Lucent
magazine

Let The Networking R/Evolution Begin
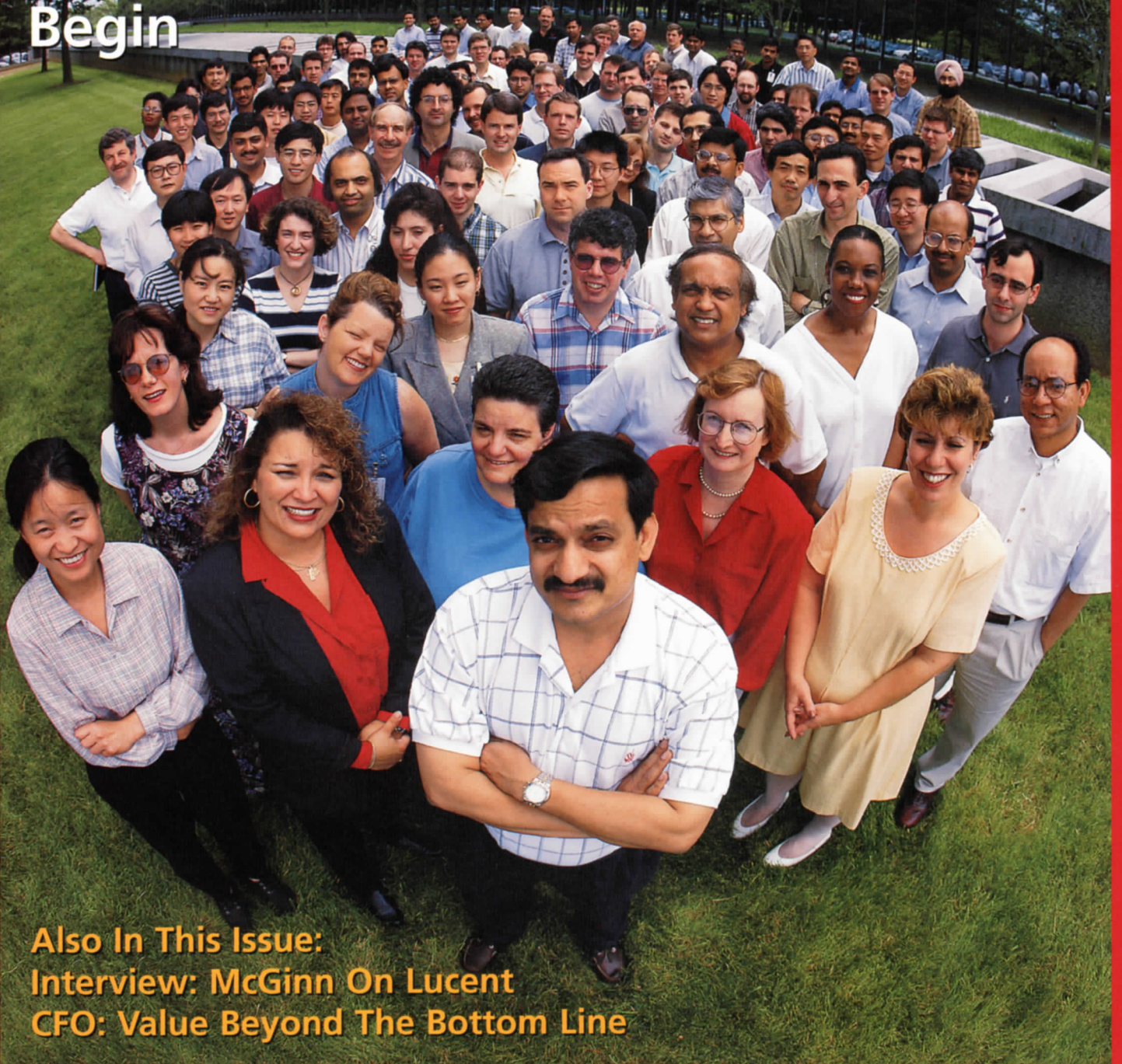
A Speedy Symbol

Lucent Technologies is an associate sponsor of BellSouth's NASCAR Winston Cup Circuit Car No. 42 driven by Joe Nemechek. The high-tech racing car represents the GROWS values in the BellSouth region — Growth in our business with BellSouth; Results-focused in becoming a winning team; Obsessed with our Customer BellSouth and our Competition; a Workplace that's open, supportive and diverse (especially in thinking in new ways); and — what else? — Speed.
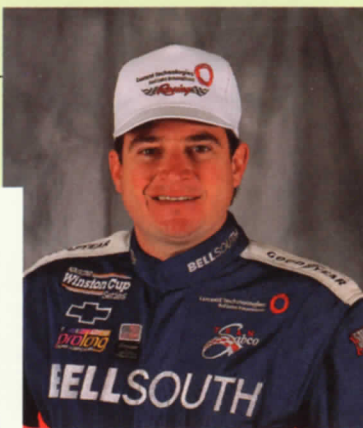
Still a Good Idea

I read the article entitled "Central Office In a Box" in the May issue of Lucent Magazine with great interest. I'm glad to see a good, idea reused to meet customers' needs. Back in 1973 we did the same thing with the No. 2 ESS Switch and called it the 2A ESS. Switching equipment was installed in "modules" and tested at the factory. The modules were loaded on flatbed trucks using air pallets. The modules were delivered to the customer's site where they were placed on concrete footings, then reconnected and retested. The customer had a functioning central office quickly.

Tim Kloth
Naperville, Ill.

Professional Pizzazz

The first time I saw Lucent Magazine was two months ago when I joined the company. I was very impressed with its graphic design. I think that professional presentation is as important as content. I particularly like the articles that deal with technical novelties, for example, "Breakthrough in Bandwidth" in the April issue.

Karol Buras
Bydgoszcz, Poland

Wondering About Y2K

The articles in Lucent Magazine are relevant, timely and interesting. Of particular interest was the recent article on Y2K ("Digital Dilemma: Year 2000," March 1998). I would like to learn more, especially as we get closer to the new millennium.

Lorraine Snowman
Whippany, N.J.

Communicating Culture

Lucent Magazine is an effective way to communicate not only the key messages, goals and stories of the company, but also its culture. In Global Commercial Markets, we include Lucent Magazine in our new-employee package — both the most recent copy and the November 1997 issue, which explains Lucent GROWS. Thank you for a great magazine.

Lynn Hughes
Lisle, Ill.

The Right Stuff

I'd like to acknowledge the energy, spirit and quick thinking of Larry Haines, Communications Workers of America area representative and installer, who responded to an accident in the parking lot of our facility recently. A driver in a sports utility vehicle was broadsided and tipped over by another vehicle. (Neither driver was a Lucent employee.) When Larry got to the car, he found a woman bleeding and wrapped around the steering wheel. He comforted her, checked for injuries and dialed 911, reassuring her until the paramedics came. It was one of those emergency situations where a person like Larry, who can act quickly and efficiently, is much appreciated.

Robb Alongi
Hayward, Calif.

