and stick with them. You want product road maps and services offerings figured out the first day so it's clear to salespeople and customers what to expect."

She adds: "What a lot of people consider the soft stuff is the most difficult: people, egos, decision-making processes and cultures. A lot of people inside joke that the first two letters of 'merger' is 'me.' You need to have clarity for employees about what happens to them as individuals: who their boss is, where their building is. One of the secrets to our success is that we did a good job of addressing employee concerns. We had very detailed plans. We dealt with the culture part by treating it as analytically and carefully as financials and product plans."

In summary, she notes, "the stereotype of HP is that we are process-oriented, focused on quality but sometimes a little slow. By contrast, Compaq is fast, with quick decision-making but not always good processes. In the end, it can take as long if you have to fix things [as the result of hasty decisions]. Our goal was to keep some of the speed and decisiveness but leverage it with better process." Ironically, it was probably the traditional methodical HP way that made the merger work: The company did "due diligence for culture, how alike and how different, what to retain and what to change."

HP's challenge now is where it goes from here.

PANEL – Open Source: A Model, Not a Movement

Open source sounds so romantic: all those brilliant techies, driven by the forces of genius and creativity, contributing code to a common effort, and surrounded by volunteer bug finders and fixers whose very presence guarantees that open-source software will ultimately be robust, reliable and secure.

Wake up! You must have been dreaming. There's no magic to open source, even though it does get energy from the same kinds of forces that power evolution, markets and bee-hives. It's worth noting that evolution has left behind lots of dead species, that markets need effective (if bottom-up) regulation, and that beehives have queens.

Our panelists represent two different perspectives on open source, but they are both advo-cates and active contributors. Mitchell Baker is president of the Mozilla Foundation;

she's in charge of managing not so much the development process as all the other activities that go into producing Firefox, Thunderbird and other Mozilla products. Kim Polese is CEO of SpikeSource, an ASP that plans to provide testing and simulations that will enable both leading products and the long tail of thousands of open-source components to gain identity and earn certification of interoperability and integrity.

Software may want to be free, but it also needs to be defined before it can do anything useful in interaction with other pieces of code. Both panelists stress how much interest they see in open source from CIOs from large enterprises, though most CIOs prefer to keep quiet, whether from fear of antagonizing vendors or simply of breaking a legacy code of conduct.

Mitchell Baker, Mozilla Foundation: Due process

Mitchell Baker came to the computer world as a lawyer; she came to the law (at Boalt School of Law at Berkeley), she says, "because I wanted to study how people organize themselves, and we use law as a tool to do that." Much to her surprise, she found herself a practicing lawyer, "and fortunately ended up in software licensing." She focused more on IP contracts, business models and deal negotiations than on litigation or corporate structures. In 1994, when she was working at Sun, a friend introduced her to a little start-up called Mosaic (i.e. Netscape-to-be), and she joined it.

"I made the same choice I had made at Sun and stayed on the technology side rather than the sales side. What I'm best at is the process of technology development and putting the pieces together. Netscape never really had a business development group, so it was the legal department that kept the business models. We did more deals than any product manager ever would have." Despite the common perception, she adds, "if you're a deal lawyer and you do a lot of negotiating, you have to learn to listen and to find some path that people can agree on."

But by 1998 not much new was happening (other than the impending takeover by AOL), and Netscape CEO Jim Barksdale suggested she move over to the run the Mozilla Foundation, which manages the production of open-source software and also serves as an advocate for the open-source model. She recalls: "At the time Mozilla had great technology talent, but not much else. I was the person who understood the complete cycle: combining the technologies, what the channel does with them and standing in front of the customer. I brought an understanding of business processes."

Now at Mozilla, she's in charge of making the famous bottom-up processes run smoothly. It's not quite the myth of a self-organizing system; it's closer to a situation where people are persuaded rather than forced to collaborate around defined products. Says Baker: "Mostly we just talk about the large projects, such as Mozilla, Apache, Linux and MySQL. In these projects, there need to be rules and policies. It may be different for all the smaller projects that are less visible."

Indeed, more and more creators and users of open-source software work in corporations; many of them develop open-source software *for* corporations. They may volunteer for the work and the corporations may contribute those individuals' time, but they often work for a salary for corporations who have some vested interest in the results of their work, even though they won't own it. "That has changed the dynamic substantially," says Baker. "Even though we don't own the software either, we do need to control the process because so many people are involved and are relying on us. Corporations won't use open-source software if we can't set schedules and stick to them. We need to work in a manner that companies can understand and rely on; they have to choose to join."

What people don't understand about open source, according to Baker, is that it's not necessarily a loose culture of potluck and anything goes. Programmers tend to be precise people, and their code has to work. The challenge is corralling all the talent and energy into producing precisely defined pieces that work together smoothly. She adds, "We have very disciplined processes in lieu of a complex management chain. These processes help us to maintain the quality of our product and allow many people to work together smoothly. Most companies have a business reason for getting involved. They need to learn something specific about the project to understand whether it fits. But it's a new experience for them. They understand that the engineering needs to be done publicly, but they're not used to discussing marketing and planning with outsiders. I try to help them get comfortable with that."

Kim Polese, SpikeSource: Insourcing the plumbing for open source

"It feels like everything I've been working on during 20 years in the software industry has been leading to this point," says Kim Polese, who joined SpikeSource, the Kleiner Perkins-funded open source company, as CEO in August 2004. "Code re-use, modular design, dynamic objects. . .finally can be unleashed because of broadband, Web standards and open source."

Polese knows whereof she speaks. As a kid growing up she spent countless hours at the Lawrence Hall of Science in Berkeley playing on mainframe computers, and later as a student at UC Berkeley, she taught programming at Lawrence Hall while she earned a degree in biophysics. After an additional year of study in computer science at the University of Washington, she returned to the Bay Area in 1986 and took a job in tech support at IntelliCorp (SEE RELEASE 1.0, APRIL 1986, JANUARY AND OCTOBER 1987, FEBRUARY AND OCTOBER 1988, AND MARCH 1989). She moved into consulting, helping companies build highly specialized applications using an expert systems framework. After joining Sun in 1989, she joined an internal stealth project called Oak, which she later renamed Java, as product manager in 1993.

With that success under her belt, Polese left in 1996 with three colleagues to form Marimba, a company focused on distributing content. The most interesting content turned out to be software, both commercial packages and in-house do-it-yourself code. Marimba ended up solving large-scale deployment challenges for companies such as Verizon and Morgan Stanley, competing with provisioning systems from Tivoli, Computer Associates and Microsoft.

Polese took the company through a successful IPO and to profitability, moving up to chairman in 2000. Upon Marimba's acquisition by BMC in June 2004, she became an advisor to start-ups such as Technorati and TrueIdentity. Then in July Ray Lane of Kleiner Perkins, a former Marimba board member, called to tell her about a new company he'd been incubating, SpikeSource. A sort of "Underwriters Lab" for open source, SpikeSource aims to solve one of the biggest challenges in using open source – interoperability of independently developed modules and components.

It was a bit like the Oak project, Polese recalls: "Eighteen engineers and no business person." But the company had already gone through 16 months of development of an automated test harness and numerous field interviews with potential customers such as General Electric and Morgan Stanley. It also had, through Lane and CTO Murugan Pal, a relationship with Cognizant in India. "Developing offshore is a core part of how we'll scale," Polese says.

The other way it will scale is through complete automation. Like many commercial open-source companies, SpikeSource is a service company. But it won't be offering consulting or customization. In the formulation of Brown and Hagel (SEE PAGE 30), SpikeSource is applying innovation to the task of running a massive testing infrastructure. The basic idea is to run tests on the most widely used combinations of open-source components, ensuring interoperability and certifying compliance with

specs and standards. (Ultimately, though, that same infrastructure can be used at marginal cost against less frequently used, long-tail modules.)

Anyone can download SpikeSource's open-source stacks (i.e. the standard modules of free software). The stacks serve as a kind of marketing for SpikeSource's charged-for services, including ongoing updates to the stacks (security patches, for example), telephone support and of course its testing services. The testing is key, whether for enterprises who want to make sure the software they use will work, or for ISVs who want to make sure the software they distribute or sell and support will work.

Most interesting to Polese are the implications of open source – both on software design and on business models. "Open source is commoditizing the software industry – which is actually a good thing, a sign the industry is maturing. [SEE **RELEASE 1.0**, MAY 2004.] In the new era, revenue comes from the service wrapped around the code, while the code itself is free. So innovation is shifting up to the next layer – process automation for aggregation, testing, delivery and support," says Polese.

"Our edge is going to be our head start and the scale that total automation will afford us; that's the core of how we scale. We won't be alone in this business. Our innovation is the test harness and other automation methodologies. Our data will let people know what works and will provide guidance in what to use when. The value is shifting from the bits to the *combinations* of the bits."

PANEL – New Directions in Search: Mirror Mirror on the Wall

New search services will understand a lot more about the user's world in order to serve users better. Search isn't just entering a query in a box to get the best answer; it's finding the information you want in context: What are you trying to do? With whom? And where? The new search services need to understand more about you, your friends and the world you live in to provide meaningful information in response to a query. . .or in the context of some other application. They will rely on domain-specific knowledge as well as greater personalization and metadata to perform their magic.

In short, search isn't just matching a simple query with a simple answer (or list of pages that possibly contain the answer). It requires an understanding of the user's needs – which may not be defined sufficiently by a phrase in a dialog box – in order to respond

*to those needs with something relevant, whether it's a Web page, a product description, an order form or perhaps even a link to a support rep (*SEE CONVOQ, PAGE 34*). When you type in "FedEx," are you looking to send a package, buy an undervalued stock, apply for a job – or check your own FedEx bill to see if you qualify for a rebate?*

*Search will become more of a background function – the presentation of relevant infor- mation or functionality just-in-time rather than on-demand (*SEE NETMESH AND ITS SITU- ATION-AWARE SOFTWARE, PAGE 35*). To do that, it will need a much better understanding both of the user (as a type and as an individual in a particular context) and of the user's world, including the user's friends and contacts as well as her business and activities and the applications she uses. (We focus more on personalization in this panel, leaving the community angle to the afternoon's roundtable on user- and community-generated metadata. See page 81.)*

Like search itself, our panel is multi-faceted. Marissa Mayer of Google, Udi Manber of A9.com and Arkady Volozh of Yandex represent full-line search companies, each with its own twist as a business. Google so far is mostly content-free, enabling users to find oth- ers' content and generating revenues primarily from advertising. A9 is a very broadly defined search service that works closely with its parent Amazon.com; it is trying to add new richness to search by adding into the mix the physical world on the one hand and the user's own content on the other. And finally, Yandex is a "traditional" portal based around Russia's leading search engine; it generates revenue from e-commerce and a variety of services in addition to advertising. Steve Johnson's company ChoiceStream operates as – or would like to become – an OEM supplier of domain-specific personal- ization services to all of them, whereas Alain Rappaport's Medstory represents the ulti- mate in domain-specific search with its ability to extract much of the meaning from content in its chosen domain of medicine.

Steve Johnson, ChoiceStream: Have it your way

If Steve Johnson is truly successful with ChoiceStream, he may harm his customers' businesses. Yet those customers – AOL, Columbia House, eMusic and, most recently announced, Yahoo! – are eagerly signing up for his software, which personalizes the choices and search results that each registered user sees when she visits a website. If it worked perfectly, in theory, and if each vendor had a broad enough inventory, the user would get the same results based on her own profile, whether she was visiting AOL or eMusic or any other ChoiceStream customer. "The idea is that you can carry not just your credit card but your personality and preferences with you everywhere. But that's a long way off. For now, our customers look at this as differentiation," says

CEO Johnson. (You could also argue that a person may elect to stress a different side of her personality at different sites: Alice goes to Yahoo! when she's feeling like a consumer, to Amazon when she wants something uplifting for the family, to Friendster when she's feeling frisky. . . .)

