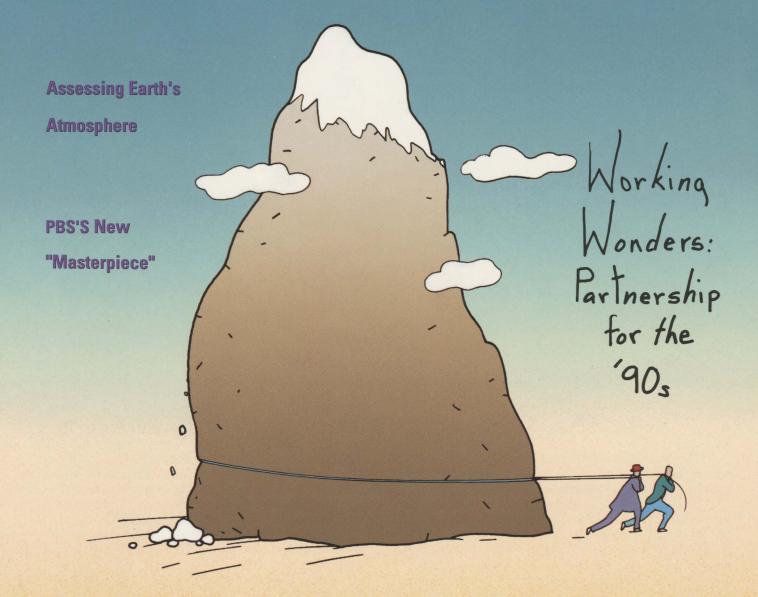
# Advantage THE INFORMATION MANAGEMENT QUARTERLY

Volume IV, Number 1, 1990 Ingres Corporation

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With the end of the '80s and the advent of the '90s, we're witnessing some extraordinary changes in the way countries, businesses, and individuals work together. As the recent changes in Eastern and Western Europe and elsewhere indicate, our world is rapidly becoming less and less one of individual countries, businesses, and people struggling to compete and survive. Rather, we're learning to achieve our goals through openness, cooperation, and partnership. In fact, I believe that the '90s will be the decade of partnerships.

Today, in our tenth year as a company, we can look back on where we've come from and where we're going. When we started out in a Berkeley basement in 1981, we had ten employees and dreamed of the day when our revenues would reach a million dollars. Today, Ingres Corporation is operating at a run-rate of \$150 million and is one of the top 10 software firms worldwide. One thing we've learned along the way is that such growth and success would not be possible without the continuing satisfaction of our customers and our business partners.

In this issue, we explore the concept of "partnership" from the different standpoints of experts in global marketing, hardware vendors (OEMs), value added remarketers (VARs), consultants, and customers. Each of these offers valuable insights into what working partnerships mean and what they offer.

Our lead article, by Harvard Business Review author Kenichi Ohmae, considers the need for creating strong alliances, especially in the increasingly competitive, expanding global market. When companies play in the global arena, Ohmae warns, "it's best not to go it alone." Ohmae's warning pertains not only to companies playing in the international market. He offers food for thought for any company that wants to succeed in increasingly competitive markets, either foreign or domestic.

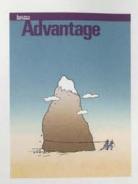
Another highlight of our "Partnership" issue is the "Interview" (pg. 9) with top executives from five of our leading partner companies: International Computers Limited (ICL), ASK Computer Systems, Price Waterhouse, Hewlett-Packard, and Cadre Technologies. Each of these companies works with us to fulfill our mutual customers' specific needs. And, as always, this issue includes feature stories on successful applications developed by INGRES customers — in this case, NASA, PBS, United Technologies, and Australian National Lines (ANL).

We're always interested in hearing from our readers, and we'd like to hear from you. What do you enjoy reading most in the Advantage? What

would you like to see changed or added? Are there other stories you'd like to be told? Please write. As our partner, your opinions matter.

Paul & Newto

Paul E. Newton President and CEO



About the Cover:

In this issue of the INGRES Advantage we focus on the importance of business partnerships and alliances. Our cover, by Istvan Banyai, whimsically illustrates how, through teamwork, we can "move mountains."

Publisher Barry Shamis

Publication Director Zoe Ann Meegan

Managing Editor Bronwyn Fryer

Senior Editor Beverly Matherne

Contributors

Michael Demshki, Patricia Duffy, Mark Lewis, George Loyer, John Kane, Kenichi Ohmae, Paul Ricci, Candy Sestric, Joe Southworth, Becky Stokes

**Editorial Consultants** 

Ron Brunt, Mark Diedrich, Annette Donnelly, James Landeros, Steven Manson, Jeff Price

> Advertising Manager Carol Vickers

> > Art Director Anita Arellano

Design Scott Sakuda, Mary Tang

Production Manager Joan Baulisch

International Liaison Kathy Mulvany

Manager, Public Relations Kevin Gallagher

Director, Product Marketing Paul Wiefels

The INGRES Advantage considers all articles submitted for publication. Direct submission queries to INGRES Advantage, c/o Ingres Corporation, 1080 Marina Village Parkway, Alameda, CA 94501-1905.

Telephone: (415) 769-1400.

Direct advertising queries to Carol Vickers, Advertising Manager (415) 748-2782.

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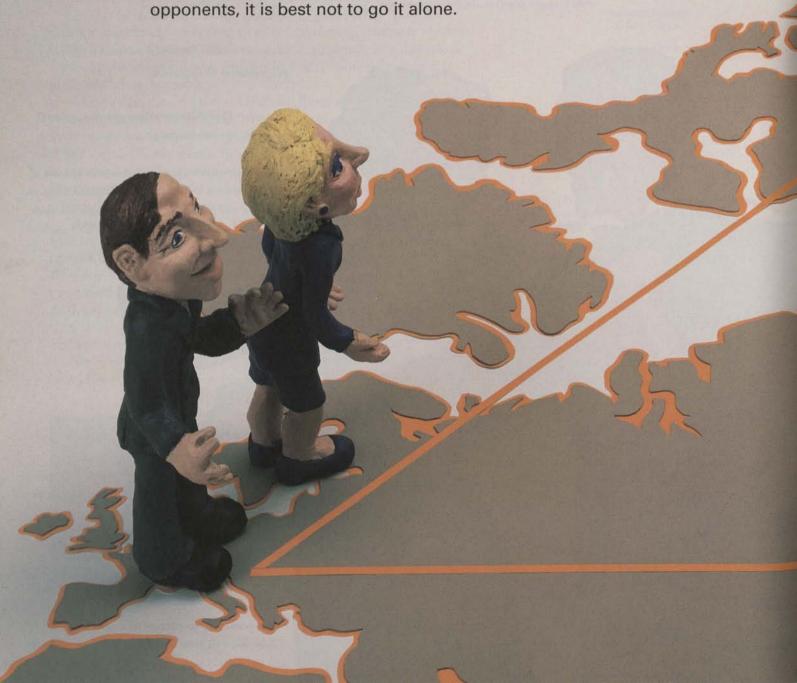
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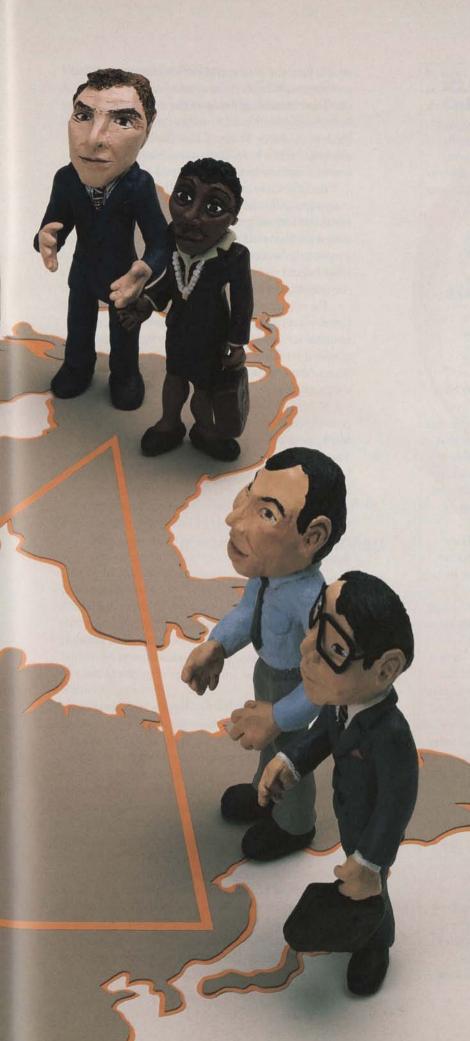
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# GLOBAL LOGIC OF STRATEGIC ALLIANCES

by Kenichi Ohmae

Companies are just beginning to learn what nations have always known: in a complex, uncertain world filled with dangerous opponents, it is best not to go it alone.





Great powers operating across broad theaters of engagement have traditionally made common cause with others whose interests ran parallel with their own. No shame in that. Entente — the striking of an alliance — is a responsible part of every good strategist's repertoire. In today's competitive environment, this is also true for corporate managers.