Write to Us

Please share your opinions about Lucent Magazine with us by sending letters to:
Lucent Magazine
Editor - Rm. 2B515A
Lucent Technologies
600 Mountain Avenue
Murray Hill, N.J. 07974
dvanatta@lucent.com

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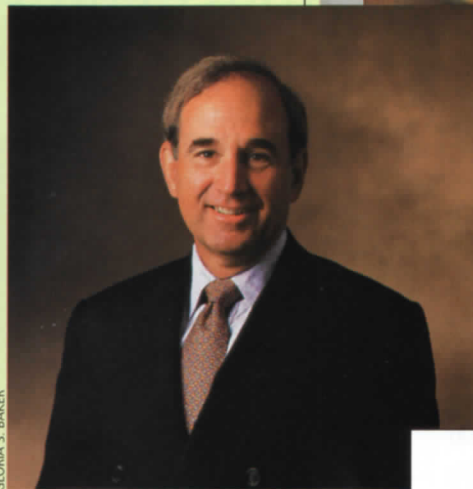
GLORIA S. BAKER

On the cover:
Ready to do battle in Lucent's communi-
cations networking R/Evolution are Vijay
Kumar (front) and his team, which helped
bring the *PacketStar* IP Switch from con-
cept to trial in just 12 months.

Cover photography: Roger Tully

"Als medewerker bij Lucent Technologies
help ik communicatie in Nederland op
grotere hoogte te brengen."

Jan Neuteboom, Manager Software Development

We Intend Networking

As Rich McGinn completes his first six months as CEO ... Lucent asserts leadership in networks of the future ... And customers rewrite their plans, and competitors morph weekly ...

We recently sat across a table in McGinn's Murray Hill, N.J., office and recorded the chairman and CEO's thoughts on Lucent's strategic direction, our amazingly fast-moving and competitive industry and what it will take to keep Lucent's star shining brightly in the future.

How should we think about Lucent today?

Differently. We're at the beginning of a new phase, beyond the start-up. We achieved our independence and gained some solid, directionally correct business results so far. We made history. But we must view Lucent today in terms of the future. What kind of company do we want to become? The answer is a company that knows how to grow and take market share; a company that moves quickly and does everything with customers in mind; a global company with a multilocal culture, a company that's at home in many countries. As much as we've accomplished — and we've made some important wins — we still have a way to go to become that company.

What recent achievements stand out in your mind?

Clearly there's good news in our customer wins. In Bell Atlantic, we've had cumulative sales of $700 million just since March of

> "The U.S. market for our products is huge — nearly 40 percent of the world total. But 60 percent of our potential business lies outside the U.S. Our growth must come from all over the world."
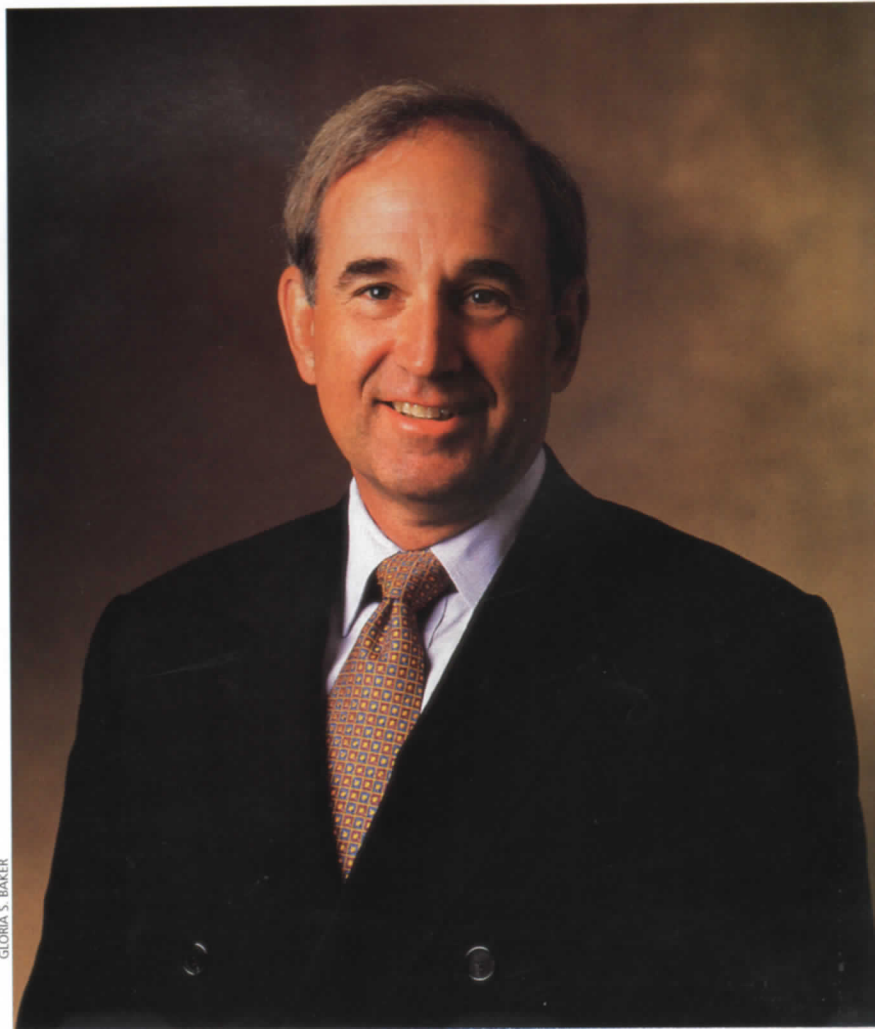
GLORIA S. BAKER

to Lead the R/Evolution...

this year. And this is to help Bell Atlantic take care of its future. It wants more capability to provide networking that will carry both voice and data services in its region. In Japan, NTT has turned to us for a major national network, including "fiber to the curb." This will replace copper cable with fiber throughout most of NTT's subscriber system. So that's big. We enable NTT to set a new global standard for multimedia networks, and we show Lucent's leadership in optical networking. We've also enjoyed major successes in optical networking with British Telecom, China's Ministry of Post and Telecommunications, Teleport Communications Group, Dacom in Korea and others. Optical networking is vital to our future — moving communications out of electronics and into lightwaves.

In wireless, I'm particularly proud that two major customers — PrimeCo and Sprint PCS — awarded us significant second contracts based on our excellent execution, premier reliability and performance. That's the kind of long-term relationship building that should be the hallmark of our enterprise.

And by the way, those customers I cited reflect an expanding, global customer base. This is vital. The U.S. market for our products is huge — nearly 40 percent of the world total. But 60 percent of our potential business lies outside the U.S. Our growth must come from all over the world.

What's the greatest challenge we face in the marketplace?
As always, the greatest challenge we face is also our greatest opportunity — data networking. There's a revolution in networking taking place. Voice networking is growing at 14 percent a year in the United States and is still 25 to 30 times as large as all the data traffic on the Internet. But the Internet is tripling in size each year. We've moved quickly on our commitment to position ourselves for leadership in data networking.

However, we realize that the future is not in data networking alone; the future is in communications networking, which relies on data networking technology. That's Lucent's space. Our plan is to offer both service providers and enterprise customers a full range of solutions — communications networks built on the most advanced optical systems, offering optimum bandwidth for both voice and data communications with unequaled reliability. Now Lucent is helping the industry move toward converged voice and data networks with packets, instead of circuits, as the fundamental networking unit.