Before ChoiceStream, Johnson founded and built an image-compression company, Johnson-Grace, in 1991. At that point, there wasn't much need for image compression, since no one was sending around images in the first place, but the idea caught Steve Case's fancy as a way to differentiate America Online from the other bulletin board services of the day, and in 1994 AOL became Johnson-Grace's first and only customer. In 1996, when Microsoft started showing an interest in the technology, AOL bought the company outright to keep the capability in-house. Johnson stayed for three years, ending up as VP, software development and working on the integration of the Netscape acquisition. When that was done, in April 1999, he left. Six months later, he founded and funded ChoiceStream, using his proceeds from the sale of Johnson-Grace to AOL.

"I figured that if we knew more about the context of the user, we could do a better job of determining relevance for each individual. I managed to bring in a few of my old professors, including chief scientist Jay Patel, an expert in behavioral economics and the psychology of judgment from Harvard. And then I just went at the problem the way I thought it should be solved," he says. "We were domain-specific from the get-go, with taxonomies for each category of content that would provide the best predictive value and the clearest differentiation. The challenge was how to translate the content into those attributes."

Basically, the early choice systems were based on collaborative filtering: Assume Juan likes A and B. If Alice likes A, she will also probably like B. That makes some sense, and it accounts for ineffabilities of taste that can't be reflected in categorizations as broad as "country," "rock" and "disco." But it is subject to all kinds of discontinuities and quirks, as well as the cold-start problem: How can you figure out who will like an item no one has looked at yet? ChoiceStream took on the more ambitious task of trying to analyze the products directly: What 15 attributes does this movie have (including stars, scriptwriter, format)? And, in practice, which attributes seem to correlate most closely with a particular user's choices? "If you want to get grungy, what we're doing is estimating coefficients of tastes over each of the attributes and then using a statistical approach called choice modeling," says Johnson. The company relies both on direct questionnaires and occasional queries, and on watching

users' clickstreams. "People don't like to be stopped to answer questions, so we try to learn as much as we can while staying in the background," says Johnson.

The range of things ChoiceStream covers includes movies, music, TV shows, travel, and "shopping," a catch-all term for everything from sweaters to lawnmowers. "If you weight it by commercial activity, we cover 70 percent of the market with the kinds of products and content we handle," says Johnson. Now the trick is to sell to the websites that serve all those markets. Currently, ChoiceStream's lead customer (unsurprisingly) is AOL; it underlies AOL's My AOL personalized movies, music and TV services, and has movie-taste profiles on 15 million AOL members. For eMusic, ChoiceStream helps users find like-minded music listeners with whom to share and discover new music.

Udi Manber, A9.com: The man most qualified. . .

After a recent lunch in Palo Alto, two of us were walking down Hamilton Street when a woman approached asking for directions to the post office. She got her answer from perhaps the single individual in the world most qualified to give local directions. That was Udi Manber, CEO of A9, the search company he launched for Amazon last year.

Manber has always been interested in search; he spent 11 years at the University of Arizona working on interesting search problems, developing Glimpse (a popular early search tool) and writing algorithms before becoming chief scientist in 1998 at Yahoo!, where he worked on various projects, in particular search and security. He left in 2002 to join Amazon.

Within Amazon he started a new search project, A9, which he launched as an independent unit for Amazon last year. At A9 he's continuing to work on "search," but broadening the meaning of the term and enriching the experience. Capabilities A9 has already launched include the ability to search your personal surfing history, your calendar and your bookmarks all from the same screen and in real time. More than that, A9's Block View, business listings enhanced by more than 20 million (so far) street-level images of the buildings that line city blocks, provides a local feel well beyond that of the map-based local services flooding into the market lately. (Even Google's elegant, draggable maps, which reach the level of art, are *abstract* art; they provide no feel of local life.) More interestingly, Block View and A9's local listings are attracting value-add from users, who are already posting their own photos and linking back and forth to other photo sites.

Local means community connection, notes Manber, and it's happening. For example, one of the half-dozen engineers who are working on A9's local service took one of its city-crawling, camera-equipped vans home for the holidays. He got a royal welcome from his friends, and his hometown will soon be the smallest of the cities covered in A9 Block View, for entirely personal rather than strategic reasons. (Of course, you may think making employees feel special and connected to their work is strategic.)

Just as Brown and Hagel point out the value of friction around transactions (SEE PAGE 30), so is there value in context around search. It helps to know what's up and down the street in order to determine what kind of clientele a store may have or what kind of neighborhood a restaurant is in.

Is Block View worth the investment A9 will be making over time as it rolls out city after city? Manber answers: "It is actually a very small investment, and that's one of our main innovations that made it all possible. We're not releasing budget numbers, so I can't tell you exactly how much it costs. You'll have to trust me when I say that the costs are really minimal and are not a barrier once you get the technology right." It has already launched Atlanta, Boston, Chicago, Dallas/Ft. Worth, Denver, New York City (Manhattan), Los Angeles, Portland (Oregon), San Francisco and Seattle, among other cities. Phoenix/Scottsdale is coming soon – with luck in time for PC Forum.

Although A9 likens its business listings to yellow pages, they are currently free to the establishments listed – including the automatic phone call service. (A9 gets its primary business data from Axciom.) But the possibilities are quite obvious, starting with sponsored phone calls, paid listings and the like.

A9 is a subsidiary of Amazon. Although it operates autonomously, the two services are closely tied. Amazon powers A9's book search and most of its personalization features, while A9 provides general search services, especially shopping, for Amazon.

Marissa Mayer, Google: Google triplet

Marissa Mayer joined Google, then about 20 employees, in 1999. She had recently earned her MS in computer science (after a BS in symbolic systems) and was still teaching part-time at Stanford. She spurned an offer from McKinsey to choose Google precisely because she felt less prepared for it than for a standard McKinsey career. While earning her BS, she had worked as a summer intern on a "recommender" system and felt comfortable with Google's approach of using links to measure relevance, but she didn't have much experience in business. Neither, of course,

did her two new bosses. "Larry and Sergey simply yelled at me and Salar [Kamangar, now in charge of Google's ad business] until we made the kinds of decisions they would have made," she says.

Mayer grew up a mostly normal kid in Wausau, WI. Everything was nearby, which usually meant a car ride away. "I remember when we were having a big argument about making a baseball diamond across a couple of yards, and nobody knew the exact dimensions: Was it 88 feet between bases, or 90? It would have taken half an hour to get into the car, go to the library, find a book. . .so we just argued all afternoon. It was 30 minutes then, versus 30 seconds now."

As director of consumer Web products, Mayer is responsible for the basic consumer-facing Google.com site, including search, news, images, Froogle and local/maps. But she's not overly focused on day-to-day things. Basic search still has room to grow, she believes. "I think of all the searches I leave unsearched each day; I may do only one out of ten that I think of. I may be more likely to think of them, but I'm also more likely to do them, given my job," she says. "For example, I'll go home after a dinner with Yukon potatoes and search to find out the difference between Yukon Gold potatoes and regular potatoes. You just have to make it more convenient."

It's not just the hidden Web she has in mind, but the ability, say, to visually scan someone's badge at a conference and immediately see a bio – discreetly – on your cell phone. We like that idea. . .now imagine it applied, for better or worse, to someone you encounter randomly in a restaurant or at a bar.

Currently, Mayer sees the appeal of local and all the new services that are hot right now, but she's trying to get Google to think longer-term. She says, "You have to ask yourself, 'Will this happen in search someday?' If the answer is yes, then it's something we'd better be working on."

She cites one user study in which users were asked to do searches using keywords about things that concerned them. One harried mother innocently typed in "discipline teenage daughter" with results that will be unsurprising to anyone familiar with the Web, but which failed to address the woman's questions around homework time, allowances and dress codes. Although Google has since mostly fixed that problem, says Mayer, "We need to get better not at doing searches, but at providing the answers people are looking for. There will be a day when ten HTML links regardless of who you are is not the answer anymore."

Alain Rappaport, Medstory: Mining for meaning

Alain Rappaport grew up in a medical family. His father practiced medicine in France and then brought the family to Baltimore for a year to teach pediatric medicine at Johns Hopkins. Rappaport himself started medical school in France at the age of 17 and also got a PhD in molecular neuropharmacology along the way, followed by a year as a post-doc in artificial intelligence at Carnegie Mellon. He got diverted for a number of years as co-founder of Neuron Data, an AI company, from 1985 to 1997. Neuron Data became Blaze Software, specializing in financial decision support, and did an IPO in 2000. It was subsequently acquired by Brokat.

After an intervening stint at NASA, Rappaport heeded the implicit advice of Neuron Data's story: Use great technology, but focus on a specific market or problem domain. And he returned to his first love, medicine. He founded Medstory to apply AI techniques (learning, ontologies, inferencing) to the challenge of organizing and deriving useful information from the huge base of medical information in science and business publications, professional journals, clinical test reports and the like. "During my 15 years at Neuron Data, computing was driven mostly by a push to industrial efficiency; the medical world was not part of that. But medicine is now very data-driven. The genome guys were early; I was a bit early. But our time is coming."

Medstory's clients include pharmaceutical and biotech companies that want to track developments in their fields, such as specific kinds of cancer or other diseases, or specific therapies or drugs. Rappaport also hopes to launch a guided-search version of Medstory to serve consumers with more relevant results and alerts than today's general-purpose search tools.

What does the software actually do? It operates as a network of dedicated, domain-specific hubs connected to medical data sources, including PubMed and the FDA as well as online services that include medical data such as Google. "We mine, for example, what gets registered with the NIH, as well as SEC documents and the Federal Register," says Rappaport. "We identify and connect not only the drugs, but also the PIs [principal investigators, or researchers], the conditions and the institutions. We can filter out interesting business transactions – and we know enough not to pick up, say, the past affiliation of someone who just joined Pfizer's board – unless that's what you're looking for." Medstory can also munch through a client's own proprietary data, such as business, technical, regulatory or clinical data or documents.

The whole thing requires substantial set-up, a process that began three years ago and is continuing now as Medstory adds new fields relating to particular kinds of cancer and other conditions. The company has a set of tools and domain-specific models that make the process of adding new fields semi-automatic; the search and structuring functions themselves are fully automated. In short, it requires a fair amount of human intervention to set things up, but then the software runs through new data automatically. "We still need people to do this," says Rappaport. "But using our tools, we can go through data in an afternoon that would likely take a year with a person. We're doing tasks that would otherwise never get done. Our hubs act like dynamically changing lenses to help the users focus their search and solve their problems."

Fields it has covered so far include breast cancer, hepatitis C, arthritis, hospital infections, obesity, insulin resistance, type 2 diabetes and certain targeted cancer treatments. That is, the system now knows enough to interpret articles about developments in these fields intelligently. The software "knows" what drugs and disease mechanisms and therapies and conditions are, how they interact, and who the relevant people and organizations are. It can find all the recent documents that discuss drugs that seem to retard the development of cancer, whether they were being tested for that feature or not. That's a useful capability: Viagra was a failure for its original purpose of reducing angina, but some clever scientists caught a curious side effect. . . .

Arkady Volozh, Yandex: Doing no evil in Russia

(DISCLOSURE: ESTHER DYSON IS AN INVESTOR.)

Russia is one of very few markets where Google does not hold the largest market share; a 12-year-old start-up called Yandex leads with about half the traffic vs. No. 2-ranked Rambler with about 25 percent. Google comes in third at a little under 15 percent. Yandex offers an e-mail service with a variety of enhancements and spam filtering, shopping goods listings, automatically clustered and annotated news, blog search, a Web page-hosting service and a variety of other services, most of which are free. Imagine Yahoo! plus Google, but for a market of only about 20 million people online. Yandex has a do-no-evil reputation in Russia, but it has a much broader range of services and a more commercial feel than Google. . .though, like Google's, its search results are sacrosanct and untainted by commercial considerations.