But managers have been slow to experiment with genuinely strategic alliances. A joint venture here and there, yes, of course. A long-term contractual relationship, certainly. But the forging of entente, rarely. A real alliance compromises the fundamental independence of economic actors, and managers don't like that. After all, for them, management has come to mean total control. Alliances mean sharing control. One precludes the other.

In stable environments, this allergy to loss of control exacts little penalty. Not so, however, in a changeable world of rapidly globalizing markets and industries — a world of converging consumer tastes, rapidly spreading technology, escalating fixed costs, and growing protectionism. I'd go further. Globalization mandates alliances, makes them absolutely essential to strategy. Uncomfortable, perhaps — but that's the way it is. Like it or not, the simultaneous developments that go under the name of globalization make alliances — entente — necessary.

Why, then, the reluctance of so many companies either to experiment with alliances or to stick with them long enough to make them

work? To some extent, both foot dragging and early exit are born of fear — fear that the alliance will turn out to be a Trojan horse that

affords potential competitors easy access to home markets. But there is also an impression that alliances represent, at best, a convenience, a quick-and-dirty means of entry into foreign markets. These attitudes make managers skittish and impatient.

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Unless you understand the long-run strategic value of entente, you will grow frustrated when it proves — as it must — not to be a cheap and easy way of responding to the uncertainties of globalization. If you expect more of your partners than is reasonable, you will blame them too quickly when things do not go as planned. Chances are your impatience will make you much less tolerant of them than you would be of your own subsidiary overseas.

The simultaneous developments that go under the name of globalization make alliances — entente — necessary.

When you expect convenience, you rarely have much patience for the messy and demanding work of building a strong competitive position. Nor do you remember all the up-front overseas investment that you did not have to make. And without memory or patience, you risk precipitating exactly what you fear most: an unhappy or unsatisfied partner that decides to bow out of the alliance and try to tackle your markets on its own.

Alliances are not tools of convenience. They are important, even critical, instruments of serving customers in a global environment. Glaxo, the British pharmaceutical company, for example, did not want to establish a full business system in each country where it did business. Especially given its costly commitment to topflight R&D, it did not see how it could — or why it should — build an extensive sales and service network to cover all the hospitals in Japan and the United States. So it decided to link up with first-class partners in Japan, swap its best drugs with them, and focus its own resources on gathering greater sales from its established network in Europe. That kind of value creation and delivery is what alliances make possible.

Few companies operating in the Triad of Japan, the United States, and Europe can offer such topflight levels of value to all their customers all the time all by themselves. They need partners. They need entente. They might wish things were otherwise. But deep down they know better. Or they should.

#### The Californiazation of Need

To understand why alliances are a necessity and not just a fad or a fashion, you first have to understand why globalization makes them essential as vehicles for customer-oriented value.

The explanation begins with a central, demon-

strable fact: the convergence of consumer needs and preferences. Whatever their nationality, consumers in the Triad increasingly receive the same information, seek the same kinds of life-styles, and desire the same kinds of products. They all want the best products available, at the lowest prices possible. Everyone, in a sense, wants to live — and shop — in California.

Economic nationalism flourishes during election campaigns and infects what legislatures do and what particular interest groups ask for. But when individuals vote with their pocketbooks — when they walk into a store or showroom anywhere in the Triad — they leave behind the rhetoric and the mudslinging and the trappings of nationalism.

Do you write with a Waterman or a Mont Blanc pen or travel with a Vuitton suitcase because of national sentiments? Of course not. It does not matter if you live in Europe or Japan or the United States. You buy these pens or pieces of luggage because they represent the kind of value you're looking for.

At the cash register, you don't care about country of origin or country of residence. You don't think about employment figures or trade deficits. You don't worry about where the product was made. It does not matter to you that a "British" sneaker by Reebok (now an American-owned company) was made in Korea, a German sneaker by Adidas made in Taiwan, or a French ski by Rossignol in Spain. All you care about is the product's quality, price, design, value, and appeal to you as a consumer.

This is just as true for industrial customers. The market for IBM computers or Toshiba laptops is not defined by geographic borders but by the inherent appeal of the product to users, regardless of where they live. And with the proliferation of trade journals, trade shows, and electronic databases, users have regular access to the same sources of product information.

Chip makers buy Nikon steppers because they are the best, not because they are made by a Japanese company. Manufacturers buy Tralfa industrial robots for the same reason and not because they happen to be Norwegian. The same goes for robots made by DeVilbiss in the United States. Companies around the world use IBM's MRP and CIM systems to shorten production times and cut work-in-process. Because of the demands of contemporary production modes, they use Fujitsu Fanuc's machine tools made in Japan. In fact, this one company dominates the numerically controlled (NC) machine-tool market worldwide: its market share in Japan is 70%; around the globe, 50%. This is neither accident nor fashion. These NC machines deliver value, and everyone knows it. But the national identity of these products has effectively disappeared.

#### The Dispersion of Technology

Today's products rely on so many different critical technologies that companies can no longer maintain cutting-edge sophistication in all of them. The business software that made IBM PCs such an instant hit -1-2-3 — was not, of course, an IBM product. It was the creation of Lotus Development Corporation. Most of the components in the popular-priced IBM PC itself were outsourced as well. IBM simply could not have developed the machine anywhere near the time it did if it had tried to keep it 100% proprietary. In fact, the heart of IBM's accomplishment with the PC lay precisely in its decision — and its ability — to approach the development effort as a process of managing multiple external vendors.

Lotus provided applications software, and Microsoft wrote the operating system on an Intel microprocessor. Of course, Lotus, Microsoft, and Intel don't want to sell only to IBM. Naturally, they want to sell their products to as wide a range of customers as possible. Just as IBM needs to rely on an army of external vendors, so each vendor needs to sell to a broad array of customers. The inevitable result is the rapid dispersion of technology. No one company can do it all, simultane-

ously. No one company can keep all the relevant technologies in-house, as General Motors did during the 1930s and 1940s. And that means that no one can truly keep all critical technologies out of the hands of competitors around the globe.

An alliance is a lot like a marriage... both partners bring to an alliance a faith that they will be stronger together than either would be separately.

Even original equipment manufacturers with captive technology are not immune to this dispersion. NEC may develop a state-of-the-art memory chip for its own mainframes, but it can sell five times the volume to other computer makers. This generates cash, lowers unit costs, and builds up the experience needed to push the technology still further. It also gets them better information about products: external customers provide tougher feedback than do internal divisions. To be a world-class producer, NEC must provide the best new technology to global customers.

In short order, the technology becomes generally available, making time even more of a critical element in global strategy. Nothing stays proprietary for long.

(continued on page 44)

#### ICL's "Do's" for Successful Collaboration

International Computers Limited, a long-time strategic partner to Ingres Corporation in Europe, offers some hints on developing a sound partnership alliance.

- 1. Treat the collaboration as a personal commitment. It's people that make partnerships work.
- 2. Anticipate that it will take up management time. If you can't spare the time, don't start it.
- Mutual respect and trust are essential. If you don't trust the people you are negotiating with, forget it.
- Remember that both partners must get something out of it (money, eventually). Mutual benefit is vital. This will probably mean you've got to give something up. Recognize this from the outset.
- Make sure you tie up a tight legal contract. Don't put off resolving unpleasant or contentious issues until "later." Once signed, however, the contract should be put away. If you refer to it, something is wrong with the relationship.
- Recognize that during the course of a collaboration, circumstances and markets change. Recognize your partner's problems and be flexible.
- Make sure you and your partner have mutual expectations of the collaboration and its time scale. One happy and one unhappy partner is a formula for failure.
- 8. Get to know your opposite numbers at all levels socially. Friends take longer to fall out.
- Appreciate that cultures both geographic and corporate Aare different. Don't expect a partner to act or respond identically to you. Find out the true reason for a particular response.
- 10. Recognize your partner's interests and independence.
- 11. Even if the arrangement is tactical in your eyes, make sure you have corporate approval. Your tactical activity may be a key piece in an overall strategic jigsaw puzzle. With corporate commitment to the partnership, you can act with the positive authority needed in these relationships.
- 12. Celebrate achievement together. It's a shared elation, and you'll have earned it!

#### Postscript

Two further things to bear in mind:

- 1. If you're negotiating a product OEM deal, look for a quid pro quo. Remember that another product may offer more in return.
- 2. Joint development agreements must include joint marketing arrangements. You need the largest market possible to recover development costs and to get volume/ margin benefits.

# How to build custom applications without building a custom staff.

If you need to build custom applications but don't have staff or time to do it yourself, there's one place you can turn. Ingres Consulting Services.

We specialize in building customized applications. So whether you're a new Ingres customer or an experienced user, we can help with overall strategy, system design and application development. You'll get industry-leading expertise

in all phases, from initial design through implementation and performance tuning.

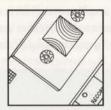
And of course we can also help with product enhancements and customization.

So when you need custom applications, don't add to your staff. Add to your Rolodex. The number is 1-800-4-INGRES.