So our challenge is to provide a complete set of offers that fill that space — communications networking — as quickly as possible. So far we're doing a good job of stepping up to the challenge, of developing data networks as reliable and robust as voice.

What is our present data networking strategy?
The strategy is a combination of internal development and external acquisitions to fill gaps. I'm proud of the R&D team that in 12 months got the *PacketStar IP Switch* to market; and *PathStar Access Server*, which offers more reliability than any routing switch out there; and both products with all the software needed to channel sophisticated voice features over packet networks. These products show that Lucent intends not just to play in but to lead the networking revolution.

In May, just before SuperComm '98, one of our industry's largest U.S. trade shows, we announced a set of systems that will evolve existing voice networks to work with the Internet protocol, or IP, a contemporary packet-networking technology. MCI will soon be testing it. Our offer will bring the reliability of the evolving, merged network up to the level of voice networking. In the next 24 months, we will demonstrate how to make a voice call across data networks, how to do the right kind of billing across these networks, and how to handle the signaling for a data call and voice call — all on a large scale.

We're effectively filling in the gaps in our data networking capability through acquisitions. Steve Willens and his team from Livingston brought us remote access networking solutions; Menachem Abraham and his Prominet team added high-speed Ethernet capabilities; and Jeong Kim and his Yurie Systems team filled a need in asynchronous transfer mode (ATM) access equipment for wide area networks. And we've announced plans to purchase LANNET. Based in Israel, LANNET makes high-capacity, high-speed switches for local area networks.

Thanks to these acquisitions, we're now in the market with a

By Focusing o and Thin

"Every week, new customers emerge in Lucent's market space.

Every week familiar customers scrap

their business plans and write new ones."

complete offer to do IP networking, either from scratch if a service provider is starting that way or by evolving networks that have so far been primarily circuit-switched. And I'm proud to add that the Yurie deal took just over three weeks to close from the day we proposed it. These acquisitions show we can move with speed and be at the front of the market.

What concerns you about the competition?

We have some very serious, worthy competitors. We have to take aim. One competitor recently called us an "old-world company," implying that we could not lead this networking revolution. These are words we have to post on our virtual locker room wall. In reality, Lucent has been a founder of the emerging new world — in data networking, in wireless and in optical networks. We know the new world is going to look very different. It's not going to look like today's data networking world but, again, it's going to be a communications networking world. And as the world moves to communications networking the game moves to our turf. So I have to thank our worthy competitor for providing the kind of fighting words that should inspire us all.

Do you think we're an entrepreneurial company...with a Silicon Valley spirit?

Enterprise is not limited to Silicon Valley. Gerry Butters (Optical Networking Group President) will tell you that New Jersey is in the heart of Photon Valley, and that photonics is crucial to the future of communications networking. Our recent breakthroughs in optical networking [delivering record-breaking capacity well ahead of what others are offering] and in data networking [the first intelligent routing capabilities, enabling data and voice to be sent over packet networks with unequaled reliability] show we are enterprising and can display this spirit.

What can employees do to help Lucent grow?

The essence of enterprise is for every employee to act like an owner. We already have the Lucent Global Founders' Grant, which extends stock options to most Lucent employees. It makes Lucent's success the source of personal success. One of the best things about the contract we've negotiated with the International Brotherhood of Electrical Workers and the Communications Workers of America in the United States is that now virtually all Lucent

employees will share personally, financially in the company's growth. Nearly a third of Lucent people who didn't have them before will get performance awards. Our goal in compensation is to ensure that as Lucent prospers, our employees prosper.

What do you expect Lucent people to do differently as owners?

My mantra is focus more on customers and act with more speed. I'm into behaviors: I want our day-to-day behaviors to reflect customer focus and speed. We have a way to go. I love the new Lucent intranet site and the interactive nature of it. But I was shocked to see in a recent survey that 26,000 people think we are acting with appropriate speed and customer focus. As John Dickson (Microelectronics Group President) often says, if most people think we're doing pretty well, then there's no reason to change.

My job is to persuade people that we have a crisis on our hands. I'm grateful for every bit of the success I've mentioned. And I'm grateful for the double-digit growth we've shown recently — above 20 percent year over year. But I believe we face a serious challenge. We have to learn to grow at rates comparable to others in our industry. In data networking, Cisco grew at 70 percent per year from 1995 to 1997. Microsoft, which is getting into Internet support, grew at 38 percent a year. Ericsson, based on its wireless technology, grew at 30 percent per year. That's the league we play in.

n Customers
king Like Owners

While the clean room equipment was being retooled, Rich McGinn recently visited the Integrated Photonic Research Group's SLIM Line lab in Murray Hill, N.J. The team designs and fabricates integrated glass waveguide structures, on silicon, to separate and route lightwaves emerging from optical fiber.

Why do you see speed and customer focus as such central behaviors?

Look at the market. One day Tellabs joins with Ciena — a data networking competitor becoming stronger by acquiring an optical networking competitor. The next week, Sprint announces it will adopt a new networking model, and build it now. A week after that, Nortel acquires Bay Networks — a supplier of public networking absorbing a major data networking supplier. And every week, new customers emerge into Lucent's market space. Every week, familiar customers scrap their business plans and write new ones.

I can't overstate the importance of rapid response to customer needs. It's fundamental. Without speed and customer focus we won't succeed. I'll say it again: We have to improve our baseline performance. Competitors who know how to grow have set a very high standard. Lucent has to meet the standard.

Any closing thoughts?

Despite the cultural changes we're making and the challenges we still face, there's much about our past — like an insistence on integrity and a respect for individuals — that we must retain. That includes a management team that's fair and demanding — always demanding more of themselves — and an environment in which we can discuss issues openly. Lucent's people are terrific. Our people were passionate about launching the corporation. Now we have to be equally passionate about committing to growth. And we have to acquire and retain talented Lucent people to make this happen. One thing I'm very happy about and I'm constantly telling people is that in a recent survey, 94 percent of employees said they would recommend Lucent as a place to work. With that kind of spirit, we can take on the world. **O**

— Blanchard Hiatt

Lucent Offers Rev Up
Networking
R/Evolution

A networking revolution is under way.

No one is sure about the exact makeup of the communications network of the future. But everyone agrees that the line between voice and data networking is blurring. Lucent, determined to pave the way for evolving networks and their customers, intends to bring clarity by combining the best features of both.

Savvy consumers are looking beyond the circuit-switched phone network for cheaper options in long-distance calling. Companies, moving more and more data, are seeking virtual private network services because they are more secure and reliable than the public Internet and more economical than leased lines. And service providers are adapting, evolving and changing their existing networks to better compete.

Lucent's revolutionary and evolutionary networking products touched down at SuperComm '98, the industry's largest annual North American trade show. A powerful Internet Protocol portfolio helped draw standing-room-only crowds to the booth.

R/Evolutionary networking

Let's Start a R/Evolution

To accelerate the networking revolution, Lucent recently introduced a powerful portfolio of networking products based on the language of the Internet — for service providers.

Voila! Now service providers can offer carrier-class Internetworking to their business customers. Businesses can save needed dollars in their data operations by using a secure and reliable public data network. And consumers can get better quality and more varied services. In short, Lucent's new Internet Protocol (IP) portfolio promises to fundamentally change the way data, voice and video are handled in evolving public networks.