Although the market is smaller, there is also less competition than in the US. While Russian techies are often techier, the consumers are often less sophisticated than in the US, making for interesting marketing challenges. That is, advertising in Russia is only a few years older than *online* advertising.

We first met Yandex founder Arkady Volozh in Moscow way back in 1991 when he was one of many Russian computer scientists trying out the strange new field of business. But he was luckier than most. His English teacher, Robert Stubblebine, had some friends back in Boston who knew the computer business. They helped him open an office in Boston and find funding for his fledgling venture (CompTek) that imported branded PCs and servers into Russia. In 1993 Boynton and Stubblebine secured initial financing along with expertise in finance and technology from two American investors – Ben Cole, a banking consultant from Boston, and Al Fenaughty, an IT veteran with roots at Univac.

"One problem in this country is that we cannot learn about business from our fathers," Volozh notes. "Instead, we have to learn things for ourselves. My only business teachers were my older American partners. We were taught a lot of mathematics and engineering in the universities but had no idea about compensation structures, financials, partner relations or investment – all natural things if you hear about them from childhood. But the 'teaching' was far beyond that. It was also, 'Be good.' 'Treat your business partners honestly.' 'Think about where you and your company want to be in five years.' These things are not obvious in the environment of a baby-young and pretty wild market. That was the time when a corporate logo pen could easily open the door to a half-a-million order."

But Volozh was not just lucky; he was also more deserving than most. He is one of those natural entrepreneurs who occasionally (but too rarely) emerge in developing markets. In parallel with hardware sales, he continued to support a software project he had started earlier with his high-school classmate Ilya Segalovich. It was a search tool that could handle the complicated morphology of the Russian language. They applied it to patent search, then to Russian classics and to the Bible (which his wife had laboriously typed into her computer because no Russian version was available online at the time). That little program morphed into Yandex, for Yet Another iNDEX, now Russia's leading search-engine-cum-portal.

Yandex was formally incorporated in 2000 by the initial CompTek owners, who raised $5 million from Russian venture fund Ru-Net Holdings for a 35 percent stake in the company. CompTek is now the largest Cisco distributor in Russia; several years ago it was sold to a Russian broad-line computer-equipment distributor. The Comptek shareholders also launched two other businesses: Infinet Wireless, a supplier of fixed wireless broadband routers designed and manufactured in Russia, and CTI, a systems integrator and No. 1 supplier of IP-telephony and Telephone Call Centers in the CIS market. Volozh runs Yandex full-time, but he remains peripheral-

ly involved in those two spin-offs. "I'm especially sorry I can't be more active in Infinet," he says. "Broadband wireless Internet will be in the center of everything here in a few years."

Volozh's plans over the next few years are to concentrate on local searchable content and some new interesting ideas and business models which he doesn't yet want to reveal. "To compete with global players it's not enough to match them technically," he says. "Ironically, we need to rely on our understanding of local Russian culture. That's what they cannot match."

INTERVIEW – Bruce Holmes, NASA: Privatization Mission

When Bruce Holmes was growing up outside Chicago in the early '60s, he watched his father commute to work in the family Cessna 172. "It was 20 minutes by air from the Halfday Airport near our house to Meigs Field near where he worked; it would have been an hour and a half by car or train." For vacations, the entire family piled into the airplane to go see relatives in Minnesota.

So it is hardly surprising Holmes ended up where he is – at NASA working hard to make airplanes and even space travel part of ordinary life for Americans. During 30 years at NASA he has fostered the technological foundations on which new aviation companies have been formed, and his successes in aviation have fueled his interest in the concept of personal space travel. Now he is trying to support the two broad movements in air and space travel that will be covered at the Flight School workshop the day after PC Forum.

The first is on-demand air taxis, a market that is now coming together with the emergence of new airplane technology and the networked systems to optimize real-time pricing and scheduling of planes and passengers (and as scheduled airline travel becomes increasingly unpleasant). There are many analogies between the emergence of air taxis in a world of giant mainframe-like airlines, and the emergence in our industry of the PC and the personal productivity and market restructuring it has unleashed.

The second is commercial space travel. Holmes has a growing passion for the commercialization of space, specifically around the idea of personal space travel.

"Ultimately, the government has to let go of its iron grip on access to space," he says. Commercialization of space could be akin to the commercialization of the Internet in both supporting and using the energies of the private sector, and in fostering uses and markets undreamed of by the originators. And, like the commercialization of the Internet, it is initially being resisted by those in the established order.

Holmes studied aerospace engineering ("I didn't understand either word when I enrolled but I knew it concerned airplanes" he says) at the University of Kansas and went straight to NASA in 1974, just as the Apollo program had wound down and NASA was preparing the Viking voyage to Mars for launch in 1976. But his specialty was aeronautics, and Holmes got to work with some of the giants of aircraft design of the time. Holmes's first flight research involved testing the first computer-designed airfoil – "the GAW-1, which translates as 'General Aviation Whitcomb' series 1, with legends such as Richard Whitcomb of supersonic area rule and winglet fame," he recalls. From its beginnings in 1915, NASA developed the technologies for civilian and military aircraft that led to the 20th-century aerospace industry.

Holmes continues: "We worked in this culture of entitlement, where the norm was publicly funded research, for its own sake. NASA was its own customer. The goal for a NASA researcher was to get published. But that culture will not be relevant to the 21st century in either air or space activities. My job as director for strategy is to help create the 21st-century version of NASA."

"In its day, NASA took the risks that were beyond the discount time-lines of private-sector investors and produced public-domain knowledge on aerodynamics, structures and materials, propulsion, flight controls and other technologies and put those out in reports that the industry could use," says Holmes. "Is there a role for government in incubating technology foundations for 21st century? Or can the VCs do it by themselves? I don't know what the answer is. But I do know that government is most effective when the public and private sectors figure out how to collaborate."

Although Holmes' technical history is within the aviation side of NASA, his current role in leading strategic thinking has considerable influence on the organization as a whole. He recently led the development of strategies for the next-generation air and space transportation system at the joint office between the White House and six departments and agencies. Moreover, he adds, "I believe that it is through energizing external influence as the customer that I can help NASA facilitate emergence of commercial space flight and personal air travel." That is what he is doing here at PC Forum and Flight School.

THE GALLERY

BY CHRISTINA KOUKKOS

As we've discussed throughout this issue, we can no longer realistically draw a solid line between IT and the real world: IT colors the way we live, work and communicate. All the companies in this year's gallery provide tools to automate, visualize, personalize or just make the IT in our lives easier to use.

ActiveWords: Your words are its command

ActiveWords is a very simple tool that does what one might imagine would be a very simple thing: It lets you talk to your computer in your own keyboard shorthand. "Our theory," says co-founder Buzz Bruggeman, "is that your language is your most important skill set." Invented by since-retired software developer Serge Beauregard, ActiveWords lets users set up unique sets of keystrokes that initiate a specific function: say, open a particular folder or file, or launch an application. Think of it as a desktop shortcut without any clicking. . .or the need to start from the desktop. From any application or view, a user can type her pre-defined shortcut and a set indicator that it's an ActiveWord – say, "oPCF<space><space>" to open the PC Forum folder, with the double-space indicating that it's an AW. While the concept is not new, we were impressed by the simplicity of the AW implementation. The software even suggests new shortcuts for processes it notes the user initiates on a regular basis. Bruggeman says the software (available for a free 60-day trial) has been downloaded tens of thousands of times. At the Forum Bruggeman will demo AW working on a notebook, a tablet PC and a beta version on a USB flash drive. The flash-drive version is key, because it means you can carry your ActiveWords – and your AW computing habits – with you from computer to computer and device to device.

KoolSpan: Smart and secure

Bethesda, MD-based KoolSpan, founded in 2002, offers a secure alternative to a corporate VPN. At PC Forum, the company will launch SecurEdge for the enterprise, a smart card-based enterprise security system. "Our system allows you to connect to your network from anywhere as a true LAN peer," says CEO Tony Fascenda. To connect to a secure network, the user inserts a KoolSpan smart card, which is the key, into her machine. The key searches the Net for its corresponding lock, which is a hardware device that sits just outside the corporate network. After the lock authenti-

cates the key, KoolSpan's software establishes a 256-bit advanced encryption standard connection between the device and the network. Once the connection is established, it is as if the remote device were sitting on the LAN, with all roles, policies and other attributes mapped to the user. Among other things, SecurEdge can help users avoid having their messages trapped by spam filters when they use a public network service such as T-Mobile from an airport lounge. The system works natively over wired and wireless networks, says Fascenda, regardless of adaptor.

Mappr (Stamen Design): Relief maps powered by photos

Mappr grew out of a project that Stamen Design business partners Eric Rodenbeck and Michal Migurski developed for Moveon.org (SEE **RELEASE 1.0**, JULY 2004) last year. "We started making maps for them to visualize the reach of their events nationwide," says Rodenbech. "Then we added a way for anyone to see photos taken at or of the events." The culmination of their work, says Rodenbeck, was a live online map of the 50,000 people who participated in a conference call with Michael Moore. Before joining the call via live streaming audio, participants entered their zip code and the number of people in their party. For each new log-in a new dot sized to reflect the group's size would appear on the map. "It gave people a sense of, 'We're all here in this online space, even though we're dispersed geographically,'" says Rodenbech. The software also allowed the call organizers to poll the participants, and the map would color-code dots based on answers. After the election, the team turned their attention to Flickr – specifically, to tags. "We noticed that a lot of people were tagging photos with location. As it turns out that's true for about 40 percent of pictures on Flickr." Using the Flickr API, the company developed a hierarchy of location codes – Texas, Austin, 78756 – and began mapping people's photos. The outcome is a number of other projects, including mapping a driver touring the US in a green Mazda Miata taking a picture of himself in front of every state capital, and a re-mapping of the legendary Route 66. People tour parts of the old Route 66 and tag their photos on Flickr with "route66" but also with the "real" geographic location. From Mappr's map of those photos emerges a highway that no longer exists. "It has started to be a little more interesting," says Rodenbech. "These people didn't intend to get involved with a group visualization project, but they did." As for the future, he says, "We are hoping our projects will serve as an example of the kinds of commercial things that will happen on the Net."

Persuadio: Finding plankton in an ocean of data

"I cannot stress strongly enough how early we are in all this," technology writer and analyst Mitch Ratcliffe says at the end of a conversation about Persuadio, the company he founded. Indeed, there isn't enough room to describe it all here, but these are highlights. At PC Forum Persuadio will launch MyDensity, a free Java-based tool that creates a visualization of a Technorati-style "link cosmos" (SEE **RELEASE 1.0**, JULY 2003) – all the website/weblog links to a particular site. "We hope people use it as a tool to browse their maps and discover connections," says Ratcliffe. But that's just the start. The company is in the process of building an enterprise edition that can track memes as they spread across the Net. First, Persuadio's configurable Web crawler gathers the location and timestamp (from blogs) of all the instances of a particular phrase – say, "PC Forum." Then Persuadio can visualize that data and show the spread of an idea through a network over time. Finally, the software will include analytical tools to map traffic levels as well as the "social" relationships among the various sites that mentioned an idea: Who reads which sites? How did the idea get passed on? "You'll be able to see strong social ties, weak links, well-worn paths between entities…" says Ratcliffe. In addition to its own Web crawler, Persuadio uses a Google commercial license to gather data, and may partner with blog-indexing sites such as Feedster or Technorati, says Ratcliffe. But he's got another idea as well: "Instead of SETI@home, you could have Google@home. We will open-source our Web crawler so that anyone can make an index about themselves or their interests. We just ask that people give that data back to us. It'll offer a much more granular view of the world," and without the need for Google's huge data center. "We're still only able to describe the first few feet of this ocean of data," says Ratcliffe. "We want to get to a point where we can see plankton instead of just looking for whales."