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## Partnership in the '90s

In the old days of the '70s and '80s, companies tried to build market leadership simply by concentrating on beating the competition. They tried to put barriers to entry wherever possible, and used every bit of their expertise and resources to separate themselves from others in their industry.

In the '90s, however, companies are finding that this old way of doing business no longer works. To compete effectively today, companies need to work closely with partners to offer increasingly demanding customers the best possible solutions.

To Ingres Corporation, partnership is as much a part of the corporate value system as quality and integrity. Ingres takes pride in its reputation for creating and sustaining successful strategic partnerships with key industry players.

In this interview, we asked five executives from these companies — Sandy Kurtzig, President of ASK Computer Systems; David Banks, President of Cadre Technologies; Wim Roelandts, Vice President and General Manager of Hewlett-Packard's Computer Systems Group; Hank Holland, Partner of Price Waterhouse; and Ron Brunt, Ingres Collaboration Manager of International Computers Limited (ICL) — what "partnership" means to them.

Ms. Kurtzig, what is the nature of ASK's relationship with Ingres Corporation, and why did you select Ingres as a partner?

We are reselling the INGRES toolset and database software to our customers who can use these to develop their own database applications or extensions to our systems. We are also planning to make extensive use of INGRES tools in some new products we are building.

We selected Ingres as a partner for several reasons. The functionality of the product and its ability to serve the needs of our customers were of primary importance. But we were also looking for a company with a worldwide presence, because we sell our own software around the world. Finally, we were impressed by Ingres's responsiveness to the needs of its partners, and by its philosophy of partnership and cooperation.

ASK's MANMAN, MAXCIM, and SIM/ 400 products are used by many of the



#### manufacturing giants worldwide. In your opinion, what are the key factors that allow ASK to lead the market in manufacturing software?

There are three key factors for our success in manufacturing - focus, focus, and focus. ASK has always concentrated on one thing: providing manufacturers with the business solutions they need. This has resulted in a true understanding of and expertise within our market, and in resources that can outgun the competition — even if that competition comes from much larger companies.

But if ASK is already a clear leader, what's the point of going into partner-

"To combine the efforts of several companies that are individually recognized for excellence. . . is much smarter than trying to be all things to all people and risking mediocrity as a result." Sandy Kurtzig ASK Computer Systems

#### ship with a company like Ingres Corporation?

Our challenge is to maintain the focus that is crucial to our success, while recognizing the customers' need for broader solutions. To do this, we've made the strategic partnership concept a key component of our business strategy. The idea is simple: to combine the efforts of several companies that are individually recognized for excellence. This is much smarter than trying to be all things to all people and risking mediocrity as a result. It's a philosophy that Ingres shares, and it's one of the reasons our two companies work well together.

#### What are some of the factors that influence this philosophy?

One of the trends in manufacturing in the '70s and '80s was to accrue multiple vendors, so you didn't have too much dependence on one vendor. In the '90s you'll see people developing closer relationships with a smaller number of vendors. We also believe in a small

> number of close partnerships in providing tools to help us develop our own products.

Another trend in manufacturing is toward more global operations with plants or distribution sites all over the world. They need to link information together. The capabilities of a distributed RDBMS like INGRES allow them to integrate this information. They also get a product that is very flexible; it's available on platforms they choose to run it on, and it adheres to industry standards. Our customers run all kinds of different databases, so we didn't want to be locked into a single database. Ingres Corporation has a gateway strategy that will allow software developed with INGRES tools to run against ALLBASE/SQL, IMS, DB2, Rdb, RMS, and other databases. This is a strategy that other vendors don't have, and it seems to me to be very realistic.

Mr. Banks, Ingres and Cadre have integrated the teamwork products for systems analysis and design with the **INGRES/4GL** application development environment. How does the INGRES/ teamwork integrated environment differ from other available products?

Well, I'd say that most frontend CASE products can be used to represent data

graphically. However, even using these products, developers still have to create the database manually; this is a time-consuming, error-prone task. With INGRES/ teamwork, the barrier between design and implementation is removed. The data definitions described in teamwork diagrams are actually used to create physical databases.

With INGRES/teamwork, MIS departments have a tightly integrated environment for all aspects of the development life cycle — designing, creating, documenting, and maintaining their databases and applications. This is more productive than using a nonintegrated set of tools.

But other RDBMS vendors offer CASE products, too; what's the advantage to customers of the INGRES/teamwork offering over, say, Oracle plus Oracle CASE products?

Cadre is the leading supplier of CASE tools; CASE is all we do, and our goal is to continue to produce technologically superior products. It's our belief that Ingres, likewise, produces a superior application development toolset. We feel this partnership — between leading producers of CASE products and of 4GL products — offers a better solution than any single company provides.

#### As the leading supplier of CASE products, what does Cadre look for in a partner?

To us, the ability to provide excellent support to customers is a decisive factor in choosing a partner. Cadre, like Ingres, considers customers as business partners; as such, it's our business to see that they're successful. This type of relationship goes well beyond simply selling products. Customers today require comprehensive pre-sales, post-sales, and training support, not just to gain, but to maintain a competitive edge. We look for vendors who are capable of providing this level of support and who are genuinely dedicated to making their customers successful.

Mr. Roelandts. Hewlett-Packard is one of the significant players in the computer systems market, and has been around for a long time. From your perspective, are attitudes about business partnerships changing?



I think attitudes about partnerships are changing in several ways. First of all, I agree with Ms. Kurtzig that the era of the "do-everything" company is over. We're moving into an era when we'll see multiple companies working together to provide each other with mutual support. At Hewlett-Packard, for example, we are well past trying to develop everything ourselves, so we are actively looking for strong partnerships.

Of course, technology itself is continually changing. The complexity and capability of systems is increasing exponentially. As this happens, people everywhere are coming to expect more and more of their technology. They're looking for complete solutions. You need to be able to speak the customer's language, understand what they need, and work with them to provide a solution.

#### What qualities does Hewlett-Packard look for in a partner?

We look for three important characteris-

tics. First, and most important, is the creation of strong, personal working relationships between our company and our selected software partner. After all,

> people make up a company — so it's important for us to have personal contacts, meetings, and close relationships at different levels. We want to get to know each other on a personal basis, as people working together. This creates a synergy of culture and shared values.

Second, Hewlett-Packard likes to form relationships with companies that know how to build win-win relationships. Software VARs give our company the highest rating among the major hardware companies, and we are pleased with the fact that Ingres has just received similar recognition by VARs as an outstanding business partner among database companies. The marketplace has confirmed our views of Ingres.

Finally, we look for leading technology. Hewlett-Packard prides itself on the technical solutions and service we provide to our customers. Ingres is also recognized by the

marketplace as a technology leader. By combining our technologies, software solutions such as ASK, and quality service, Hewlett-Packard and Ingres give our customers the value they demand.

Mr. Holland, since Price Waterhouse is one of the most respected consulting firms around, you must be very selective when it comes to partners. How do you go about selecting a partner?

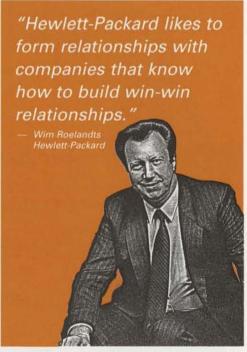
We concentrate on creating a few highquality partnerships. When we're looking for a partner, we do a lot of research and careful evaluation. First, we look at the market need for consulting in that area, based on the prospective partner company's size and growth. Then we take a close look at the product's capabilities and quality. We also consider the company's reputation in the market. We also consider the company's philosophy and its compatibility with ours. But

perhaps most importantly, we evaluate the vendor's relationships and reputation with our clients. If all these criteria are met, we've got a partner.

As a consulting firm, what's the advantage to Price Waterhouse of creating a close partnership with a technology vendor?

As Mr. Roelandts pointed out, customers are no longer looking for partial solutions. Our clients want full solutions. In order to deliver these solutions, our consultants must have an in-depth knowledge of the product, as well as highly focused skills.

We feel that Price Waterhouse's ability to match business requirements, combined with Ingres's innovative technology, offers customers a complete solution. People come to Price Waterhouse expecting precise methods, with a history of experience and integrity - those are things that make us unique. You put this together with exceptional technology and the sum is better than each of the parts.



This total offers more to the customer than any single company could offer by itself.

In addition, by creating quality partnerships, we are able to provide our consultants with the rigorous internal

(continued on page 46)

# ASSESSING EAF ATMOSPHERE

re we destroying the Earth? Scientific measurements have documented changes in the Earth's lower atmosphere as well as substantial alterations in chemical composition in the upper atmosphere. These changes, caused in part by human activity, could affect global climate and significantly impact terrestrial life and human societies.

# TH'S



While some of these changes have a natural origin, human activities are also responsible for atmospheric change. In contrast, however, human activities are generating long-term trends that may lead to large and irreversible effects.