The Promise of Packets

Data traffic (such as fax, Web-surfing and modem traffic) has been riding on circuit-switched voice networks. But it's inherently more efficient to transport that traffic in "packets" (which can be portrayed as envelopes carrying digital information). So data traffic is now moving onto packet data networks. And with packets now also able to carry voice, more and more real-time traffic (Internet telephony, Internet call centers and video transmissions) is following in close pursuit.

Established service providers can no longer afford to maintain separate networks, one overlaid on top of another. They want to build a reliable data backbone so they can provide revenue-generating data services. And they also want to leverage their existing equipment while taking advantage of the latest developments in the fast-rising packet technology called IP and in optical networking. In addition, competition and deregulation have brought in new service providers that are building single IP networks for voice, video and data from scratch.

But even with all the promise of IP, today's data networks are notoriously congested, unreliable and inflexible. Routers, the key node in today's IP networks, lack the intelligence, quality-of-service capabilities and sophistication that network managers need. Data networks must be as reliable as voice networks.

Data networking makes up a $6 billion market in the Asia/Pacific region, and $3 billion of that lies in Japan, according to industry estimates. At Networld+Interop '98 in Japan, Lucent announced its new data networking offer to the region.

CALVIN CHAN

By focusing on service providers' needs, Lucent has moved the game onto its own turf, said Carly Fiorina, group president, Global Service Provider Business. The service provider market for IP equipment is growing more than 25 percent a year, she said, and will reach $20 billion by 2001. "We have a real opportunity to lead this business because of the relationships we have with service providers around the world. Lucent, the one company that understands networks better than anyone else, intends to lead the network revolution."

Service providers need a data network as reliable, secure and easy to manage as their voice network. And, Fiorina added, they require the professional support that may be the top unmet need of data networking customers.

Lucent's portfolio brings breakthrough IP networking by introducing next-generation carrier-class IP networking products. For example:

• *PacketStar* **IP Switch.** A next-generation wide-area-network routing switch with capacity of up to 32 million packets per second, this product goes far beyond the performance of traditional routers.

It manages data in a way that accommodates different levels of customer needs, from those of the casual Internet user to the business with critical data applications. These capabilities are critical to delivering extensive telephony and fax services over large-scale IP networks, and data and video over IP and virtual private networks.

Target customers are carriers, Internet backbone providers, Internet service providers and large private network operators. MCI will evaluate the product.

"IP router networks today operate on best effort," said Vikram Karmarkar, director, IP networking, product management and marketing, Data Networking Systems (DNS). "They cannot distinguish between those packets that are part of a high-bandwidth service and those that are part of a low-bandwidth service. Everything is mixed into the data stream. End users can only send and pray that everything will get through reliably."

As more real-time voice and video, and more critical data applications move on to IP networks, it becomes imperative that packets are not dropped and re-sent later.

The *PacketStar* IP Switch changes

this picture. It enables a service provider — for the first time — to guarantee and price many different levels of IP service, said Bill O'Shea, group president, DNS. "A sales department that wants a premium, guaranteed level of service daily may pay a few hundred dollars per month. The real estate department requiring a certain level of assured bandwidth performance between 8 a.m. and 5 p.m. might pay $50 per month, and the 14-year-old who wants to browse Web sites on the actor Leonardo Di Caprio can continue with 'best-effort' routing at $21.95 per month. The latter gets that best effort, after the premium service subscriber's needs are met."

• *PathStar* **Access Server.** Acting as a central office switch-router for the IP world, this is a new class of product. As an access device, said Tony Scarfo, director, IP networking, DNS, it enables network operators to offer low-cost, reliable voice and data services over IP networks to customers connected to public networks through copper loops. This product meets the needs of carriers expanding into new areas, competitive entrants building IP networks, service providers wanting new data services capacity or Internet service providers offering standards-based Internet-telephony services. The access server is also the only IP-based product that offers direct access to the standard copper wire-based local loop, which means operators may spend half of what they'd normally pay for multiple products. The product supports direct plain old telephone service, integrated services digital network and digital subscriber loop access without requiring a circuit switch.

Other Lucent offerings make it cost-effective and efficient to move voice and voice-related services over IP networks. They include:

• *PacketStar* **Gateway Solution.** This product consists of a voice gateway, which converts voice signals into IP or asynchro-

Yurie Adds ATM Access Technology To Lucent's Growing Data Networking Portfolio

Weeks before Lucent's $1 billion acquisition of Yurie Systems was complete, Jeong Kim, former chairman, had already ordered his Lucent business card. That card reads, "President, Carrier Networks, Data Networking Systems, Lucent Technologies."

Why the excitement? "I think Lucent may be the only company with a chance of blocking the top data networking company," said Kim in a recent phone interview from the group's main office in Landover, Md. "And I love being part of the team that can make that happen."

Born in Seoul, Korea, Kim came to the United States at age 14. He graduated from Johns Hopkins University in three years, with a degree in electrical engineering and computer science, became an officer in the U.S. Navy, then earned a doctorate in engineering from the University of Maryland in two years.

After working with Allied Signal Corp., he formed Yurie (named after his daughter) in 1992 and built it into a leading ATM (asynchronous transfer mode) access equipment company — with 238 employees and $51 million in revenues. *Business Week* magazine recognized Yurie as the No. 1 Hot Growth Company in 1997.


"Yurie was early to market with a leadership product in a market that's about to explode from $100 million in annual sales today to $600 million by 2000," said Bill O'Shea, group president, Data Networking Systems.

Kim also feels the match is right. He was struck by the fact that Lucent made the offer in such a quick and decisive way. "That was a very clear statement that top management is committed to being aggressive in the data networking business," he said. "When time to market is key, talk is cheap; it's really your actions and behavior that make the difference."

As for Kim's 237 colleagues, they're excited about the prospect of winning in the marketplace, he said. "What they're most interested in is the chance for our systems to be used more widely, because they've spent years developing the equipment — it's their baby." Now they get to work with Bell Labs, he said, to find ways to leverage that technology into the product line.

— *Shirley Chan*
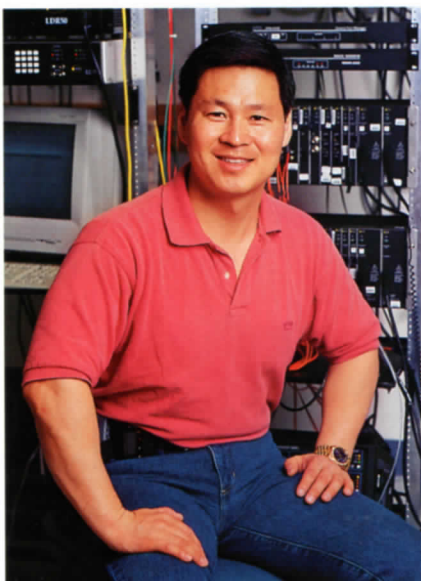
Jeong Kim, founder of Yurie Systems, now carries business cards with the Lucent logo.

Data Networking Competitors at a Glance

Ascend Communications

- Develops, manufactures and sells wide-area networking solutions for telecommunications carriers, Internet service providers and businesses.

- Corporate headquarters: Alameda, Calif.

- Number of employees: approx. 2,000

- 1997 net sales: $1.17 billion (up from $890.3 million in 1996).