Send Word Now: Lack of communication breakdown

"I started researching group communication before 9/11," says Send Word Now founder Sandy Cohen. "Everyone was going to be reachable with one identifier, but no one knew if it'd be a phone number, e-mail, text messaging ID, or something else. After 9/11, I heard hundreds of stories about communication breakdown. It was a question of the reliability of public communication systems." So he built Send Word Now, which allows an individual to broadcast a message to a group of people, from any device (landline, mobile phone, computer) and over any communication network (phone, cell-phone network, the Web). It also allows users to ask poll-like questions and gather responses. He first started selling the service to companies and government agencies preparing emergency response and business continuity plans. "But as we worked with customers, we noticed that people used it more frequently –

not just for emergencies, but for 'everyday' emergencies or communications in smaller groups," says Cohen. Most customers so far are Fortune 1000 companies and federal, local and regional government agencies, including the US Postal Service, Bank of New York, Pfizer, the US Department of Health and Human Services and the Department of Veteran's Affairs. Pricing for the service is similar to that of a cell-phone plan: A subscription fee based on the number of contacts in a system and a fixed number of minutes, with additional fees for overage. The company plans to introduce a consumer model in April. "Someday every organization will have SWN or something like it. And every individual in an organization will use SWN or something like it," predicts Cohen.

TravelPost.com: Let your experiences help us be your guide

TravelPost.com founder Sam Shank aims to build "the ultimate travel tool" for consumers. While traditional travel guides and travel-advice sites such as Trip Advisor (a speaker at PC Forum last year) provide reviews from experts and other people, they offer no way to get recommendations from people who are like you, Shank observes. The site launched in October 2004 with a suite of travel journaling tools that include interactive and personalized maps. Over the coming months the site will deploy a series of tools that help visitors create a travel profile and publish and share personal travel experiences including where they've been, what they liked and what they would like to do. TravelPost will then find users recommendations and tips from other travelers with similar preferences. "How do you plan trips? You begin by talking to people like you – your friends," says Shank. "They give the best recommendations. TravelPost taps into the power of the network to give you a wider breadth of advice." At PC Forum the company will announce a "major strategic partnership in reviews and recommendation space," he says. Initially the company will earn Google AdWords revenue, but Shank plans to integrate "transactional opportunities that match customers' particular tastes and preferences."

Company Presenters

BY CHRISTINA KOUKKOS

Some of this year's company presenters help us discover, personalize and share digital content and data, and then bring it into a real-world context. The last three help CIOs give employees tools to make the CIO's job easier!

Search and data

Just as photo-sharing sites help users organize and share photos of the past, TRUMBA will help users organize and share their time in the (near) future.

EVDB hopes to become the de-facto database of event listings, with tools to help people discover events they might be interested in.

ENDECA uses faceted classification techniques to provide guided navigation through large, regular data sets such as parts catalogs.

SIDEREAN SOFTWARE helps users navigate large data sets with complex relationships among the parts, such as a product catalog connected to a database of product developers, a sales team, and a library of technical papers.

Real-world

IMPINJ uses patented manufacturing techniques to develop low-cost, low-power and efficient RFID tags.

GROUPER NETWORKS is a peer-to-peer file-sharing network with built-in community and privacy, and an operating plan that might help keep it legal.

EPOCRATES provides wireless data services for health-care professionals.

When BRIGHTCOVE launches later this year, it will be a syndicated commerce service for video content.

For CIOs

REARDEN COMMERCE offers an e-commerce platform and service grid for employee business services and more.

OPERA SOFTWARE has developed a Web browser for mobile devices that delivers the true mobile Internet.

JOTSPOT is a wiki provider that also offers standard functional workflow and light data tools so that users can develop "mini-applications."

Brightcove: Bright but still occluded

Think of Brightcove as an amalgam of Amazon's affiliate program, Akimbo's "Internet TV" service and a cable television operator, sprinkled liberally with founder Jeremy Allaire's technological and business success and savvy. Or call it a syndicated commerce service (SEE **RELEASE 1.0**, JULY 1999). As a very young company, it veils its public face in mystery; Allaire chooses his words carefully when describing the service in order to avoid tipping off the competition.

When the Brightcove service launches toward the end of this year, says Allaire, it will give video rights holders the ability to offer their products directly to consumers via "an emerging open platform on the Net" that avoids traditional middlemen such as retail outlets and cable operators. Part of that emerging platform is Macromedia MX – a platform he helped develop as CTO of Macromedia from 2000 (when he sold his first company, Allaire Corporation, to Macromedia) until 2003, when he left to become entrepreneur in residence at General Catalyst Partners.

"Before the Web, you had desktop publishing, but no economical distribution channel," says Allaire. "Then the Web allowed people to distribute text" very cheaply and to a worldwide audience, resulting in the exponential growth of websites catering to niche audiences (a.k.a. the long tail). "The same idea applies here. Over the next 5 to 10 years, the number of video entities [both video-producing entities and video items] will likewise grow exponentially."

Brightcove will offer content creators services such as hosting, distribution, promotion, e-commerce, fulfillment and customer service, so that they can be creative and leave the customer relationship management and logistics to experts. (This aligns with the new thinking about corporate structure from John Seely Brown and John Hagel; SEE PAGE 30.)

 "On the flip side," says Allaire, "we're creating a consumer-facing service on behalf of the creators where any publisher's stuff will be available to a wide audience. We're offering the kinds of services that you would expect to make it easy for consumers to find and download these experiences."

While the concept of Internet TV is not new, the widespread adoption of broadband and wireless home networks, together with the availability of free authoring tools and open consumer electronic devices, have combined to create a fertile environment for realization of the concept for the first time. "There are a lot of other factors as well," says Allaire. "For example, people are hungry for richer experiences on their

computers and other devices," and new data standards enable personalization (SEE CHOICESTREAM, PAGE 45), diversity and community (SEE ROUNDTABLE, PAGE 81).

By devices, Allaire means more than just television sets: "The people who talk about IP video, Internet television or whatever they call it, tend to think only of the TV set in the living room. But people will expect media to work across all their devices." Brightcove will piggyback on open platforms such as the browser (SEE PAGE 73), the Macromedia platform and any others that emerge. It is also betting on the adoption of open *devices*. "We're betting that it'll be consumer-led adoption, where the consumers buy the hardware, instead of an operator-led adoption, where consumers get [probably closed, proprietary devices] for 'free' along with a subscription." As a result, Brightcove can focus on becoming an online service company and not worry about devices, as Akimbo must.

When pushed for specifics about the service, Allaire is carefully vague: "Rights holders will have unique forms of distribution that will give them more profit than traditional avenues," he says. "We expect to work with a range of marketing and distribution partners for our service, including device companies, PC companies and online service companies."

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BRIGHTCOVE INFO

Headquarters: Cambridge, MA

Founded: July 2004

Employees: 15

Funding: $5.5 million from General
        Catalyst and Accel Partners

Key metric: launching early beta at PC
        Forum

URL: www.brightcove.com

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And his business model? "We can't really talk about it right now, other than to say that we expect to make money in a number of ways." He laughs. "I'm not being vague because we don't know. In fact, we have unique answers to that question," he assures us.

We are inclined to believe him, which is one reason we invited Brightcove to present at PC Forum. And he offers more than simple assurances for why he'll succeed. First, he has put together a carefully selected team with experience in all aspects of his business: online merchandising, consumer-oriented online services, video-on-demand services, rich media platforms and traditional video distribution channels such as cable and satellite.

Second, he's got a realistic sense of the challenges facing Brightcove and its place in the industry: "The video industry is a $150-billion industry. This is not a zero-sum game. Hundreds of companies will extract and create value, so we're just focusing on creating a successful business in the middle. To do so, we need to do two things. First, we need to make the content creators and rights holders successful. Content companies experiment with a lot of distribution channels. If we can help those com-

panies and individuals create new revenue streams, we'll win. Second, we need consumers to love it. If it's too slow or awkward or expensive, consumers won't want it. It's got to do something compelling for the consumer. That's a very tall order."

EVDB: Seed in his head sprouts

"Helping people find things online has permeated my last 15 or so years," says Brian Dear, founder and CEO of EVDB. It all started long before the Web in 1987, when Dear founded Coconut Computing, a company that built client/server tools for building rich multimedia online services, including movie listings. After selling Coconut in 1995, Dear shopped around a business plan for a service that would provide alerts via e-mail about any upcoming events a subscriber might specify. He didn't find anyone willing to fund the idea at the time, but the seed stayed in his head.

"In 2001 I started making a list of all the events here in San Diego that I would have gone to had I known about them," he continues. "It's hard to keep track of all the different things happening in a metro area. Small meetings or lectures at a local university are generally off the radar of major media." That led Dear to dust off his old business plan in 2003 and update it for the Web. While many websites cover events for particular niches or geographic areas, and others aggregate those listings, says Dear, "the Web is still a complete and utter mess when it comes to events and calendaring. There's no search engine and there are no simple standards for representing and sharing rich event data. Calendaring applications tend to be difficult to scale and navigate and read. Yet it is the primary way people try to represent events. RSS, XML, Web services and the enormous explosion of blogs. . .all these factors could be harnessed for an event service on the Web." Enter EVDB.

Like IMDB, the Internet movie database, and CDDB, the CD database (SEE **RELEASE 1.0**, SEPTEMBER 2003), Dear hopes, EVDB could become the de-facto database of event listings. Like any such service, EVDB will solicit listings from the small guys, and it will take the trouble to collect them itself from the big guys who don't need it as much (yet) as it needs them. When EVDB rolls out its early beta at PC Forum, the events in the system will be gathered by crawling the Web and from partnerships with listings services. The company has already partnered with Meetup and is in discussions with a number of other sources. Wherever possible and logical, event listings will include contact, ticketing and other useful information including full agendas for conferences.

"Traditionally event organizers publish listings of their events using unstructured text in a calendar format, and users have no tools to find them easily or sync them to their desktop or handheld calendar apps," says Dear. "Our argument is that calendars are the wrong metaphor for publishing event listings on the Web. They don't scale well and they're not very readable. People want to know about *events*, some of which they'll put in their own *personal* calendars. As an analogy, take Apple. They didn't create the iTunes Music Store to sell *playlists* of music. Apple created it so that users could find and buy *songs* and then use iTunes to collect those songs into arbitrary groups, or playlists, that make sense to them. We're pursuing events and calendars in the same way."

In addition to making ad-hoc searches for events, users can subscribe to RSS feeds for particular areas of interest, for particular tags (SEE **RELEASE 1.0**, FEBRUARY 2005) or for the results of continuous searches based on specific criteria – much like the "perching" option offered by RSS feed aggregator Pluck (SEE **RELEASE 1.0**, DECEMBER 2004). For ease of use, EVDB will decompose larger events into their constituent parts – e.g. a conference will be broken down into individual agenda items – so that users can choose which specific sessions they wish to attend and flag the speakers or topics that interest them. EVBD will offer tools for users to pull events directly into their Outlook or iCal calendars.

EVDB INFO
Headquarters: La Jolla, CA
Founded: January 2004
Employees: 3
Funding: $300,000 from angels including Esther Dyson, Daphne Kis, Josh Kopelman and Mark Pincus
Key metric: launching early beta at PC Forum
URL: www.evdb.com

Initially EVDB will display ads using Google's AdSense, but Dear plans to roll out a more sophisticated and targeted ad-serving system later in the year, he says. "We want to enable advertisers to target regions down to the street corner, or to particular time frames or topic."

The company also plans to publish a Web services API which will allow free access to the database for noncommercial use or a commercial license for any organization – such as a local newspaper – to pull all or part of EVDB data into its website. Other large-scale users could include travel planners, event organizers and hospitality providers of all kinds.