One example is the burning of fossil fuels, which release carbon dioxide into the atmosphere. This and other gases such as nitrous oxide (resulting from microbial activity, combustion, and nitrogen fertilizers), methane (produced by swamps, rice paddies, and the digestive systems of termites and ruminant animals), and the chlorofluorocarbons, or CFCs, (from spray propellants, plastic foam manufacture, industrial components cleaning, and air conditioners and refrigerators) trap infrared radiation near the Earth's surface. This so-called "greenhouse effect" could raise the global average surface temperature some two degrees Celsius by the middle of the next century — a climate change greater than any ever experienced by organized human societies.

The CFCs also contribute to depletion of the Earth's stratospheric ozone layer, which shields terrestrial life from harmful ultraviolet radiation. Other greenhouse gases, such as methane and nitrous oxide also play roles in the ozone chemistry of the upper atmosphere.

The National Aeronautics and Space Administration (NASA) has embarked on a critical mission addressing the problem of stratospheric changes linked to human activities that lead to ozone depletion. NASA—like many of the world's leading scientists—believes that its Upper Atmosphere Research Satellite (UARS) will provide the comprehensive database needed for an understanding of changes in the ozone level.

In August 1991, NASA's UARS will carry a payload of instrumentation into orbit some 360 miles



The National Aeronautics and Space Administration (NASA) has embarked on a critical mission addressing the problem of stratospheric changes linked to human activities that lead to ozone depletion.

(600 kilometers) above the Earth. These spacecraft sensors will measure the energy radiated by the atmosphere and the energy absorbed or scattered from sunlight passing through the atmosphere. Analysis of the results will furnish detailed information on chemical constituents, temperature, winds, and the effects of the Sun's energy and the solar wind. These findings will help to reveal the mechanisms that control the structure and variability of the upper atmosphere, improve the predictability of ozone depletion, and define the role of the upper atmosphere in the Earth's climate system.

#### **More Than a Million Files**

The Herculean task of managing and tracking more than one million files created as a result of scientific data to be transmitted to Earth by UARS is being borne by system software being developed specifically for the UARS mission.

INGRES is being integrated into the system software being developed at NASA's Goddard Space Flight Center, Greenbelt, Maryland, and by computer scientists from Computer Sciences Corp. of nearby Laurel. The system will run on a DEC VAXcluster and data received from UARS will be transferred to a Filetek optical disk system for permanent storage.

"INGRES will track every file we have in the system," says Dan Marinelli, data processing engineer for the Mission Operation and Data Systems Directorate at NASA Goddard. "It's a massive job. The spacecraft will be up a minimum of 18 months and will be sending information from nine instrument systems on a continuous basis."

#### The Mission

The UARS mission is by far the most complex investigation of the upper atmosphere ever attempted. The UARS observatory includes the scientific instruments and the Multimission Modular Spacecraft (MMS). The MMS incorporates standard modules for altitude control, communications and data handling, electrical power, and propulsion.

Instruments aboard the spacecraft will provide the most complete and thoroughly integrated experimental picture ever obtained of the upper atmosphere. Operating collectively and simultaneously, they will take three types of measurements: composition and temperature, winds, and energy inputs.

Four instruments will be devoted to measuring composition and temperature of the stratosphere. They will spectroscopically determine the concentrations of many different chemical species and derive the variation of atmospheric temperature with altitude by observing infrared emissions from carbon dioxide.

Two instruments, using high-resolution interferometry, will study upper-atmosphere winds by sensing the Doppler shift in light absorbed by or omitted from atmospheric molecules.

Three instruments will obtain estimates of the energy incident on the atmosphere by measuring solar ultraviolet radiation and the flux of charged particles from the Earth's magnetosphere.

Data from the instruments will be recorded by an on-board computer, with each instrument having its own data stream. On Earth, the data will be captured at Goddard's Data Capture Facility where the data is "cleaned up" for further application processing. This processing is performed on the DEC VAXcluster using algorithms developed by mission scientists.

#### **Easy Access**

Computer Sciences Corp. (CSC) is responsible for building the database applications and interfaces. "It's our job to develop the applications software to give users a general view of what's in the database," CSC Senior Computer Scientist Bill Koster says. "It enables them to get into INGRES and to use it to access and process the data from the UARS instruments."

The scientific data will reside in the optical storage system and not in the INGRES database. "However, scientists can transparently pull information from the database to enable access to their data for processing and study," says Koster.

Koster is using the FORTRAN language with embedded SQL to develop his INGRES applications. The database will include a huge catalog, disk tables, user tables, and the accounting and systems information needed to manage the whole program. "For instance, the system software will automatically determine how much CPU time and disk space will be needed to perform daily data processing, clear the necessary hardware, and pull the data from optical storage. It will all be transparent to the user," says Koster.

Once recorded at White Sands, New Mexico, the data will be forwarded to the Data Capture Facility where it is edited, telemetry bytes are decommutated, and transmitted to the UARS Central Data Handling Facility (VAXcluster) for processing. It will go through three levels of processing and each level will be tracked in the database. Scientists will depend on INGRES to enable them to identify and obtain the science files needed for their studies.

In addition to managing the files being generated, INGRES also provides the user interface to the database. "Ease of access to the data is vital because scientists from all over the world will be studying the results of the experiments for many years. They have to be able to get at the proper files quickly and INGRES gives users a logical, well-structured access," according to NASA's Marinelli.



"Ease of access to the data is vital because scientists from all over the world will be studying the results of the experiments for many years."

#### Speed Is Important

NASA Goddard's Information Processing and Data Systems Technology Divisions evaluated several relational database management systems when the project began in 1986. In addition to INGRES, they considered the Oracle RDBMS and DEC's own Rdb implementation on VAX.

"INGRES was chosen primarily because of its faster execution time against our set of test queries," Marinelli says. "It turned out to be a wise decision because when we started the project we didn't realize there would be so many tables involved. INGRES's speed has been an important plus for us."

The INGRES report writing capability and friendly user interface also are helping the project move ahead smoothly. "With the INGRES Report-Writer, we are able to prepare instant reports, rather than having them done by software developers," Marinelli says.

Marinelli and his team began work with INGRES 5.0 and have moved up to the latest versions of INGRES as the new releases have become available.

Like Marinelli at NASA Goddard, Koster is using INGRES 6.1 in the present development work. "The dynamic embedded SQL of 6.1 has simplified coding considerably and has speeded up the entire program," he says.

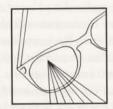
All of the interactive applications are being written in INGRES/4GL, which has simplified a lot of the coding, according to Koster. He also uses Applications-By-Forms to create 4GL applications and the INGRES Report-Writer to define reports when necessary.

#### **Analysis Made Easy**

The UARS data system at Goddard unites the UARS mission and its many data sets from the nine

(continued on page 47)

## PDQ Performance Solutions



Global competition affects every sector of the high-technology industry. In the past several years, hardware vendors have come to rely heavily on partnerships to maintain profitability and growth. Likewise, it is only through partnering that suppliers of multiprocessor database solutions can keep pace with growing industry requirements.

Pressure for better and better performance of UNIX RDBMS solutions is mounting as we enter the 1990s. The pressure is coming at solution suppliers from two sides. It comes from those who can now afford to automate new areas of their business due to the vastly improved price/performance of the current generation of multiprocessor systems. And it also comes from those moving mission-critical applications over to relational databases and UNIX to gain the productivity, price, and technology choices now being offered.

There is no doubt that future OLTP applications will demand 500-plus TPS (transactions per second) performance. More significantly, decision support applications running against very large databases must improve performance by an order of magnitude to keep up with the ever growing requirement for mission-critical information.

Single suppliers can no longer provide the advancements in technology that will set the pace of this industry. Only by combining expertise in diverse areas through partnerships will companies succeed.

#### A Good Track Record Counts

Several years ago, Ingres Corporation and Sequent Computer Systems recognized the potential benefits of combining relational database technology with the high performance of multiprocessor systems. This combination promised to provide solutions beyond the scope either partner could deliver independently.

Because UNIX is process based (that is, each relational database user is seen as a set of processes by the system), multiple processors on a system inherently im-

proves performance because many user processes can run at the same time. This natural fit between relational database management systems and multiprocessors was seen by both Ingres and Sequent as the basis of a powerful database solution for the fast-growing OLTP marketplace.

Jointly undertaking the Silver Bullet project in early 1988,

the companies showed that these two independently developed technologies, when combined, could produce powerful results. During the Silver Bullet project, Sequent and Ingres engineers worked side by side to expand the simple idea of many processes working on many processors. The joint effort produced the first commercial UNIX relational database transaction rates to break 100 TPS — a huge leap over the then-current 40 TPS.

The most significant result of this

project, however, was not the new recordsetting performance numbers. The days
and evenings spent working together in a
high-pressure, exhilarating environment
created a single team out of two. Engineers from both companies developed a
high degree of respect for each other and
a deeper understanding of the other's
product. The most lasting and valuable
result of this effort was not the benchmark performance, but the formation
of this cross-company team and the
exchange of knowledge that would lead
to far greater projects in the future.

Having addressed the challenge of OLTP performance in multiprocessor environments, Sequent and Ingres once again have embarked on a joint development project to meet the needs of decision support.