Bay Networks
(being acquired by Nortel)

- Offers frame and ATM switches, routers, shared media, remote and Internet access solutions, IP services and network management applications. Products for corporate enterprises, service providers and telecommunications carriers.

- Corporate headquarters: Santa Clara, Calif. (Nortel is based in Toronto, Canada.)

- Number of employees: approx. 7,000 (Nortel has 73,000 employees.)

- 1997 revenue: $2.09 billion (up from $2.06 billion in 1996). (Nortel's 1997 revenue was $15.45 billion.)

Cisco Systems

- Offers networking solutions such as routers, local- and wide-area network switches, dial and other access solutions, Web site management tools, Internet appliances and network management software.

- Corporate headquarters: San Jose, Calif.

- Number of employees: approx. 13,000

- Fiscal 1997 revenue: $6.44 billion (up from $4.10 billion in 1996)

nous transfer mode packets; a signaling gateway, which provides signaling and routing information needed to carry those packets through the network; and a feature server, or a platform for the development of advanced network services. Established phone companies can use the solution to ensure their circuit-switched networks work well with packet networks.

Some of SuperComm's 40,000 attendees visited a display featuring Lucent's *PacketStar* Gateway Solution.

We've also introduced advanced data networking capabilities into our embedded world-class products. For example:

• **5ESS AnyMedia Switch** with an integrated **PortMaster** 4 remote IP access technology. These products enable Lucent's *5ESS* customers, such as the regional Bell operating companies, to offer direct Internet-access service or enhanced services (V.90 modem and ISDN) wholesale to existing Internet service providers. This benefits customers by offering them another way to generate revenue with existing equipment.

• *WaveStar* **Bandwidth Manager.** This offering routes IP, ATM, voice and video traffic. It also integrates all access and transport facilities (IP and ATM switches and routers, add/drop multiplexers and digital cross-connect

systems) into a single network node for service providers. And it saves providers up to 60 percent in equipment costs and up to 85 percent in central office space requirements.

Rounding out the rest of Lucent's IP portfolio are:

• **The** *PacketStar* **Internet Telephony System** (*PacketStar* ITS) 2.0 allows service providers to offer high-quality voice and fax transmission over IP networks using analog phones, faxes and PCs. The product meets the needs of carriers and telephone companies interested in offering consumers inexpensive long-distance rates, as well as telephone companies wanting to use their existing data networks for Internet telephony services.

• **The** *OneVision* **Network Management product family** offers unifying operations support for network operators.

To Market, To Market

Behind the scenes of the high-profile portfolio rollout, Lucent employees adopted a novel teaming approach to quickly bring the products to market. That helps, especially in the data networking business, which continues to evolve at a pace unfamiliar to that of regulated telephony environments.

"Traditionally, a research prototype is handed off to a product group for commercialization," said Wayne Fabricius, vice president, Service Provider Markets, DNS. "But in the case of the *PacketStar* IP Switch, product developers teamed with researchers early on — right after proof of concept — to leverage their knowledge base," he said. "They worked as an integrated, innovative, entrepreneurial team, which, incidentally, is a trend established in the data business."

Key players from Bell Labs moved into DNS to work with people experienced in product design and identifying customer needs. "We broke down traditional boundaries," said Bill Proetta, vice president, Research and Development, Service Provider

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March 9, 1998

Lucent announces the *WaveStar* Bandwidth Manager, which saves communications carriers up to 60 percent in equipment costs. Tyco Submarine Systems will be the first to deploy the system.

April 27, 1998

Lucent to acquire Yurie Systems, a leader in ATM WAN remote access networking, based in Landover, Md.
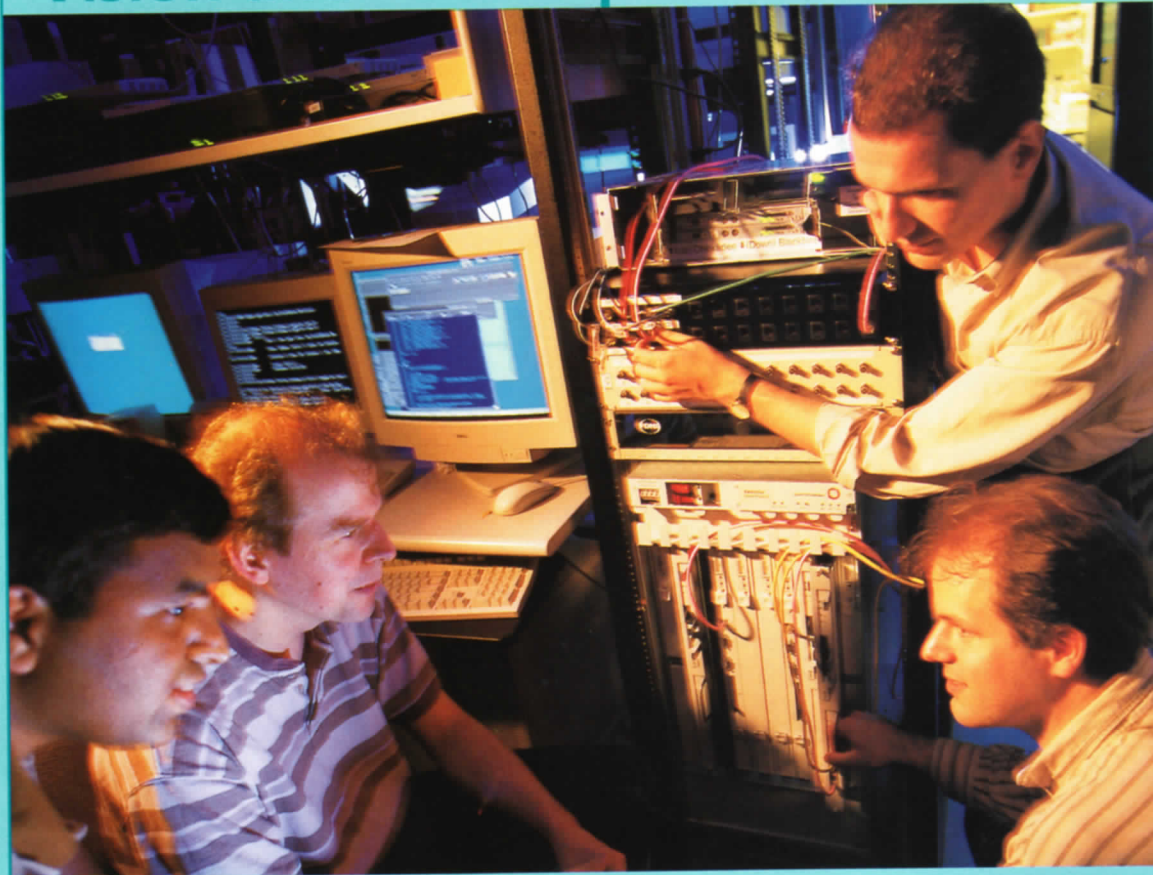
May 5, 1998

Bill O'Shea outlines Lucent's IP strategy to analysts at Networld+Interop '98. DNS announces enhanced voice-over-IP products.