EVDB does not plan to offer its own ticketing or event planning services, but will partner with companies in those spaces, says Dear. "We are simply trying to help people find out about events, first and foremost. That's a big enough challenge," he says.

Endeca: Facing the facets

BY DAVID WEINBERGER

*We first covered Endeca in last month's issue of **Release 1.0**, "Taxonomies to Tags: From Trees to Piles of Leaves," by David Weinberger. We've reprinted Weinberger's profile of the company here.*

No matter how overwhelming our e-mail and scheduling information looks to us, it's a bouquet of daisies compared with the informational jungles large organizations quickly grow. Faceted classification scales up quite nicely, but getting it right requires taxonomic and content expertise as well as software that can handle huge computational problems fast enough to keep up with a user casually clicking through a series of screens.

"For the first year, when Endeca was under wraps, its working name was Optigrab," says founder and CEO Steve Papa. "But when a prospect noticed that we'd named it after the little handle on eyeglasses invented by a Steve Martin character, we changed it to Endeca." The name refers to "entdecken," German for "discover," a word that's not only appropriate but is also free of any reference to the movie *The Jerk*. Endeca is now doing big business – doubling revenues year to year, and having its first $10-million quarter – with organizations such as IBM, Wal-Mart, Barnes & Noble and the Library of Congress.

Endeca organizes large sets of data into faceted classification systems – dynamic, hierarchical trees that the user navigates to find what she's looking for. Faceted classification may *look* like the parametric searches featured on many e-commerce sites, but they're different. For example, at electronics retailer NewEgg.com, users shopping for digital cameras can specify the details of any of 13 parameters, from manufacturer to the type of memory stick, and see only the cameras that match those selections. But that's not yet faceted classification, explains Papa. The NewEgg system lets users specify the parameters to find all Nikon, 5-megapixel cameras for under $50, even though there are no results. Endeca's system, on the other hand, dynamically adjusts the parameters so that users are never given choices that lead to null result sets. The result is what Endeca calls "guided navigation." Papa points to a demo Endeca constructed in-house using 90,000 reviews from the *Wine Spectator* database. Each review can be sorted on any of nine facets, including the type of wine, country, price range, year and winery. So far, it sounds like NewEgg. But if you say you want to see only wines with very high ratings, the checkboxes for the lower end of price range disappear, because there are no extremely good, cheap wines. Ask for a

Zinfandel and all the countries except the United States and – surprise! – South Africa disappear. Faceted systems don't construct every logically possible tree, but only trees that can lead a user to a result she wants.

This is not a trivial technical challenge. Each time the user specifies a facet – "Show me white wines. Now show me white wines from Germany. . ." – the system computes the paths through the tree that result in populated branches. If a branch has no wines hanging from it, that branch doesn't sprout. In the wine demo, there are 10^{34} possible paths, but "only" 250 million of them lead to existing wines. That's a computable problem. If you were instead to hard-code a single tree structure with nine facets, there would be only 8000 paths through the tree, and once you had sorted by country, you might not be able to sort by type.

These capabilities are crucial for an application Endeca built for a company that provides equipment and services to the oil and gas drilling industry. In one particular project, using a faceted user interface an engineer can find exactly the right bolt among 147,000 approved parts chosen from a database of 25 million available pieces, with a total of 1500 facets. The engineers need to see only the parts that are available, or else they will waste enormous amounts of time wandering in the desert. Further, because they see only facets relevant to the particular set of parts, they can browse a complex schema without having to know the schema itself.

Endeca is focusing on large customers with large online presences. For example, Barnes & Noble, which had hired eight ontologists to build a 250,000-term taxonomy, uses Endeca's system to provide users with results that cut across categories. Endeca's average deal price is about $400,000, and the customers' results are frequently impressive, says Papa: Overstock.com increased conversion rates and revenue per session by double digits, because people were better able to find items; Eddie Bauer experienced a 30 percent increase in sales; and IBM.com saw a 50 percent increase in its conversion rate.

Endeca is now starting a push into the enterprise business intelligence space, using its faceted classification engine to produce dynamic reports. For example, Harvard University is rolling out a system that will enable about 1000 people working on alumni relations to sort donors by 20 different facets. Pick year, amount donated, and age facets and you are instantly shown a graph of donor data with year as the X axis, amount as the Y axis,

> **ENDECA INFO**
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> Headquarters: Boston, MA
> Founded: August 1999
> Employees: 200
> Funding: $45 million from angels including Dick Parsons, Brian Totty, Bill Sahlman and institutions including Bessemer, Venrock, In-Q-Tel and Lehman Brothers
> Key metric: $32 million in 2004 revenues; key customers include The New York Times Company, the FBI, IBM, Wal-Mart, John Deere and the Library of Congress
> URL: www.endeca.com

and donor age groupings as the bars. Change a facet and the report updates to show the regions where a fundraising lunch is likely to be most lucrative. American Express, the US Army Reserve, Fidelity and NYTimes.com are also customers.

With Endeca's e-commerce clients increasing their sales and its enterprise application clients gaining savings in the "tens of millions of dollars," according to Papa, Endeca is finding no shortage of work.

Epocrates: Take two aspirin and sync me in the morning

"We are transforming the way medicine is practiced, the way doctors interact with a patient. At the same time, we are transforming how pharmas reach physicians," says Kirk Loevner, president and CEO of Epocrates, which combines a knowledge base for clinicians with a number of messaging and other communication services. Loevner was formerly CEO at three Internet companies: Pinnacor (neé Screaming Media), a financial services technology company he sold to CBS MarketWatch; PublishOne, a secure online publishing service; and Internet Shopping Network. He also spent ten years at Apple Computer, where he was part of the team that developed desktop publishing.

The company claims a 75 percent market share for electronic medical data on hand-held devices for doctors and other health-care professionals, which leaves it ideally positioned to interoperate with providers of electronic medical records (EMR) and the slowly increasing number of e-prescription service providers, someday to include drugstore.com (PAGE 25). (SEE **RELEASE 1.0**, JANUARY 2005.) "We're just one piece of the infrastructure," he says. "We have the reach and distribution to doctors and they trust us, so we are ready when these other services happen."

"People think that physicians won't adopt technology, but that's not true," he continues. "They have adopted PDAs faster than any other group has adopted any other technology." One major factor in this rate of adoption, says Loevner, is Epocrates: "Our adoption curves match almost exactly," he says. The reason that 85 percent of PDAs used in the medical field are Palms, he claims, is that Epocrates didn't have a Pocket PC version until about 18 months ago. (About 40 percent of all US doctors use any sort of PDA.)

Epocrates was co-founded in 1998 by Richard Fiedotin (MD) and Jeff Tangney while they were at Stanford Business School. The product was initially developed to help doctors keep track of new drugs, drug dosing and other drug treatment information.

Fiedotin and Tangney tested it with doctors at Stanford's Student Health Center. The physicians liked it so much that Fiedotin and Tangney decided put it on the Web to see what would happen. Tens of thousands of medical professionals found and downloaded it. "It was all word-of-mouth," says Loevner. "The company didn't do much marketing until about nine months ago," shortly after he joined as CEO. The founders are both still involved in the company; they share a seat on the board and Tangney runs sales. Loevner joined last year to help with the transition from a start-up to a mature company. The company is now building the product on more platforms such as smart phones, and expanding internationally.

The Epocrates service now comprises an updated version of the original portable drug guide for 3000 drugs as well as drug formularies and co-pay information from 120 insurance plans covering 100,000,000 "lives" (as customers are called in the insurance biz). It also includes a guide to diagnoses and treatments for more than 1200 diseases and their causes and symptoms and a separate guide to infectious diseases. Finally, it includes information on 300 different lab tests to help doctors decide which tests to run and to help interpret the results. It even includes medical billing codes for reimbursement for the tests.

The 460,000 active users each pay up to $140 per year for the service, which lets them sync to a continually updated database of information, and is available on any Palm OS or Pocket PC device. A bit less than half of Epocrates customers – 200,000 – are MDs, 170,000 of whom are in the US. The other 260,000 are physician assistants, nurses, pharmacists and other health-care professionals.

When the user synchs the Epocrates database, the system also delivers alerts about drug recalls, FDA advisories, and so on. It also sends clinical messages and it can conduct polls on behalf of (and paid for by) market research agencies and pharmas, targeting users by specialty, geography and other factors. Doctors have to opt in to take part in polls, but if they participate they are awarded a $50 "honorarium" on a debit card provided by Epocrates. "Pharmas spend $25 billion per year on marketing – mostly to physicians," says Loevner. "We offer a much higher ROI on their marketing dollars than stamping their brand on prescription pads or paying a sales rep to drive around dropping off drug samples."

A few weeks ago the company launched a service that allows doctors to take continuing medical education (CME) courses on their mobile devices. Doctors need to earn

> **EPOCRATES INFO**
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> Headquarters: San Mateo, CA
> Founded: October 1998
> Employees: 120
> Funding: $45 million from Sprout Group, Interwest Partners, Three Arch Partners, Draper Fisher Jurvetson and Bay City Capital
> Key metric: 460,000 active customers
> URL: www.epocrates.com

a certain number of CME credits each year – traditional venues include professional meetings, often sponsored by pharmas – in order to maintain their accreditation. Whereas in the past they often had to attend classes or take a test at a particular time and place, explains Loevner, "Now they can take the course on a handheld. A doctor can do it on his way home or during lunch." Once finished, they receive their accreditation certificate via e-mail from Epocrates. The company works with Johns Hopkins, Journal Watch (publishers of the *New England Journal of Medicine*) and other health-care institutions that develop CME coursework and transform it into PDA format. Epocrates gets a cut of the fees paid by the sponsoring pharma company for distributing and collecting completed courses and tests.

This may sound like a slightly too-cozy relationship for a provider of purportedly unbiased clinical information to have with pharmas, but Loevner disagrees. "All of our information-gathering and updating activities are monitored by a medical editorial review board," he stresses. "That part of our business is completely independent of the pharma industry. We have built a trusted brand with the doctors. To them, we are as credible as the leading medical journals." That trusted relationship is worth too much to the company to degrade the integrity of the diagnostic drug information, he says. And unfortunately it is par for the course in medicine.

Loevner sees the services side of the business, which currently comprises about two-thirds of revenues, growing faster than subscription revenue. This year the company plans to offer international versions of its products and services.

Grouper Networks: Will you be in my group?
Launched in October 2004, Grouper Networks is the creator of Grouper, a private personal peer-to-peer file-sharing network. Sound illegal? It's not. At least the founders, CEO Josh Felser and president David Samuel, hope the RIAA and MPAA will see it that way. "Grouper is designed for people who know each other to share personal media," says Felser. "It allows me to share my home movies with people I trust, and then to communicate about them. We want to turn every user's PC into a server, and every user into a publisher," says Felser.

Felser and Samuel previously co-founded Spinner.com, a Web radio service that offered more than 100 different channels of streaming audio. The pair sold the company to AOL in May 1999 for $320 million in stock and stayed on with AOL, Felser as general manager of AOL's music brands until February 2001, and Samuel as VP of technology until May 2000.

In its most basic form, Grouper is a simple piece of software that allows an individual to invite his friends into a group, and then helps members of that group share a particular set of files and folders on each other's computers. The company has so far stayed out of the quicksand of intellectual property rights infringement by limiting to 30 the number of people in a group. And while users can download each other's photos, videos and documents, they can only stream music files.

The Grouper interface and experience is heavily focused on communication and interaction around the files being shared. Felser says that among beta users there is "a grassroots demand for people who don't know each other directly and want to connect" through friends. To that end, each member of a group can view other members' personal profiles, which must include a valid e-mail address. Group members can communicate using their regular e-mail client, or use the embedded instant-messaging and e-mail applications.

Grouper also includes an open-invite feature that lets a group leader – say, a musician or amateur radio broadcaster – allow any registered Grouper member to join her group through a link on a website. . .though the total number of members for any particular group is still limited to 30.