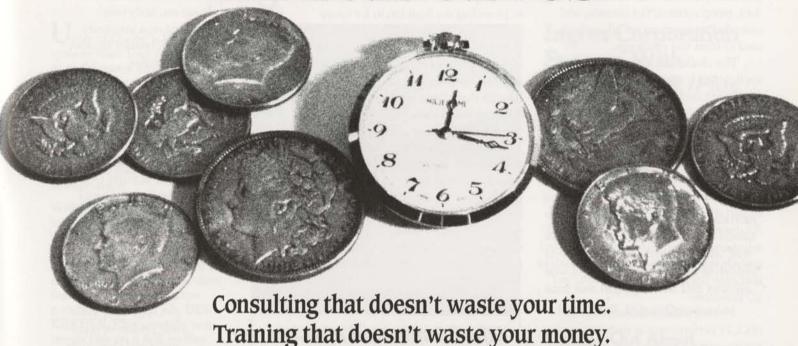
## Decision Support: The Other Side of OLTP

The Silver Bullet project dealt with creating technology to manage update-intensive, short transactions that typify OLTP applications. Along with every OLTP application, however, exist several decision support applications that are typically a series of batch programs, often run at night.

To achieve high performance in

(continued on page 18)

# DataBasics



Relational and Management Computing Co is a hard-working group of trainers and consultants in relational database technologies. RMCC is an Ingres® partner and a Santa Cruz Operation™ Open Desktop developer of a Human Resources Employee Record Keeping System.

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OLTP applications, the technology must handle many small, independent, repetitive requests on the database in parallel. Dynamic processor load balancing, shared data, group commit, fast commit, and compiled transactions are all methods used to meet this challenge.

The challenge of decision support applications is very different. While OLTP applications emphasize many users loading data into the database, decision support applications involve few users running complex queries to extract information from the database.

Decision-support applications consist of complex queries involving joins across many tables, running against very large databases. These complex queries usually select only a small number of records and include aggregate and order-by operations that each use a high degree of CPU and I/O resources.

Having addressed the challenge of OLTP performance in multiprocessor environments, Sequent and Ingres once again have embarked on a joint development project to meet the needs of decision support. This two-year project is known as PDQ, or Parallel Database Ouerv.

#### What Is PDQ?

Simply put, PDQ is a series of performance features that transparently break single, complex, and/or large queries into pieces that are processed in parallel. These features are expected to produce an average query performance improvement of at least an order of magnitude. PDQ allows this performance improvement to be sustained as the database grows by supporting the addition of processors and I/O capability to a Sequent multiprocessor system.

The first step of this project has been to alter the INGRES server such that a single server can utilize an unlimited number of processes on behalf of a single INGRES session. The current INGRES server is multithreaded, offering support for multiple users, but does so using a single UNIX process. As part of PDQ, Ingres and Sequent have added code to enable a single server to call on multiple processes and, hence, multiple processors, to work on its behalf.

This feature, called the multiple concurrent threads (MCT) server, is now in final preparation for Beta test. In addition to providing the foundation for future parallel query work, MCT can utilize all the CPUs in a multiprocessor machine without the need for going to multiple INGRES servers. Since a single server handles the scheduling for all requests, all server load balancing across processors will now be dynamic and fully automatic.

The Ingres/Sequent team is currently in the process of integrating a parallel sort feature on top of MCT. Sorting is a critical part of many important database functions including: index building, table reorganization, the order-by clause, and sort-merge joins. With the sort function running in parallel, performance increases

Silver Bullet and PDQ are two tangible examples of what happens when we combine our talents and build on previous experience.

of at least 300 percent can be achieved across a broad range of operations.

Processing a query in parallel requires the ability to logically split those tables involved into many small tables spread out over multiple disks and split the select over many processors. This will be accomplished with the next phase of PDQ, parallel scan. By spreading a table out over five disks, for example, one or more CPU's can be attached to each disk providing many times the processing power while accessing several different portions of the table concurrently. This technology is expected to result in linear performance gains for select operations.

The final phase of PDO will concentrate on the join part of the query. It will look at advanced algorithms for parallel joins and include the capability to simultaneously schedule multiple joins that

make up a single complex query.

It is still too early in the project to accurately predict the overall performance improvement resulting from the PDO project. However, early tests performed by Sequent on a university database showed a performance improvement of more than ten times.

#### Partnerships Drive Technology Development

Partnering is an important part of the culture at both Ingres and Sequent. Through partnering, both companies continue to bring to the industry multiprocessor relational database solutions that exceed what our companies could do independently. Silver Bullet and PDO are two tangible examples of what happens when we combine our talents

> and build on previous experience.

The early 1990s will present opportunities and challenges for multiprocessor database systems that far exceed anything we have seen to date. With true partnering that has passed the test of time and the trials of actual product develop-

ment, we will be able to provide the performance solutions that customers require in the time frame they demand: Pretty Darn Quick!

> By Michael Demshki Sequent Computer Systems, Inc.



Michael Demshki is database program manager at Sequent Computer Systems, Inc., a leading supplier of UNIX multiprocessor systems for OLTP. He has recently served on the Transaction Processing Performance

Council, an industry council defining standard benchmarks for measuring transaction processing and database performance.

# "How Badly Is File Fragmentation Slowing Down Your VAX"?"

Users of Digital's VAX/VMS<sup>TM</sup> systems have long complained of performance problems stemming from the gradual fragmentation of disk files. Every VAX/VMS Files-11 ODS-2 disk tends to fragment with use. It might take a month or it might take only a few days, but sooner or later the disk will have to be defragmented.

With DISKEEPER/Plus customized online defragmenter, all the disks on a VAX/VMS system can be kept defragmented indefinitely. DISKEEPER/Plus cleans them up and keeps them that way. Running as a lowpriority background job, DIS-KEEPER/Plus carefully rearranges files on a disk so they consist of as few pieces as possible, and attempts to combine spaces on the disk into a single large contiguous space. Because of its customization features you decide when and how DISKEEPER/Plus is to run on your system. It is a true set-it-andforget-it approach to defragmentation.

# How Does Fragmentation Occur?

VAX/VMS tries to allocate space for a file as close to the beginning (logical block number zero) of the disk as possible. It does so even if there is plenty of free space near the end of the disk and placing the file near the beginning requires that the file be split up into many pieces.

When you consider the long-term effects of this allocation strategy on a disk in continuous use, you can readily see that fragmentation can become extreme. Before **DISKEEPER/Plus**, the recommended remedy for disk fragmentation was to backup the fragmented disk to tape (or another disk), reinitialize the disk and restore the files from the backup save-set. This procedure is time-consuming and costly as it must be repeated whenever the system slows down.



Like "magic hands" Executive Software's Three Time Award Winning DISKEEPER/Plus™ eliminates file and free space fragmentation on your disks.

# How Does Fragmentation Affect Performance?

Every disk has fragmentation unless it has just been defragmented and not used since. A file fragmented into two pieces can take twice as long to access as a contiguous file. A three-piece file can take three times as long, and so on. Some files fragment into hundreds of pieces in a few days' use. Imagine the performance cost of 100 disk accesses where only one would do! Defragmentation can return a very substantial portion of your VAX to productive use.

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#### Ingres Corporation Success With DISKEEPER/Plus

"We found that DISKEEPER/ Plus tends to improve performance on VAX/VMS systems running INGRES."

George Hyman, Ingres Corporation

"We are pleased the evaluation of DISKEEPER/Plus has come to a successful completion. We use DISKEEPER/Plus in-house and are happy with the results."