A New Discipline:
Vision and Focus Speed IP Switch to Market

Researchers and developers gained insights from each other on the integrated team that launched Lucent's new Internet Protocol (IP) switch. Shown here are (left to right): Raman Arunachalam, Paul Moster, Dimitrios Stiliadis (top) and Bernhard Suter.

Research interlocked with Product Development in a unique dovetail that quickly brought solid results for the *PacketStar* IP Switch.

Traditionally, a new product starts in the laboratory. "Research builds a prototype as fast as possible to demonstrate a new concept," said Vijay Kumar, director of advanced internetworking systems and head of high-speed networks research. "Then product developers take over. They gather customer requirements, lay out plans and schedules for the product, and push it to the finish."

But on the IP switch, Lucent's focus on speed called for a different approach. A core team of 15 researchers worked together with product developers in Data Networking Systems to bring the product to market. Side by side, Research and Product Development found shortcuts, gained insight from each other, and brought the product from concept to customer trial in 12 months. "Researchers learned the realities of developing a product, such as customer interactions, requirements and external schedules," said Kumar, "and developers learned how to be flexible with changing customer requirements in a rapidly evolving market."

"Compared with making a research prototype, making a product requires a certain discipline," said Dimitrios Stiliadis, a Bell Labs researcher on the IP switch. "I didn't know what that discipline was — until now." Through day-to-day interaction with product development, "you see how people talk, how they think, and you get closer to the product requirements," he said.

"The *PacketStar* switch is a really complicated system, and to see it through to the end we have to take care of every detail — from the look of the box to the factory's needs, to the power supply for the system," said Stiliadis. This was new territory for researchers, he said, who tend to be perfectionists and sometimes become too absorbed in the mathematics of a problem.

While researchers need the focus of the developers, developers need the vision of the researchers. "Early on, a lot of people said the switch was too complex and it couldn't be done," recalls Paul Moster, a device developer for the IP switch, Data Networking Systems.

"Research found a way to pull it off," he said. "By dividing and conquering, they partitioned the task, defined it, and explained how to implement a section of a circuit, for example, so that a developer like me can come in, dig in and go. And their knowledge of the best algorithms and architecture that the world has to offer helped us do something very complex in a very efficient way."

"In bringing a new product to market, it's not whether you meet a research agenda or a development agenda," said Kumar. "But how fast you can convert a breakthrough into a competitive product that customers like."

— *Shirley Chan*

Markets, DNS. "Our subject matter experts interacted directly with customers to gather their requirements for the IP switch. The payoffs were a dramatic cut in cycle time and a product that differentiates itself."

"Customers like our innovations in high-speed IP and quality of service; they wanted our product quickly," said Vijay Kumar, director of advanced internetworking systems and head of high-speed networks research. He credits the work of each and every member of the 80 people on his team. "We worked through problems involving algorithms, architecture and implementation at a good pace," he said. (See related story, page 12.)

Team members brought the *PacketStar* IP Switch from concept to customer trial in just 12 months. And the *PathStar* Access Server moved from concept to product in nine months.

Competitive Context

A year ago, Lucent said it intended to be the leader in data networking. Since then, we've introduced dozens of products in this space. We've acquired Livingston Enterprises, Prominet Corp. and Yurie Systems, and we are acquiring LANNET. And it's all paying off.

Now, to contend with the likes of Ascend, Cisco, Nortel/Bay Networks and 3Com, Lucent is making its mark in the world of IP.

"Last year, questions centered on our credibility in data networking," said O'Shea. "This year, the premier competitor in the industry is calling us his number one competitor. So I think we've made substantial progress and we will continue to do so."

There are differences in how Lucent and its competitors approach the market. "Competitors are trying to figure out how to convert voice streams to packets, rather than how to provide features to customers," noted Carly Fiorina.

"Customers are the ones driving the solutions, not technology," said Jeong Kim, president, Carrier Networks, DNS. "So we're not trying to make a statement about ATM or IP; we're trying to offer a multiservices platform," said Kim. "And in the IP world, it's not just speed that matters, it's service-level differentiation, plus the reliability that Lucent is famous for in infrastructure."

Others may argue the benefits of the two packet architectures but, for practical purposes, any dispute about which one is better is moot. "We recognize carriers have a lot of existing infrastructure already," said Kim. "We don't want to just provide another overlay. We want to provide a smooth migration from today's network to the optical packet backbone networks of the future." That means making the Internet a lot richer in features and easier to use.

Growing right along with the Internet is the widespread, robust packet technology of ATM, or asynchronous transfer mode. ATM is a transmission and switching technology that allows all kinds of signals, at all kinds of speeds, to be transported in "cells" or fixed-length packets across a common infrastructure at the same time.

Lucent's ATM portfolio for service providers extends from end to end. It includes the *PacketStar* ATM Core Switch (formerly *GlobeView*-2000), Lucent *PacketStar* Multiservice Switch 1000 (MX 1000), and *PacketStar* Access Concentrator 60 and 120.

Also supporting Lucent's network vision is the *WaveStar* family of optical networking products, which give network providers unprecedented new capacity in their embedded fiber networks as well as the management and restoration capability they need to operate new high-speed, high-capacity networks.

Summed up Bill O'Shea: "Customers want it all — cost savings and business efficiency; revenue enhancement and new services; a migration path to the future; and networks that are reliable, scaleable and manageable. How can you deny them any of that?"○

— *Shirley Chan*

May 5, 1998
(continued)

Switching and Access Systems introduces *WildWire* IP ADSL Access System.

May 27, 1998

Lucent introduces breakthrough portfolio of IP products for service provider networks. MCI will be first to evaluate *PacketStar* IP switch.

July 9, 1998

Lucent to purchase LANNET, a leading supplier of next-generation Ethernet and ATM switching solutions for local area networks.

What's It Going To Take?

R/Evol

Lucent advertising around the world is relaying one key message — we have the products, people and know-how to solve customers' problems — and that's what it's going to take.

Aggressive new ad campaigns are getting the word out around the world that Lucent knows networking — particularly, data networking. The new ads let customers know that we not only have the products, but also the people with the know-how to create a complete networking solution.

What's it going to take to go IP?

revolution?
evolution?

Yes.

Introducing R/Evolutionary networking from Lucent Technologies.

A totally comprehensive portfolio of IP-based data networking products that will R/Evolutionize the way data/voice/video are handled in public networks.

R/Evolutionary networking is all about R/Evolutionary new ideas. Faster speeds. Greater access. More bandwidth. And lower costs.

It's about R/Evenue. R/Eliability And extending your R/Each.

R/Evolutionary networking comes with 126 years of network know-how. It allows you to build the network of the future while keeping up with growth on the network you have now.

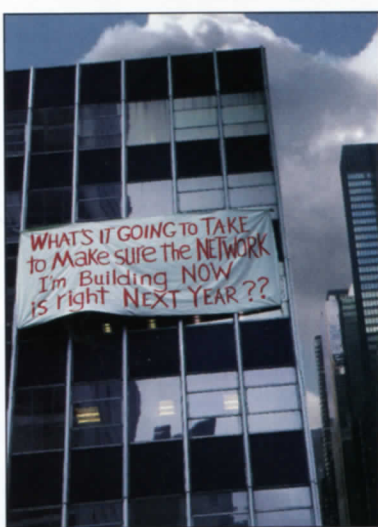It allows you to R/Evolutionize from the ground up. Or evolve from any installed network base. (Hence the name.)