Because these files and relationships are private by definition, says Felser, Grouper "doesn't monitor anything that's being shared. The files and communications between members are encrypted, and presence is distributed into the network. None of our servers handles presence." Grouper servers store and manage only the encryption keys for each group, and authenticate connections between group members. And since all traffic is encrypted, Grouper does not know what is being shared or exchanged by group members. . .helping it avoid tricky IP and illegal content issues. It does, however, track aggregated and anonymized statistics about what types of files (music, photos, video, documents) are being shared. Users can opt out of this tracking if they like.

But Grouper isn't limited to simple file sharing. Among other features in the release it will debut at PC Forum, the company will announce and launch a more sophisticated file-discovery mechanism based on the concept of "interestingness," a term coined by Joshua Schachter, creator of bookmark-sharing site del.icio.us (SEE **RELEASE 1.0**, FEBRUARY 2005). Interestingness is similar to Google's Page rank, but instead of being

> GROUPER NETWORKS INFO
>
> Headquarters: Mill Valley, CA
> Founded: December 2003
> Employees: 14
> Funding: $3.5 million from founders and angels including Rich LeFurgy, Jeremy Verba and Duff Ackerman & Goodrich
> Key metric: more than 200,000 downloads
> URL: www.grouper.com

based on the number and quality of links to a page, it is based on attention metrics - the number times a file is downloaded, streamed or viewed, the "quality" of people who do so and, in Grouper's case, a ranking system for the content.

So far, Grouper's application has been downloaded more than 200,000 times. About 60 percent of those downloads became active clients, says Felser. Based on a survey of Grouper's users, files shared are evenly split among photos, games, music and video clips.

Once the service launches, Felser says, the company will make money in three ways: It will display rich-media advertising in the free client and will offer a for-fee premium version that gives users additional capabilities including tools to manage their own personal network of PCs and devices. Finally, the company plans to partner with an e-commerce provider to offer members the ability to buy and sell media.

Impinj: Nonvolatile success

Impinj, a developer of RFID (radio-frequency ID) chips, was founded in 2000 by Carver Mead, professor emeritus of engineering and applied science at CalTech and a widely respected physicist, and Chris Diorio, an associate professor of computer science and engineering at the University of Washington. While Diorio was studying under Mead at CalTech in the mid-'90s, they discovered a new semiconductor phenomenon that underlies the patented technology and that sets Impinj apart from other RFID tag developers such as Alien Technology and Symbol Technologies. (SEE **RELEASE 1.0**, JUNE 2003.)

The ideal RFID tag, says CEO Bill Colleran, who joined the company in 2001, has three characteristics: It is low-cost, requires low power and has rewritable non-volatile memory (NVM). "Two out of three is pretty easy, but getting all three is hard," he says. "Impinj has all three."

In a basic RFID set-up, an RFID reader broadcasts an RF signal to tags within range – up to 30 feet for tags using the new Gen 2 standard, which was ratified in January 2005. Impinj co-authored that standard as a member of EPCglobal, an industry-driven standards organization for using electronic product codes (EPC) to support RFID. The tag, which typically comprises an antenna and a passive chip, uses the RF signal as a power source to return-broadcast its embedded identity information, typically an EPC stored in NVM.

Impinj's technology, called self-adaptive silicon (SAS), allows it to manufacture RFID tags that consume less power and that cost much less than its competitors' tags. "CMOS, the standard semiconductor manufacturing process, is not optimized for analog; Moore's Law applies only to the digital part of a chip," explains Colleran. "But after we manufacture thousands of chips using CMOS, we can [use SAS to] give the transistors in the chips a sort of 'training signal' that allows them to calibrate themselves so that they are optimized, and therefore able to do their job with low power. This lets us get both digital and high-performance analog to scale together."

SAS can also be used to place permanent information on a chip more cheaply. "There's nothing new about nonvolatile memory (NVM)," says Colleran, "but companies have invested hundreds of millions of dollars to develop NVM manufacturing processes that are very expensive. We can implement NVM in a low-cost CMOS process." And, says Colleran, its NVM requires less power to read and write to the chip in the field, giving its systems a wider range and requiring fewer bulky readers.

All this is important for communication applications such as cell phones, smart cards. . .and especially RFID tags, where the input/output is analog but the processing is digital, says Colleran, who previously served as CEO of Innovent Systems, a developer of CMOS chips for wireless communications. He sold Innovent to Broadcom in July 2000 for $500 million.

Impinj's current RFID product, its ZumaRFID tag chip, is based on one of the Gen 2 standard's predecessors, Class 0. Colleran says it is the first rewritable RFID chip on the market to include long a 30-foot read *and* write range – performance enhancements made possible by SAS. In April 2005, Impinj hopes to be first to market in its roll-out of tags using Gen 2, which features enhanced range, throughput, security and flexibility.

So far, the company has about a dozen RFID customers, though it cannot name names yet. It also licenses its NVM technology to non-RFID semiconductor companies including National Semiconductor, Motorola and Taiwan Semiconductor Manufacturing Company. In addition to licensing and royalty fees, Impinj receives from its NVM customers insight into new semiconductor manufacturing techniques. "It's like funded R&D in new manufacturing processes for RFID products," says Colleran.

IMPINJ INFO
Headquarters: Seattle, WA
Founded: September 2000
Employees: ~ 80
Funding: $50 million from ARCH Venture Partners, Madrona Venture Group, Polaris Venture Partners, Mobius Venture Capital, UPS Strategic Enterprise Fund, Unilever Technology Ventures and Andrew Viterbi, co-founder of Qualcomm
Key metric: $21-million revenue backlog over the next year to 18 months; more than 80 patents issued or pending
URL: www.impinj.com

Colleran says that revenues from Impinj's RFID products were less than $1 million in 2004, but he expects that to grow several hundred percent in 2005: He says the company has a $21-million revenue backlog for the next 18 months or so. That's not surprising in light of Wal-Mart's mandate that its 100 largest suppliers begin using RFID by this past January. Although some schedules have slipped, the demand is there.

JotSpot: Do-it-yourself personal apps

JotSpot is not "just" a wiki company, insists founder and CEO Joe Kraus. "It's the long tail of software," he says. "The Long Tail" is a concept introduced by *Wired* magazine editor Chris Anderson to describe the enormous but fragmented market for niche products and services, and refers to the long, descending curve on the right side of a power-law distribution curve tail. "So far the long tail has been applied to consumer-oriented stuff: Amazon for books, Netflix for movies, Technorati for blogs," says Kraus. "JotSpot brings it to applications." Kraus and co-founder and CTO Graham Spencer previously co-founded Excite, the portal and search engine they sold to broadband provider @Home Network for $6.7 billion in January 1999. After leaving Excite@Home, the pair co-founded Digitalconsumer.org, a nonprofit that protects consumer fair-use rights to digital media, before starting JotSpot last year. (Kraus and Spencer also spoke at the 2001 PC Forum.)

JotSpot (FORMERLY WIKIPAD; **SEE RELEASE 1.0**, JUNE 2004) includes all the usual functionality of a wiki – a sort of mini website on which it's easy for any (authorized) user to add and edit pages and to track any changes with seamless background version management. But it also offers standard functional workflow and light data tools such as forms, the ability to attach documents or to send and receive e-mail messages to a page, calendars and integrated Google search results.

JotSpot users can combine its integrated tools, applications from the JotSpot user-generated "application gallery" and their own personalizations to build simple, easy-to-adapt mini-applications designed for a specific purpose. "Right now, people build small applications [such as a spreadsheet to manage a project] in Excel and e-mail it around" to the people that might find it useful, says Kraus. "You do it in Excel because no [software developer] is going to build that little app. Anyone can do it. It's incredibly easy, so it's disposable: You make it and throw it away. But you would *never* do that with so-called real software."

JOTSPOT INFO

Headquarters: Palo Alto, CA
Founded: January 2004
Employees: 12
Funding: $5.2 million from Redpoint and
    Mayfield Ventures
Key metric: thousands of beta users;
    about 25 apps in user "application
    gallery"
URL: www.jotspot.com

Instead of throwing away Excel mini-apps, JotSpot allows users to re-use, re-purpose and even share applications. "You can even take an Excel sheet you already built, suck it in [to your JotSpot wiki] and make it an app," says Kraus. "You don't even know that you're building an application."

"The first phase of Web was building data," explains Kraus. "Now it's integrating that data" to build personalized experiences and applications. "Not *customization*, but *personalization*," he stresses.

Unveiled in October 2004, the company raised $5.2 million and has "thousands" of customers for its free beta accounts. Customers are using JotSpot for "anything from managing the launch of a product, to coordination of its foreign talent pool by a Chinese TV station," says Kraus. JotSpot currently is in open beta. In the coming months it will officially launch the service, which will cost customers about $5 per user per month. But before that, it will launch another product (that's as specific as Kraus would be!) at PC Forum.

Opera Software: Screen harmony

Opera is slightly different from the companies we normally invite to present at PC Forum. It's not a start-up: It was spun out of the Norwegian telecom company Telenor back in 1995. But another major criterion we use to choose companies is that they are starting (or represent) a new trend that we believe will have a great impact on the IT industry. With mobile service providers moving quickly to introduce to the underdeveloped palates of US consumers the kinds of services that their counterparts in Europe and Asia take for granted, Opera has a lot to teach us.

Opera develops Web browsers for PCs, mobile phones, PDAs and home-media devices. While its PC browser is well regarded (*PC World* voted it best browser in 2004) and a key part of Opera's business, its mobile browser business may be the most interesting going forward.

The development of the original Opera browser began in 1994 as a research project at Telenor led by employees Jon von Tetzchner and Geir Ivarsøy. In August 1995 von Tetzchner and Ivarsøy negotiated to spin out further development to Opera Software, the company they co-founded. "The first version of the software was developed on Sun OS, though the development quickly moved to Windows," says von Tetzchner, now CEO of the company. "We were thinking about making it cross-platform from the beginning, but focused on the PC at the time." By 1997, the com-

pany began to develop for other platforms, including the Symbian OS for mobile devices. The company now has browsers for all major desktop operating systems, with millions of deployments worldwide.

Unlike mobile browsers from other vendors, Opera's isn't a scaled-down version of a fat, resource-intensive PC version; it is the only browser vendor to offer the same browser – and therefore to display the same Web pages – on PCs as well as other devices. "When you tell people that you offer the mobile Internet, that's what they expect," says von Tetzchner. "Since 1998 we have made sure [the browser] runs on a device with ridiculously low memory."

In other words, the mobile browser doesn't require WAP (wireless access protocol) or NTT DoCoMo's i-Mode, obviating the need for publishers to create mobile-device versions of their content in WAP's wireless markup language or i-Mode's compact wireless markup language. "Making a WAP browser is fairly easy, so lots of providers do that," he continues. "We do a *Web* browser. That's a much bigger task." The company has spent nearly a million hours developing a patented display method, called small-screen rendering, which uses clues from the HTML code of a Web page to reformat it to fit the width of any size of screen. For instance, it could re-render a page with a three-column layout into one. It also resizes images intelligently.

OPERA SOFTWARE INFO

Headquarters: Oslo, Norway

Founded: August 1995

Employees: ~200

Funding: $32 million from angels, Four Seasons Ventures and Teknoinvest

Key metric: US partners include Motorola, Qualcomm, Google, Adobe, Macromedia, IBM and Montevista

URL: www.opera.com

The company sells its mobile browser to OS vendors such as Symbian, OEM phone vendors such as Nokia, Sony Ericsson and Motorola, and operators such as KDDI (the second-biggest operator in Japan, behind NTT), Vodafone and Orange. It even sells to end-users.

The company earns about one-third of its revenue from its desktop product, sold direct to consumers or offered for free with embedded ads. The other two-thirds of revenues come from creators of embedded browser applications, mostly on mobile devices but also for verticals and home-media devices, a sector in which von Tetzchner expects huge growth in the next few years.