**Bob Odell, Ingres Corporation** 

# Finding Out About Fragmentation

File Fragmentation Analysis Utility

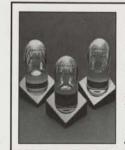
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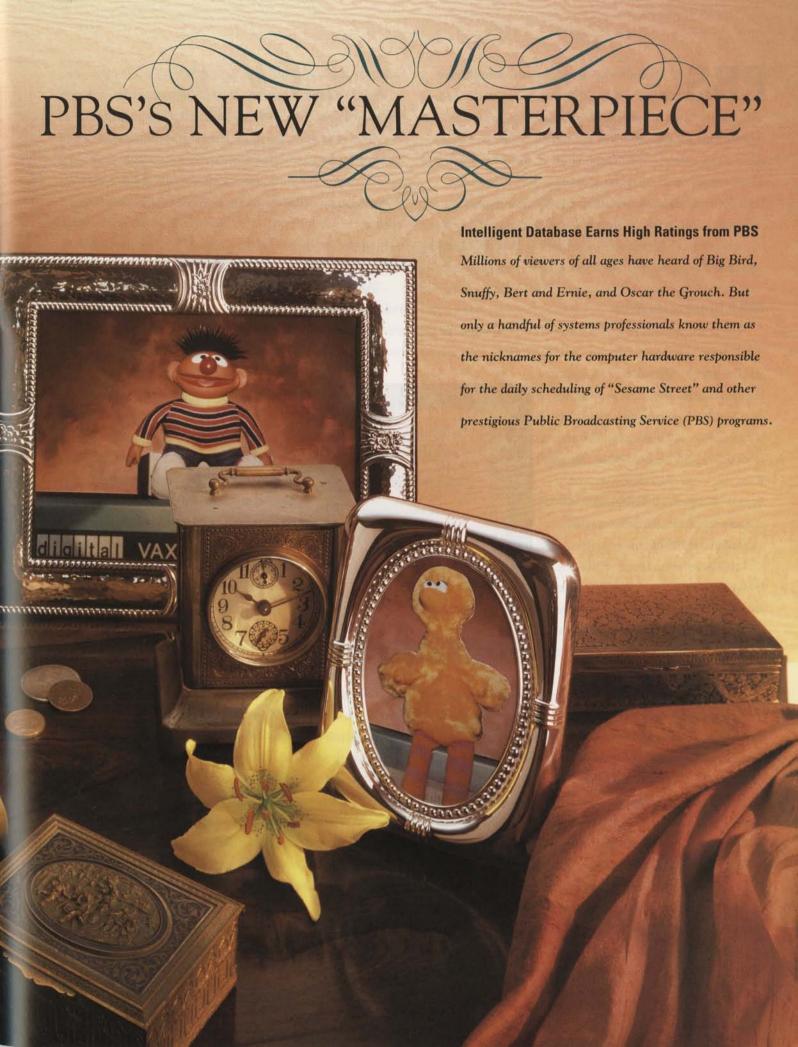
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PBS is a membership organization responsible for nation's system of viewer-supported, noncommercial television stations. Headquartered in Alexandria, Virginia, PBS relies on sponsors, both public and private, instead of on advertising to finance a wide variety of quality broadcasts. Included in its portfolio is such award-winning children's fare as Sesame Street, as well as such shows as Masterpiece Theater, Nova, the National Geographic specials, The MacNeil/Lehrer Newshour, and Upstairs, Downstairs.

#### **NOLA Broadcasts Nova**

Using a system called NOLA (Network Operations Log Application), the MIS department at PBS creates four complex

schedules for broadcasts via four satellite transponders per day. That nets out to over 57,000 programs and events a year transmitted to 327 noncommercial stations serving the United States, Puerto Rico, the Virgin Islands, Guam, and Samoa. NOLA also tells the user where the more than 130,000 videotapes are located in the PBS library.

NOLA is the backbone of all PBS broadcasts. In fact, NOLA was American television's very first satellite program distribution system and has been running at PBS for more than 10 years. It was first hosted on a DEC PDP/1170. Then, five

years ago, it was ported to DEC VAXes. The network now has a VAXcluster consisting of two DEC/VAX 8650s known affectionately as "Big Bird" and "Snuffy," and two DEC/VAX 785s dubbed "Bert" and "Ernie" running under VMS. There is also a MicroVAX II used for testing called "Oscar."

Formerly existing as a group of RMS files providing little control of data integrity, NOLA was manipulated by very old and difficult-to-maintain software written in BASIC. As recently as the fall of 1988, PBS was still plagued by a hardware/ software mismatch — powerful hardware, but painfully inadequate software. "You couldn't implement changes in the old system very easily," remembers Frank Pellegrino, PBS's manager of Database Applications and Operations. "It was a big, cumbersome job when someone wanted a new report or field. The

logic was simply too old."

Frank and the 13 others in the MIS department knew they needed a relational database management system. Anything less would just not be enough to handle assembling broadcast schedules, creating the complex reports sent out to the stations, monitoring and adjusting to schedule changes, and maintaining and locating the tapes. What's more, most of the end users - 100 each on the two 8650s, and 25 each on the 785s — would be non-systems professionals so their ultimate choice would have to be a user-friendly one.

"Although we meticulously evaluated 12 RDBMS vendors and their products, including Oracle and Sybase," notes Pellegrino, "it was the combination of Ingres Corporation's solid track record, satisfied user base, knowledgeable, straightfor-

> ward staff, and the product's consistent stability and ease of use that really held our attention."

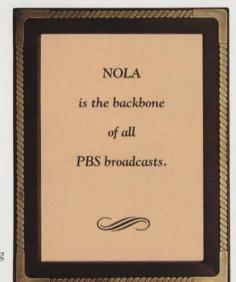
By January 1989, PBS had bought the INGRES RDBMS and was one of the first customers to be running Release 6. They used it immediately to write five applications. The first is a hotline that tracks in-house problems. The second is a purchase order system. The third is an inventory system that maintains a list of all PBS's hardware. Tied to this third system is a property pass system that creates permission slips for employees taking equipment off premises, then auto-

matically updates the inventory system accordingly. The fifth system — called the PBX system — monitors all in-house phone calls and generates reports for interdepartmental billing.

What about NOLA? Because NOLA holds 130,000 records (one for each tape) and 50 tables (the primary program table is 100,000 blocks), it represents a big conversion. It also represented an excellent Beta site possibility for Ingres's latest and most ambitious release to date: Release 6.3, otherwise known as the Intelligent Database. Pellegrino and his manager Bill Mountjoy agreed and the project began in mid-September.

#### An Intelligent Alternative

The new INGRES release is called "intelligent" because it



is capable of modeling all critical aspects of a business within the database server. In addition to enhanced data management capabilities, the product offers an optional Knowledge Management extension that provides business rules for managing the knowledge of how a business works. An Object Management extension, also optional, allows the server to manage industryspecific - or nonconventional data - through user-defined datatypes.

Currently, PBS is converting NOLA to the Intelligent Database. MIS staffers have used Oscar, the MicroVAX II, to test various capabilities in the three major new components of INGRES: Data Management, Knowledge Management, and Object Management.

PBS has found the Data Management capabilities of the

new release have allowed it to make group and application permissions. In the past, controlling the access of a large number of users of a database proved to be extremely resource-intensive. Typically, PBS has coped with large numbers of one-at-a-time permissions, each one often taking from 30 minutes to an hour to execute. By using the new INGRES group and application permit features, this problem is essentially eradicated. What used to average 45 minutes now only takes 5. "By being able to give permissions to groups of users or to an application," says Pellegrino, "I can spend

more time doing the important tasks I should be doing responding to requests, developing applications, managing personnel, or doing systems analysis — instead of setting up permissions."

The "rules" capability of the new INGRES Knowledge Management extension guarantees database integrity. NOLA has many "program" tables, including smaller tables that depend on larger "parent," or main, tables. "Our final goal is data consistency," notes Pellegrino. "We don't want people to create a NOLA record if the record doesn't exist in the main table. With INGRES rules embedded in the system, we won't have to worry about validation checks on every single table. When we purchased INGRES, we wanted a rules capability so

we wouldn't have to build logic into the code. We got what we wanted. What's more, INGRES is the only RDBMS in which the number of rules is unlimited, so integrities - many interdependent ones — are maintained. For us, rules are a big addition to the product."

In the Object Management category, INGRES's userdefined datatypes enable PBS to store nonclassical datatypes inside the central database system instead of managing them in application programs. PBS combines letters and numbers to indicate programs, episodes, and other identifying information. For example, "SESA1012C" stands for "Sesame Street, episode 1012, closed caption." Before, PBS would have had to use three fields: "SESA" as a character, "1012" as an integer, and "C" as another character. "This user-defined datatype is now defined

> with a single key. By programming in this datatype, we don't have to define the program, episode, and closed-caption note in three separate columns," says Pellegrino.

# "When we purchased INGRES, we wanted a rules capability so we wouldn't have to build logic into the code. We got what we wanted."

#### **Production Mode by August**

Once successfully tested, the new NOLA will be ported back to the DEC VAXcluster. It is scheduled for full production mode by August 1990. By that time, in addition to all the powerful features of the Intelligent Database, PBS anticipates its development cycle will be much more efficient. According to

Pellegrino, "Because of the prototyping capabilities in INGRES's 4GL and because we'll be able to use SQL with the INGRES Report-Writer to put together output reports faster, we'll be able to do analysis and construct simple systems in no time."

Speed and efficiency are to be expected from any RDBMS worth its salt. But what about the company and all the support behind the product? "All in all," adds Pellegrino, "Ingres Corporation has worked - and is continuing to work - extremely well with us. The expertise and support we received from our local office were outstanding. We're very impressed."

By Mark Lewis

## Getting Started with **Technical Support**



Every new INGRES user — from the CIO to the end user — occasionally has questions about INGRES. For this reason, we've dedicated this "INGRES Users Ask" to all our new and existing customers who want to know how to get off on the right foot in getting technical support.

- Q: I'm a new user in Pittsburgh, Pennsylvania, and our office opens at 8:00 a.m. Do I have to wait 'til 11:00 a.m. to get technical support from Ingres headquarters in California?
- A: No. Another full-service technical support center, located in Saddlebrook, New Jersey, is open from 8:00 a.m. to 5:00 p.m. Eastern Standard Time (EST). Just phone (201) 587-0448 to log your request. If it's past 5:00 p.m. in Pittsburgh, you can still call Ingres headquarters in Alameda until 8:00 p.m. EST.
- Q: The person who used to be our Ingres contact has left the company. How do I become the new technical support contact?
- A: To change technical support contact information, simply call our Customer Accounts Department at (415) 748-3432 and give your information to an Ingres account representative. You'll want to give the representative your Ingres license number along with the change of information. We'll promptly send you a new contact identification number in the mail but, in the meantime, our technical support team will be glad to help you as usual.
- Q: What information should I have on hand before I call technical support?
- A: Thanks for asking! The Ingres technical support team can answer your question more quickly if you have the relevant information on hand when you call. Please be ready to give the representative your contact ID number and your current INGRES release number.