Going IP?
Give us a call.
Let's start a R/Evolution.

Lucent Technologies

We make the things that make communications work.

Just Call to Start a R/Evolution
A new portfolio of data networking products introduced in May (see cover story, p.6) provided the impetus for our newest campaign in the United States, called "R/Evolutionary Networking."

Full-page ads in *The New York Times, The Wall Street Journal* and trade magazines invited customers to give us a call — and together we'd start a R/Evolution. The ads were aimed at both our traditional customers — the established telecom service providers, who must evolve their networks to handle the new surge of data — and at the decision-makers for start-ups — companies like Qwest and ICG that are building high-speed data networks from scratch.

"Our new ads tell both sets of customers that Lucent understands better than anyone how to make the convergence of data and voice work," said Kathy Fitzgerald, senior vice president, Public Relations, Investor Relations and Advertising. "We've introduced revolutionary new products for data networking for start-up companies, and at the same time are helping our traditional customers evolve to an IP (Internet protocol) world."

Kent Miller, director of Advertising and Brand Management, noted that the "R/Evolutionary Networking" campaign has taken a targeted approach to customers. "Our new advertising directly addresses the needs of our customers and positions Lucent as a dominant presence in the data networking space," he said.

ution!

What's It Going to Take?

"R/Evolutionary Networking" grew out of "What's It Going To Take?"—a print and TV campaign rolled out in April to show that Lucent understands the concerns of customers looking for data networks as reliable as voice.

In the print ads, those concerns are right up front. Frustrated customers have scrawled questions on banners hanging out of office windows and fliers tacked up on telephone poles. "What's it going to take to manage my data network without hiring an army?" Answer: "An ally." Or, "What's it going to take to make sure the network I'm building now is right next year?" Answer: "Know-how." The text of the ads tells customers that the answer is Lucent's full set of resources—our people, technology and networking know-how.

"It's as if the customer were sitting across from us in a frank discussion of his or her needs," said Sue Sienko, advertising director for the Global Service Provider Business and the Microelectronics Group. "Any time an ad mimics a customer's voice, a bell goes off and the customer says, 'Hey, I just said this the other day.' The customer knows this company listens and understands his needs and desires."

The TV ad features a lone hitchhiker holding up a destination sign, "Data Networks as Reliable as Voice Networks or Bust." Several cars whoosh by him, their drivers hooting derisively. But when a Lucent van goes by, it stops, and the hitchhiker hops in.

"Als medewerker bij Lucent Technologies help ik communicatie in Nederland op grotere hoogte te brengen."

Jan Reuzeboom, Manager Software Development

Establishing Our Credentials Around the World

While "R/Evolutionary Networking" and "What's It Going to Take" are running in the United States, a new campaign focused on brand recognition is building Lucent's reputation in Europe, Asia/Pacific, Canada and Latin America.

"The universal input from our offices around the world is that Lucent needs to establish its credentials outside the United States," said Sharon McNamara, Corporate Advertising manager. "Global customers need to know who we are and see that we understand local needs and issues and are committed to local businesses."

Recently rolled out in 12 countries around the world, a series of print ads presents our credentials through Lucent's employees. The ads consist of two photos "pinned" to a white background. The first shows a Lucent employee from the targeted country in a personal setting, often pursuing a hobby, like fishing, photography or flying. The second photo represents the work the employee is doing at Lucent, such as building a wireless network or developing software for a network operations center. The copy, always in-language, explains in the employee's voice who Lucent is and what we do. At the end, the Lucent business card carries local contact information.

Different from the Rest

What's in the future for Lucent advertising? "All of our advertising, from television commercials to product ads, must continue to set us apart and make the Lucent brand the best-known and respected in all of our businesses," Miller said. "To do that, advertising must keep us top-of-mind with customers, show that we've got what they need and that we're different from our growing list of competitors."

Whatever the campaign, Lucent advertising around the world will always relay one key message — we have the products, people and know-how to solve customers' problems — and that's what it's going to take. O

*— Shirley Chan and
Suzanne Sidhu*

Team CFO:

Adding Value Beyond the Bottom Line

DON PETERSON
Executive Vice President
and Chief Financial Officer

PETER VIDOR

Bean counters. Number crunchers. Corporate cops. If these are words that come to mind when you think about Lucent's Corporate Finance Organization (CFO), Executive Vice President and Chief Financial Officer Don Peterson says think again.

Today, the organization is not only leaner and meaner, it is bringing enhanced value to its business partners throughout Lucent by providing what CFO employees call "incredibly awesome partner service powered by incredibly awesome people."

"When Lucent was formed, we looked at what we had in terms of a finance function," said Peterson. "We found that our costs were too high — more than 2 percent of revenue — and our activities were focused on counting things, controlling things. We were not focused on moving the business forward. In order to add more value, we had to make changes and, at the same time, reduce costs."

CFO has adopted what is called the shared services model. This model for structuring the organization puts all transactional activities in one place, and offers a common set of services for all of Lucent's business groups. The intention is to become excellent at those activities, while freeing up resources for more strategic work, including business planning; financial analyses of customers and competitors; portfolio analysis and modeling; and giving business partners instant, on-line access to critical financial information.

Offering Awesome Service

The shared services model has three parts: policy, subject matter experts and corporate center support; business unit support; and the underlying infrastructure focused on transactions, which is called Lucent Financial Services, or LFS.

The **Policy, Subject Matter Experts and Corporate Center Support** group functions like a portfolio manager, making the best financial decisions for Lucent as a whole, while balancing the needs of all the operating units. Because of this group's early planning and proactive problem-solving efforts, Lucent has been able, since its spin-off from AT&T, to reduce its tax rate from 41 percent to 36 percent, and its selling, general and administrative (SG&A) expense from more than 25 percent of revenue to about 21 percent.

"These are good indicators of the progress we're making," said Peterson. "If you take the tax rate savings and the reduction in finance costs as a percentage of revenue, those two items alone will contribute about 25 cents a share to Lucent by the end of 1998. This stuff is working."

Business Unit Support is CFO's second branch. With all transactional activity now in Lucent Financial Services, the Business Unit support teams can focus exclusively on business analysis and driving Lucent in the right direction.

"The CFO BU support teams work side by side with our sales teams," explained Peterson. "In

> **"CFO's objectives have made a substantial change in my department.** We satisfy our Lucent customers by ensuring end-to-end support for inquiries. This is the way it should be. Treating everyone the way you would like to be treated."

making a sale, you basically have to convince customers that what you have to sell them for a dollar has some value greater than that dollar. The CFO team member can help the total team understand the business economics of the customer, can help them understand
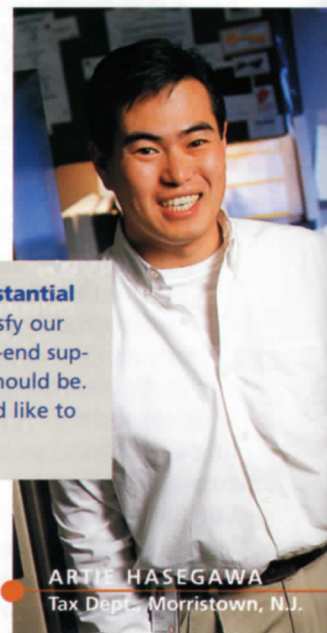
ARTIE HASEGAWA
Tax Dept., Morristown, N.J.