The company is the process of rolling out the Opera Platform, which will give mobile devices access to what von Tetzchner calls "Internet on steroids." The platform has hooks into the OS that allow the customer – the OEM, the operator or the OS provider – to "take over" the main screen. That would allow an end-user to get a variety of custom content from a mobile operator instead of a default display upon

turning on his phone. "The opening screen becomes programmable. It becomes a Web page," explains von Tetzchner. "So you can have what you usually have [battery-life and signal-strength indicators and so on], but also other elements such as direct news feeds. That's good for operators, because they can reach you as a customer. And it's good for the customer, because you can get something that's of interest to you."

The Opera platform isn't replacing the OS, he stresses, but adding to it and giving the mobile phone more capabilities.

In 2003, six new devices shipped with Opera pre-installed, according to von Tetzchner. In 2004 that number was 13. The company already has agreements that match the 2004 figure for 2005. . .with three quarters to go.

Among other partnerships in the US market, Motorola uses the Opera browser for a number of phones and Adobe integrates the Opera browser into its Web development tool kits. The company also collaborates with IBM on voice technology.

Rearden Commerce: Chore-chain management

"We live in a tech-centric world where hundreds of billions of dollars have been spent [on application development] in discrete product areas," begins Rearden Commerce founder and CEO Patrick Grady. "But none of it interoperates, and efforts at system integration have not helped much. In fact, we've reached a state of diminishing returns. It takes more effort to make applications interoperate than to do it manually."

Grady hopes to solve this problem with Rearden Commerce, neé Talaris, a company he founded in 2000 but which has been in stealth mode until now. The goal is to provide an e-commerce platform and service grid based on Web-services and service-oriented architecture (SOA) (SEE **RELEASE 1.0**, DECEMBER 2003) for what he describes as "user-centric computing: an environment in which all your disparate applications, services, devices and content streams interoperate as one meta app and work asynchronously on your behalf."

The concept is not a new one, the company readily concedes: "Others have tried [to do the same], most publicly Microsoft's .Net/Passport/Hailstorm initiatives and HP's eSpeak," he continues. "Both failed, for a number of technical and business model reasons." Just as Trumba (PAGE 79) is utilizing new technologies to implement an old idea (flexible, dynamic calendaring) better, so does Rearden hope to use both

lessons learned from its predecessors and new Web services technologies to succeed where others have failed.

One reason for others' failure, Grady believes, is that they lacked a real-world application to solidify demand and galvanize suppliers. To address this Rearden developed an e-procurement application for employee business services (EBS) including audio and Web conferencing, shipping, dining, courier services and travel. In addition to providing a real-world application of the company's vision, the application, dubbed Rearden EBS, helps "pay the bills and galvanize a network effect," says Grady. It also solves a problem visible to operating executives rather than just to IT staff.

Grady says that in the US alone, businesses spend $1.5 trillion annually on corporate services, with only about 60 percent of that spent with preferred vendors or according to corporate policies. Rearden EBS aims to control that spending. It provides a single interface for a customer's employees to purchase products and corporate services in the context of their own personal preferences (American Airlines, aisle seat; Marriott Hotel, high floor) while also enforcing corporate policy (no first-class flights for *you*, buster!; no meals costing more than $8.75) and using only approved suppliers with negotiated corporate discounts. Any changes in corporate policy or service providers are enforced immediately for all end-users.

Rearden EBS also will help employees make better ad-hoc purchasing decisions by displaying vendor and pricing choices side-by-side: Why send it priority overnight when simple overnight will get it there just three hours later and save the company $20?

Toby Redshaw, VP of technology for Motorola, a customer who uses Rearden EBS for package shipping in the Motorola corporate offices, talks about Rearden like a true believer: "Folks raved about the interface, how much better it was that what we had before. They said, 'Don't take it away! I don't care if it's just a pilot!' And then there were the savings. . . ." Deb Stanton, general manager of global procurement for Whirlpool, another customer, agrees: "I have anecdotal evidence that people are making better decisions. When they use Rearden EBS to ship something, they say, 'I had no idea it was that much money.'" Both Motorola and Whirlpool plan to use other Rearden EBS services.

Rearden is betting that using open standards plus specific apps will help it succeed where eSpeak and others failed. "I would like to see a world where all applications, services, devices and content can get on to the Rearden platform easily," says Grady. "In fact, we may some day open up our API so that we are not our own bottleneck."

Rearden's competitive advantage, says Grady, is the "orchestration of all these services, and a deep understanding of the semantics and ontologies of complex services." Over the last five years, Rearden has abstracted out the common traits of many services and developed what it calls services business language. It has also worked hard to understand the business logic of processes such as booking travel, shipping a package and reserving a conference call. The company has hired a number of the business-process experts including Mark Orttung, former VP of product marketing at Sabre-Holdings' online business-to-business e-commerce unit, and Corey Billington, former VP of supply-chain services at HP. The company also works closely with the major service providers in every sector it serves.

Rearden customers pay an annual fee of $250,000 to $1 million (depending on the size of the company) and $10 per month per user. In addition to Whirlpool, Motorola and HP the company has signed three-to-five-year deals with a number of other as yet undisclosed customers – mostly large enterprises.

The Rearden platform can be a de-facto aggregator of purchasing power for small and medium-size enterprises (SME) as well. In fact, Rearden plans to partner with companies that want to provide its service to SMEs. It already has partnered with HP, which will resell Rearden as part of its business-process outsourcing services.

Siderean Software: Facets of trees

BY DAVID WEINBERGER

*We first covered Siderean Software in last month's issue of **Release 1.0**, "Taxonomies to Tags: From Trees to Piles of Leaves," by David Weinberger. We've reprinted Weinberger's profile of the company here.*

Siderean Software's name refers to sidereal navigation, the art of navigating the ocean by noting the rise and set points of 32 stars. The company literature contrasts its approach with giving the user nothing but a blank search box by which to navigate. The 32 stars become, for Siderean's users, whatever number of facets a project requires to make information findable. But even within Siderean's cutting-edge

faceted categorizations, hierarchical, tree-like taxonomies have not vanished: Open a facet and you may find a tree inside.

In pure faceted classification, all facets are equal: Pick any facet as your root, any other facet as the first branch, etc. That makes systems from companies such as Endeca (PAGE 64) excellent for navigating large, regular data sets such as parts catalogs. Siderean, on the other hand, is especially well suited for more complex schemas that involve complex relationships among the parts, such as a product catalog connected to a database of product developers, a sales team, and a library of technical papers. Building such systems benefits from human understanding and human effort in addition to transforming existing database schemas into facets automatically. (Less than 20 percent of Siderean's revenues come from consulting.)

Founder and CTO Brad Allen was previously the CTO of Limbex, which created the consumer search assistant WebCompass. As an example of Siderean's value, he points to a project at NASA's Jet Propulsion Laboratory. After the Columbia space shuttle tragedy in 2003, it became imperative to break down the walls separating NASA's multiple sources of data. So the consulting company Taxonomy Strategies crawled the NASA data – structured and unstructured – and extracted metadata such as document type, originating organization or person and date. Under the supervision of Jayne Dutra, team leader for Web information architecture and Web content management at JPL, NASA then defined how it wanted users to be able to search the different facets: Abstracts and descriptions should be full-text searchable, organizations should be searchable hierarchically, etc. Siderean represented those rules in an XML document from which its system builds HTML query boxes and menus for end-users to search and browse the documents. As a result, you can refine text searches by clicking on the appropriate facets listed to the left. For example, one specification of the "Missions and Projects" facet might be "Planetary Missions" under which would be listed the Apollo missions – but not the Mercury or Gemini missions, which were restricted to earth orbit.

Old-fashioned, pre-built hierarchies may surface during the search process. For example, says Allen, "If I'm narrowing down on the organization facet I might focus in on NASA center. Under that you would see a list of the different NASA centers. Click on one of those – the Wallops Flight Facility within the Goddard Space Flight Center, for example – and you get the next organizational level." He explains, "Facets can have information in them that is hierarchical or flat."

SIDEREAN SOFTWARE INFO

Headquarters: El Segundo, CA

Founded: July 2001

Employees: 15

Funding: $6 million from Clearstone, InnoCal and Red Rock

Key metric: customers include National Instruments, Environmental Health News and Fortunoff

URL: www.siderean.com

Adding the hierarchical information takes longer than simply setting up the faceted system, so Siderean sometimes delivers a purely faceted system first and then incrementally adds hierarchical elements. "Either or both can be effective in helping people focus their results," says Allen. Although the company occasionally goes head to head with Endeca, Allen does not see the companies as direct competitors. Much of Endeca's business comes from large e-commerce sites, while Siderean focuses on sales and marketing applications within retail, manufacturing and financial services, as well as applications within publishing, government and education. Less than 20 percent of its revenue comes from consulting.

Trumba: Capturing time

EVDB (PAGE 62) plans to help users discover events they might be interested in: a meeting, a reading by a favorite author, a competitor's event. Trumba is a personal tool that will help users schedule and manage those official events as well as things they already know about and should remember – the micro-events in their personal lives such as babysitters, doctor's appointments, PTA meetings, business meetings. It also enables users to share their schedules with family, friends and colleagues. Just as photo-sharing sites help users organize and share photos of the past, Trumba will help users organize and share their time in the (near) future.

The company was co-founded by CEO Jeremy Jaech, VP of product development Ted Johnson and chief software architect Peter Mullen. All three previously worked together at Visio, which Jaech and Johnson co-founded in 1990 and sold to Microsoft in 2000. A few years later, Jaech and Johnson decided to get the team back together for a new project. "We both came out of corporate environment, where we had good administrative support," recalls Jaech. As independent entrepreneurs, "we no longer had it. So we hit upon calendar management as a need that was probably more pervasive than just for the two of us."

The basic premise is not new: Companies such as When.com (acquired by AOL in 1999) and services such as Yahoo! Calendar offer much of the same functionality as Trumba. But Trumba is taking those early efforts and building a more sophisticated and flexible tool that takes advantage of broadband connectivity, mobile-device applications and the Microsoft .Net framework. "Just as we did with Visio, we are taking technology that is ready for prime time and making it happen," says Jaech.

Trumba's central strategy is to pull as many events as possible into a single place (Trumba's hosted database), and then help users find the events, add them to their

calendars and share them with others. While some of this is possible with group calendars on Yahoo! groups or by setting up multiple Outlook folders, the Trumba user interface and features make it much easier to create, share and manage many different calendar views – family, professional, bowling league and so on – with small groups of people. Calendar owners have full control over who can view or edit particular parts of their calendars and the ability to send e-mail or cell-phone text message notifications of upcoming events.

Also, says Jaech, "It's not a walled garden. We don't require that everyone who's a participant in the groups be part of our world [as Yahoo! does]. Even if you're not a Trumba subscriber, you can take a group event and stick it in your Outlook, MSN, iCal or other calendar and that's fine with us." At the moment, Trumba users can synch their calendars to Outlook and send meeting requests to iCal or MSN Calendar. The company plans to add hooks to a few other interfaces, and may even build its own standalone client for customers who don't use other offline schedule-management applications such as Outlook or iCal.

Its customers include a variety of kinds of groups, from busy families to the local VFW hall to events-listings sites to large organizations that have their own calendaring systems but want to offer their members an easy way to add events to their personal calendars. "Eventually we'll offer our customers an XML stream so they can use our events to populate their own calendar on their website," says Jaech.

At the moment the company is just coming out of family-and-friends mode, with a soft beta-launch in its native Seattle. It will broaden the beta at PC Forum to all Forum attendees and other "friends," and hopes to launch sometime in June.