For faster service, it helps if you can think through the events that preceded the problem you're experiencing, and can state precisely what happened. If you've encountered an error message, copy down the

- complete text of the message to read to the support representative. And if you think you've encountered a bug, be prepared, if possible, to offer a succinct test case demonstrating the symptoms.
- Q: I use telephone support extensively. Sometimes I think it would be helpful to have an Ingres technical support person on site. Does Ingres Corporation offer that kind of service?
- A: Yes. The service, called Premium Support, comes in two flavors. First, you can choose a dedicated telephone representative at Ingres. This representative understands the context of your applications and systems and is available to answer your questions when you call. Or you can choose an on-site technical representative. If you'd like more information about these services, contact your Ingres sales representative.
- Q: Sometimes my question is answered directly by the person who picks up the phone. Other times I have to wait for a call back. Why?
- A: That's because Ingres technical support uses "Calltrack," an INGRES knowledge base application, to track the status of each and every customer call that comes into our technical support center. Calltrack contains a database of problems that have already been solved. The representative who answers your call queries the knowledge base to see if a problem like the one you're reporting has been solved. If it has, the representative will give you the answer immediately. Currently, we have something like 6000 problems listed in that knowledge base, which means approximately 40 percent of incoming calls are handled immediately, with the help of Calltrack.

- Q: When I have an easy question, is my call prioritized differently than if I have an emergency?
- A: Yes. We have set up a call ranking system in order to serve our customers in the most efficient manner possible. The technical support staff ranks incoming calls according to the nature of the problem. For example, a "Rank 1" call involves a critical problem (i.e., the system is inoperative and this is having a critical impact on your organization). If a call is ranked "2," it means that your system is functional but restricted in some way. If a call is ranked "3," this means that you have called requesting consultation or information, and we respond to these calls after we have responded to Rank 1 and Rank 2 calls. Calls with the same rank are handled according to the age of the call.
- Q: I'm responsible for installing INGRES Release 6 on a VAXcluster, but I've never installed software on a cluster before. What assistance can Ingres Corporation provide me?
- A: We've got just the thing you need Installation Assurance! Under this plan, an Ingres technical representative, versed in INGRES installation, will come to your site. He or she will help you plan and execute the installation of INGRES on the VAXcluster, keeping in mind your application and system requirements. To hear more about this, contact your Ingres sales representative or call 1-800-4-INGRES.
- Q: How do I find out more about using technical support?
- A: The answers to all your questions are in the Ingres Technical Support Users' Guide. To order the guide, simply call 1-800-4-INGRES. We'll be delighted to send you one.

By Candy Sestric and George Loyer



# NAIUA Becomes Not-for-**Profit Corporation**

During the NAIUA Annual Conference held in April of 1989, Ingres Corporation and the NAIUA Executive Board developed an eight-point plan to create a stronger user organization by moving toward financial independence over the next three years. I am pleased to announce that the NAIUA has fulfilled the first step of this plan and is now incorporated as a not-for-profit corporation.

The next steps involve generating funds to cover operating expenses and enlisting the help of a management services company to handle many of our day-to-day tasks. We hope, as time and cost is reduced, that more volunteers will come forward to serve on the executive board, especially for the elected offices of vice president and member-at-large.

Executive Board members eventually will serve as advisors to those actually performing required functions. If you would like to serve on the Executive Board or would like more information, please contact Rick Angelini at (301) 278-6266.

We'd like to officially welcome Craig Stevens, director of Channel Marketing, and Dave Smith, our NAIUA liaison at Ingres Corporation. Craig and Dave have been working with us over the past several months and we are all looking forward to making this year the best ever for INGRES users.

Don't forget to register for the 1990 Annual Conference to be held May 6-10. As anyone who has attended previous conferences will tell you, it's one of the best ways to network with fellow INGRES

users, trade technical tips, and talk with Ingres Corporation experts in a fun, relaxed environment. For more information on the annual meeting, please call Mary Ellen Kay at Ingres Corporation — (415) 748-3402.

Many local and regional user groups (Denver, Washington, DC, Salt Lake City, Chicago, Southern Florida, Albuquerque, Pittsburgh, and New York City) have held or scheduled meetings. If you need more information on local user groups or anything concerning the North American or European INGRES User Associations, please call Becky Stokes at (801) 544-7778 or FAX (801) 546-3439.

> By Becky Stokes President, NAIUA

## Come to the 1990 North American INGRES User Association (NAIUA), May 6-10!

#### Do you want to:

- · Share technical knowledge with colleagues in your industry?
- · Get helpful hints from technical experts?
- · Find out about the latest developments in INGRES?
- · Visit with INGRES Partners?
- Get your hands on some INGRES training?
- And more?

#### Are you looking for a wonderful time:

- · At Ingres parties?
- Companion programs & vacations?
- And more?

#### Do you want to learn more about INGRES:

- Application Design
- Database Administration and Design
- Distributed Databases
- User Interfaces
- Release 6.3 Features
- And more?

#### Then the NAIUA Conference is for you!

If you haven't already registered for this year's NAIUA Conference, there will be registration available on-site or call Mary Ellen Kay at (415) 748-3402 for more information.

Date: May 6th

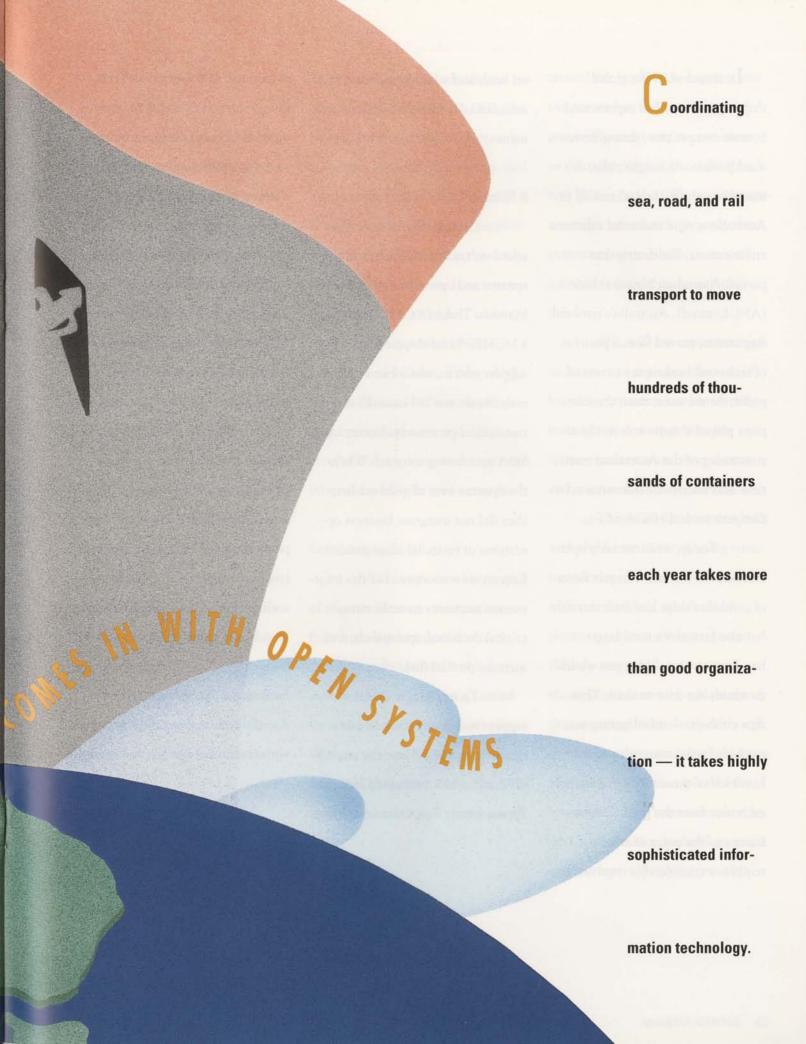
Time: Anytime from 1:00 p.m. to 9:00 p.m.

Place: NAIUA Registration Desk

Lower Level, Salt Palace, 100 S.W. Temple, Salt Lake City, Utah

See you there!

AUSIRALIAN AL MARIS SHIP



In recent years the global shipping industry has experienced intense competition, strong downward pressure on freight rates, diminishing profits, and, certainly in Australia, a rigid industrial relations environment. Yet during that period, Australian National Line (ANL Limited), Australia's national flag carrier, moved from a position of technical bankruptcy to one of profit. At the same time, the company played a major role in the restructuring of the Australian maritime and waterfront industries on a competitive and efficient basis.

Today, ANL not only operates one of Australia's largest fleets of container ships and bulk carriers, but also provides a total cargo handling service — not just wharf-to-wharf, but door-to-door. This new concept — coordinating sea, road, and rail transport to move hundreds of thousands of containers each year from the point of manufacture to the point of sale — requires a considerable organization

on land, and a highly sophisticated information technology environment.