PETER VIDOR

competitors' resources and vulnerabilities. He or she can help the team use that information to frame offers and, from another point of view, can also help them with expertise in structuring and negotiating financing. Our Treasury people and Project Finance people, in conjunction with the business unit support teams, are doing a great job making that happen."


MARILYN T. MOORE
FIRST Operations, Alpharetta, Ga.
RALPH DANIEL

"Since we have been Lucent, we have done more than $4 billion in customer financing and we have offered another $10 billion of financing to prospective customers," added Treasurer Meg Walsh. "The BU support team member and our Project Financing Office bring their expertise to bear in structuring and negotiating financings, and then resell those obligations into the capital markets so we don't have to hold them. Our objective is to turn that 'paper' into cash at 100 cents on the dollar by being out there at the point of sale, making sure the deal is structured right, making sure the economics work."

Recently, CFO's BU support team for Communications Software Group played a critical role in closing a $200 million sale to Bell Atlantic. They not only helped the sales team meet Bell Atlantic's price, but also helped maximize the profitability of the deal to Lucent through careful pricing analysis, credit structuring and skillful negotiations.

Lucent Financial Services (LFS) is the part of CFO that touches all employees because it handles transaction-based reporting and processes, including vouchers and payroll. By centralizing those functions, CFO can achieve economies of scale, reduce transaction volume, increase consistency, replicate best practices and decrease system costs. Already, the number of people doing LFS-equivalent functions has decreased by a third while Lucent's sales have increased by a third. But if you ask LFS colleagues they will tell you: "It's not about the transaction, it's about the rela-

> **"Mindsets and attitudes are changing in my immediate group.** The people who do the jobs and have the knowledge are being asked to make key decisions. We all are beginning to understand that we have to work together to be successful. The old ways of doing things are no longer acceptable."

JÖRG MEYER
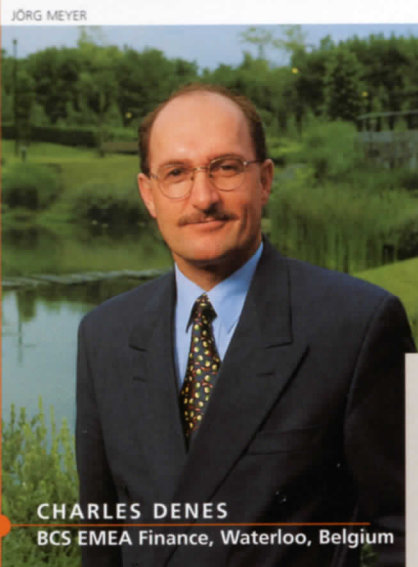
CHARLES DENES
BCS EMEA Finance, Waterloo, Belgium

tionship." In other words, CFO's customers — all of us — must agree that its service is "incredibly awesome."

"Earlier this year we had some problems with payroll," said Peterson. "I think we responded in a much stronger way than we ever would have before. I hope we always do that, and I believe systems are going to be the key to better service."

LFS will be connected into the new PeopleSoft employee information system that is being implemented, with cutover completed this summer. Starting in the fall,

CFO will implement SAP, the Global Enterprise Solutions software, as both its core financial system and its purchasing and payment system.

"It's the hard connection of those things into the payment process that we think is going to give us the best chance to decrease errors and increase responsiveness," Peterson said.

World-Class Progress

CFO's vision, what they call their Strategic Intent, is what the organization hopes to be: "Team CFO...Engine of Excellence...Powering Lucent."

"We enlisted everybody in the vision and then enlisted them in the whole effort to reach that vision. By the time we were done, I think most people were committed to our goals and wanted to be part of the work," said Peterson. "Once we achieve our objectives, we can say with confidence we've done our job.

"I'm very pleased with our progress — our re-invention — so far, and I attribute it to our efforts to involve people in their own futures, facilitate their growth and development and give them the power to make contributions. We truly believe our people know what they're doing and why

> **"The re-invention has given me a new way to think about things.** Our company's expectations of growth from EMEA demand that we do things differently. The re-invention has helped me to lead, motivate and energize my team around the need for a more focused way of thinking and acting."

they're doing it, and that they can do it better than the rest of us.

"Now we're starting to ask what comes next. I believe the opportunities ahead of us will be just as rich as those we've had in the last two years, and I know the finance community will embrace them just as energetically. We will continue to make progress. We are being recognized as a world-class finance organization, and that's exactly where good finance people want to be." ○
— *Rich Larris*

How I Contribute to Speedy Decision-Making

John Smith,
material handler,
Field Operations Services,
Business Communications
Systems Group,
Lenexa, Kan.

"Quick decisions are important in my job because we have to ship emergency materials orders to technicians same-day or overnight. Processes slow down for two reasons: it's sometimes unclear who has the authority to authorize the shipment or it's unclear what the procedure is from location to location. These things need to be clarified so we can do what's best for the customer."
Suggestion: Be sure your decision is based on sound judgment, then just do whatever is necessary to satisfy our customers.

Marcelo Amma,
account manager,
Business Communications
Systems Group,
Buenos Aires, Argentina

"In Argentina, we are developing the indirect channel with great enthusiasm, as the market is growing very fast. We can take advantage of that speedy change because we offer our channel partners leading technology in business solutions."
Suggestion: We can speed up our success if we align ourselves with our new indirect channel partners and share our strategies with them.

Swarna Prabha,
R&D engineer,
Network Cable Systems,
Indianapolis

"If things slow down in our development cycles, I take an aggressive approach to solve problems and move roadblocks. I solicit team members' thoughts about the problem, and try to learn as much as I can. I'm not afraid to strike out on an untried path if that will resolve the issue."
Suggestion: Don't wait for things to happen. Be proactive.

Faisal Nabulsi,
optoelectronics development engineer,
Microelectronics Group,
Breinigsville, Pa.

"When we have technical issues that prevent us from shipping products to customers, coming up with a fast solution and a risk analysis to make a quick decision becomes the only job for everyone. Providing our customers the quality products they order at the time they want is what we do, and any issue that stands in our way must be resolved very quickly."
Suggestion: The decision-making process is part of our daily life; responsible employees make sound decisions quickly.

Brian Martin,
global provisioning director,
Global Service Provider
Business,
Warren, N.J.

"The real struggle is to make effective decisions quickly. In today's competitive environment, there is enormous pressure to take immediate action to correct a problem. We must move with a sense of urgency, but at the same time be as thorough as possible in identifying the root cause of a problem. Without the right facts, we can end up working very speedily on the wrong problem."
Suggestion: Get the facts, get a cross-functional team, get focused on the right problem, and get busy.

Geoffrey Ho,
SYSTIMAX sales manager,
Global Service Provider
Business,
Singapore

"I prioritize to ensure the most important issues are addressed first. Responding to customers' needs is always first, and revenue generation is second. For everything I do, I calculate whether it will help reach one of these goals. This system helps me make quick decisions and balance the time I have with what I need to do."
Suggestion: Don't try to achieve speed in all you do. Set defined goals and prioritize your time to meet them first.

Lucent Technologies
Bell Labs Innovations