The company is still tweaking its business model, says Jaech, but possible revenue streams include Google-style advertising on Trumba-hosted calendar sites, subscription fees for premium services including turning off ads, and potentially transaction fees for coordinating e-commerce activities such as ticket-purchasing for small events and organizations. "This is for *small* organizations," Jaech stresses. "We're not trying to compete with Ticketmaster!"

So whom are you competing with? we ask. "Paper," Jaech says. "The calendar stuck on the fridge." He relents: "But also Web calendaring. Our first customers will be the early adopters, about half of whom are using Outlook calendaring. About 15 percent are using Yahoo! Calendar. It'll take some time to move people."

Roundtable Discussion: Metadata is the New Content

BY ESTHER DYSON AND DAVID WEINBERGER

This roundtable takes the Forum into the future of user-generated metadata, in a format that reflects the topic. The users – i.e. the audience – will generate most of the content, while the moderators – **Release 1.0** *contributor David Weinberger and Esther Dyson – will serve mostly to assess the metadata – who's raising her hand? Who's hogging the floor and getting too* much *attention? – keep order and reflect the content back to the users.*

The traditional Web was a structure that supported pieces of content. You could find content by its attributes or by their location in a data structure, whether a traditional topic taxonomy or a relational database with rows and columns. In the new world, what matters is the web *between* the pieces: the links among different chunks of content, the social relationships surrounding the people (Friendster, LinkedIn, Orkut, HotorNot, Tickle, Eurekster et al.), the photos (Flickr and Mappr), the blogs (Persuadio and Technorati) and even the bookmarks (del.icio.us). There's a whole metastructure with its own potential structure just waiting to be mined, in which the chunks of content are embedded.

For practical purposes, Google started things off by using authors' and webmasters' links (and lots of derivative data) to determine content's "Page rank." Rather than use some abstract, relatively static score that's the same for any user, we now use more time-sensitive metrics and attention metadata to define the relationships implicit in our content and its relevance to individuals. Such user-generated metadata, both implicit and explicit, comprises everything from tags and trackbacks to attention data concerning who likes what and who likes whom, and the implicit trail of data every time you view a photo or don't follow a link.

Tags are the latest craze to sweep the Net. (SEE **RELEASE 1.0**, FEBRUARY 2005.) If they catch on beyond the quickly growing list of apps now embracing them, they could invert the taxonomic apple cart. Instead of categories being created by authorities and those who own the information, each end-user can create her own. If users can see how others have tagged the same resources, a folksonomy – a bottom-up taxonomy (or even ontology) – emerges.

Tagging may achieve some part of the dream of the Semantic Web without all the fuss and engineering. (SEE **RELEASE 1.0**, JANUARY AND FEBRUARY 2003.) But we still need

interoperable application modules and functions (SEE REARDEN COMMERCE, PAGE 75) as well as tags to make it come alive.

Indeed, as we flood the Web with user-created tags and metadata, we may make a big mess. What social conventions and applications could help to make the mess more useful? For example, tags should be "better" than domain names precisely because no one owns them – as long as we can keep the copyright lawyers from claiming (in some sense) brand-name tags. But will bottom-up efforts suffice to adjudicate or avoid conflicts?

Then there are all the scaling issues, which may be solved by (loose) hierarchies (or at least subdivisions) after all: The intersection of tags and social networks may help to keep tags useful when there are 25 million sites and correspondingly many photos tagged "blog." Right now tags have a "type anything you want" appeal, but typed tags (like typed links) are rearing their heads: Flickr is contemplating an author tag and a place tag, for example.

All this raises bigger issues, too. Change the metadata rules and you've changed the rules for knowledge: What's a topic and how are topics related? The tree of knowledge is becoming a big pile of leaves. Often we understand and trust content because of its position in a hierarchy that has been put together by authorities we trust. Perhaps we must learn to trust our own branches. There is no central root; the center is within and among us. ■ R 1.0

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Calendar of High-Tech Events

APRIL 2-5   **e-Learning 2005** - Dallas, TX. e-Learning 2005 is the annual conference for distance learning faculty, and instructional designers, media specialists, Web course designers, and anyone interested in learning about the IT in Education market. e-Learning 2005 will feature pre-conference workshops, keynote speakers, and vendors exhibiting the latest e-learning technologies and services, and more than 60 one-hour concurrent sessions. To register, visit the site or contact Christine Mullins, 1 (202) 293-3110, cmullins@itcnetwork.org. www.itcnetwork.org

APRIL 5-6   **Open Source Business Conference** - San Francisco, CA. The OSBC will detail best-practice strategies for leveraging open source as a business tool and identify recent open source trends in IT spending. New this year will be a track dedicated to the CIO, in which attendees will learn how to develop and implement open source to generate control and flexibility in IT. Register online or contact Debbie Diodati, 1 (508) 424-4847, debbie_diodati@idg.com, with registration questions. www.osbc.com

APRIL 17-19   **TIE 2005** - Rapid City, SD. This will be the 19th annual Technology & Innovations in Education conference, offering practical, technology-integrated workshops and presentations for those interested in implementing the use of technology in education, or exploring the market. Approximately 30 Sunday pre-conference indepth sessions, 180 Monday-Tuesday general sessions, and 100 state-of-the-art curriculum, equipment and software exhibits are offered. Register on the site or contact Dr. James Parry, 1 (605) 394-1876, jparry@tie.net. www.tie.net

APRIL 18-21   **Systems & Software Techology Conference** - Salt Lake City, UT. The SSTC represents the convergence of the Department of Defense's tactical and non-tactical information systems, and software technologies. To register visit the website. www.stc-online.org

APRIL 25-27   **AD:TECH** - San Francisco, CA. More than ever, on-going interaction between brands and consumers is required if advertisers are to stay relevant and provide value. AD:TECH's Conference and Expo captures the insights, tools and techniques that today's business and marketing leaders need to profit from these transitional times. Keynote speakers include John Costello, Brian McAndrews and Esther Dyson. Register via the site, or call Joelle Coretti, 1 (203) 371-6322 x209. www.ad-tech.com **E**

MAY 1-5   **NetWorld+Interop** - Las Vegas, NV. This event offers a deep focus on networking innovation areas within the context of the end-to-end network. Sign up for registration information online or contact Valerie Leader, 1 (415) 905-2643, valerie@interop.net. www.interop.com

MAY 2-7   **DallasCon 2005** - Dallas, TX. This Professional Cyber Defense Conference is in its 4th year, and focusing on a practical approach to Network and Wireless Security geared to technical professionals. Current topics to be covered include: VOIP Security, Wireless Hacking, Network Penetration, Encryption and more. Attendees will enjoy four days of intense training, followed by two days of informative discussion. Register via the website or contact Darius Peikari, 1 (775) 278-8911, dpeikari@dallascon.com. www.dallascon.com

Calendar of High-Tech Events

MAY 5-6   **WITI 2005 National Conference** - Los Angeles, CA. This year, the Women in Technology International conference will focus on the effect the Internet and Sarbanes-Oxley have had on forcing companies to look at their corporate structure, and question why compliance-driven programs are not working. To register visit the website or call 1 (818) 788-9484. www.witi.com

MAY 9-12   **Digital ID World 2005** - San Francisco, CA. Digital ID World 2005 is the premier event for the emerging identity management industry, with over 80 hours of strategic and practical implementation workshops, tutorials and panels designed to arm participants with the knowledge and perspective required to succeed in today's increasingly challenging and hostile networked environment. Speakers include Stratton Sclavos, Phil Becker and Doc Searls. Register online, or call 1 (303) 663-7317. conference.digitalidworld.com/2005/ e

MAY 15-17   **AeA Micro Cap** - Monterey, CA. This will be the 7th year for the conference, which continues to be a highly efficient forum for bringing company executives and investors together in a time and cost efficient venue. Register for one or both days via the site, or contact Tina Morais, 1 (408) 987-4234, cristina_morais@aeanet.org. www.aeanet.org/MicroCap

MAY 24-25   **SIIA Enterprise Software Summit** - Universal City, CA. For 20 years, SIIA has brought software executives together to debate the challenges, opportunities and evolving landscape of the industry. For more information or to register, visit the site. Questions/comments contact Anika King, 1 (202) 789-4463. www.siia.net/ess/2005

JUNE 1-3   **Wireless Community Conference** - Monterey, CA. This Conference covers the latest information in wireless technology and its use in the classroom, field and research settings, offering attendees hands-on demonstrations with industry experts, workshop sessions on the latest 802.11 technologies, panels and forums with leaders in the world of mobility, and e-Learning on campus and in the community. Register on the site or contact Karen Letendre, 1 (831) 582-5384, karen_letendre@csumb.edu, with further questions. wetec.csumb.edu/WeTEC_conference.htm

JUNE 13-16   **AeA & Santa Clara University Management Development Program** - Santa Clara, CA. For over 25 years the AeA & Santa Clara Management Development Program has worked with managers and directors of high tech companies, teaching new managers core business disciplines and effective management techniques to lead the innovation process and high performance work teams. Participants learn skills that improve productivity, collaboration and business strategy from the faculty of Santa Clara University's Leavey School of Business, located in the heart of Silicon Valley. Register via the site, or for more information contact Jeannine Seremi-Banayat, 1 (408) 987-4276, executivedevelopment@aeanet.org. www.aeanet.org/Education/HRST100_SCUStart.asp

Calendar of High-Tech Events

JULY 19-21   **Innovation Summit @ Stanford University** - Stanford, CA. The Innovation Summit features executive speakers who are some of the most powerful players in technology, government, and the social sector. Previous speakers included Sergey Brin (Google), Rob Glaser (RealNetworks), Michael Powell (FCC Chairman), Ronnie Lott (Baseball Hall of Famer) and Mark Benioff (Salesforce.com). Register via the website. Contact Kathy Osweiler with any questions at 1 (415) 751-0170, kathy@alwayson-network.com. www.alwayson-network.com/events

AUGUST 1-5   **OSCON 2005** - Portland, OR. OSCON, or the O'Reilly Open Source Convention, will be held at the Oregon Convention Center, where participants will enjoy tutorials, sessions, parties, BOFs, and a huge exhibit hall. The Call for Proposals is now open, and registration and hotel information will be available soon. Get the details as soon as they have them by signing up for the OSCON newsletter via the website. Or contact Andrew Calvo for more information at 1 (707) 827-7176, andrewc@oreilly.com. conferences.oreillynet.com/os2005

AUGUST 7-18   **AeA & Stanford Executive Institute** - Stanford, CA. This conference is designed for technology executives with a minimum of 10 years of management experience. Eleven nationally distinguished faculty, known for their award-winning research and collaboration with high tech companies, teach advanced business and leadership disciplines and lead discussions on today's top industry challenges. Participants learn new perspectives from industry experts and accomplished colleagues from around the world. Register via the site, or for more information contact Jeannine Seremi-Banayat, 1 (408) 987-4276, executivedevelopment@aeanet.org. www.aeanet.org/Education/HRAP100_StanfordIntro.asp?bhcp=1

SEPTEMBER 13-15   **The Delphi Proving Ground. . .** - Boston, MA. . . .for Taxonomy & Information Architecture. This is a results-oriented workshop in in which participants interact with senior Delphi Information Architecture and Taxonomy faculty. The group workshop setting offers the chance to hear about other teams strategy and design ideas, which are likely to challenge and encourage your team to strive for next-level results as you work toward goals. Registration can be done via the site, or by calling 1 (800) 335-7440. www.delphigroup.com/events/taxonomy-pg/index.htm

OCTOBER 19-2   **Pop!Tech 2005** - Camden, ME This event is an intellectual and creative conference that explores the social impact of technology and the shape of things to come. To register, visit the website, or for more information call the Camden Technology Conference info line at 1 (207) 230-2425. www.camcon.org

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E   Events Esther plans to attend.

Lack of a symbol is no indication of lack of merit. The full, current calendar is available on our website, www.release1-0.com. Please contact Kate Tobin (kate@edventure.com) to let us know about other events we should include.

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