#### A Need to Integrate Operations

Until two years ago, ANL relied on traditional data processing systems and operations to support its business. Three DEC PDP 11/84s ran a MUMPS-based shipping agency support system, while two Fujitsu mainframes ran in-house developed transaction processing systems and MSA accounting software. While the systems were of good quality, they did not integrate business operations or financial management. Executives were starved of the information necessary to make timecritical decisions, spot trends, and increase profitability.

To implement decisionsupport systems that would put timely information into the managers' hands, ANL recruited Gary Biesse, former Tax Office employee, as manager of Information Technology. He led the team to determine what management information was needed and recommended a strategy based on relational database management technology and open systems. This led to the evaluation of INGRES and Oracle, the leading hardware-independent RDBMS at the time, and the selection of INGRES because of the strength of its 4GL.

With the wisdom of hindsight in 1990, this may not seem
like a particularly daring move, but
in mid-1987, it was a bold strategy,
particularly for a large, conservative, government-owned agency
such as ANL. Biesse sold the recommendations to management on the
basis of total cost of ownership,
hardware independence, and reduced development time compared
with traditional systems and methods.

#### From PC Prototype to Full Production System

A comprehensive analysis of the information available in bills of lading was made, resulting in the first application, the cargo history information subsystem of the ANL Cargo Information System (ACIS). To assist in the analysis and development, Biesse engaged Syscorp Pty. Ltd., a firm of consultants with expertise in UNIX and relational database design and development.

The system was prototyped on a PC using INGRES and subsequently moved to a small multiuser UNIX machine. Once the database structure was in place, the data was automatically loaded from the bills of lading in the PDP-based agency support system.

Once the system was accepted by ANL management, the organization issued a Request for Proposals, evaluating submissions from Alcatel-STC, CMAD, DEC, Fujitsu, Hewlett-Packard, Network Solutions, Pyramid Technology, and Sigma Data. Ultimately, Pyramid was named as the computer supplier and Network Solutions as the network supplier. This was based on total cost, and the vendors' commitment to and support of UNIX, INGRES, and Ethernet. Today, ANL has two Pyramid 9815s with 48 megabytes of memory and 3 gigabytes of disk capacity, and a national Ethernet-based wide area network.

#### **Coordinating Cargo**

ACIS satisfies a wide range of requests for cargo information, from high-level analysis down to details of individual bills of lading, such as what cargo is being carried for which customers to which ports.

With more than 62,000 container entries in the system currently, ACIS tracks the locations of containers all

around the world. "A shipping line can succeed or fail on the basis of getting the right empty containers to the right place at the right time," says Biesse, "and ACIS gives management the information it needs about customers, cargo, ships, ports, and agents to ensure that we achieve this."

ANL will use expert systems techniques to minimize the cost of locating containers but has already realized major savings from the system, better control over agents, and improved customer service.

The ACIS database was built with the future in mind, using structures and codes that are compatible with international standards for electronic document interchange (EDI), putting ANL into a very strong position to take advantage of this emerging technology. Although this had not been an initial objective of management, it is typical of the forward-thinking approach taken by ANL's information technology team and has been achieved at no addi-

tional cost.

ANL had used electronic exchange of data in the past — for example, to receive ships' manifests from its Asian agents — but not under the umbrella of international standards. By adopting the recognized standards, ANL can supply information to its overseas trading partners in the formats they require.

#### **Open Systems**

Today ANL is heading toward a corporate database environment for all its information processing needs. "It became obvious to us that the structure we had developed for decision support systems could also be used to support our operations systems," says Biesse. "I can see that in two to three years time our entire operation will be based on UNIX, INGRES, and Ethernet."

In the past, individual PCbased systems proliferated to support particular user activities because of the lack of suitable productivity tools on the main systems. In the past few months, however, the information technology group has been able to prove to users how ACIS can be expanded to meet their requirements. According to Biesse, "Management information requests that used to take weeks to satisfy have all been satisfied within 24 hours since the implementation of ACIS."

John Wise, managing director of Syscorp and head of the systems development team, adds, "Through its use of open systems, ANL is beautifully placed to be able to support new operations. The technology is in place to allow the rapid implementation of systems. For example, we can provide a complete accounting facility simply by adding a few more tables to the ACIS data structure."

Biesse admits, "Management was initially a bit concerned about taking a totally new technical direction, but was reassured after a Peat Marwick Hungerford review endorsed it. I truly believe it is only a matter of time before executives are fired for buying proprietary systems because their boards will be aware they could have achieved twice as much at half the cost by going with open systems."

ANL was incorporated as
ANL Limited on the first of July,
1989, as part of the government's
program to improve performance of
all government business enterprises
by encouraging them to compete
with private enterprise on an equal
footing and making them accountable for their performance. The information technology backbone is
now in place to support these aims
well into the future.

By Patricia Duffy Patricia Duffy is marketing manager of the Asia/ Pacific Region for Pyramid Technology Corporation.

# CASE, with a Deft Touch...

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CASE with A Deft Touch

## Breaking the SQL Barrier



By combining relational database and natural language technology, we come a step closer to the ultimate goal - to turn raw data into useful knowledge.

In recent years, RDBMS vendors and third-party software companies have worked hard to provide a host of new tools designed to improve application programmer productivity. While these sophisticated SQL and SQL-based programming tools are very powerful in the hands of a trained programmer, their usefulness to an end user is limited because most presume a complete knowledge of logical database design.

Fortunately, new tools designed to aid both programmers and end users are now available. These tools can provide end users with access to relational databases using plain English, without having to use SQL. At the same time, they can reduce the MIS application backlog. Such tools are particularly useful for time-critical, unanticipated queries that would otherwise require more customized, time consuming SQL coding.

#### **English for End-Users**

Called natural language systems, these new tools let users interact in English with their computers, without needing to know the commands used by the underlying software. They are used by management and professionals who need frequent access to relational databases for crucial information.

To use a natural language interface, the user simply types the query in English for the information needed. The interface converts the guery into SQL, retrieves the information from the relational database, and displays the English query and results on the screen. A natural language system can help the user investigate and analyze

data from many different perspectives and, thus, make more intelligent decisions.

Since typing in English is natural and common for English-speaking users, it is inherently easier and more concise than

programming with a computer language. For example, posing the question, "Who made more money than the average sales representative in the New York branch?" in English is much faster than programming the SOL commands necessary to retrieve the same data. (This query, depending on the system and database, could take more than 20 lines of SQL coding!) By eliminating the need for executives, managers, and administrative staff to learn and know SQL, a natural language makes the end user more independent, self-sufficient, and productive.

#### A Boost for MIS

Besides the obvious benefits to end users, natural languages also offer significant benefits to MIS. Foremost among these is the ability to reduce an applications backlog. Instead of responding to numerous end-user requests, writing and generating customized reports, and then maintaining and modifying those reports, MIS can simply maintain the database.

When developing applications, programmers can use natural language to build small prototype databases. These can be presented to the users to determine exactly what they want. Changes are then made easily, again using the generated

code instead of starting over.

Instead of programming in SQL, a developer can build the natural language application and actually increase the amount of working SQL code generated by over 200%. And if users require further assistance from MIS after using the natural language interface on their own, an applications developer can manipulate the generated code, instead of starting from scratch in SQL.

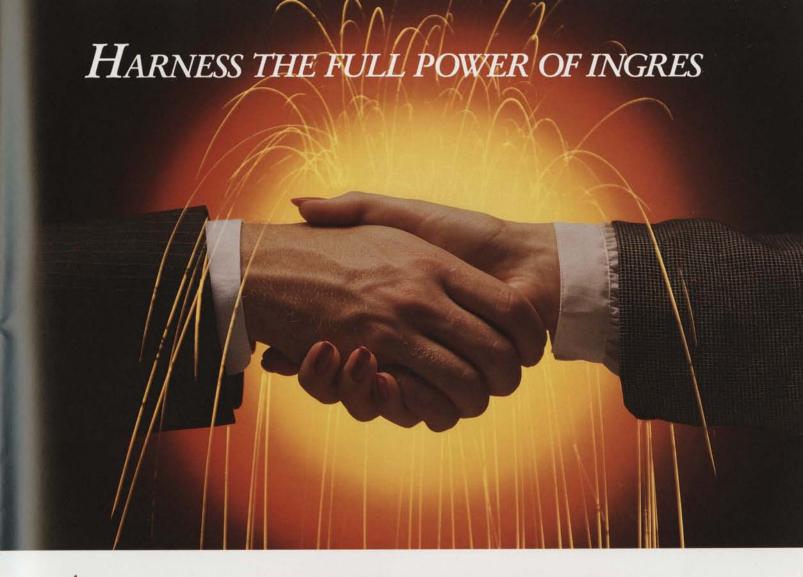
By eliminating the need for executives, managers, and administrative staff to learn and know SQL, a natural language makes the end user more independent, self-sufficient, and productive.

> Finally, a natural language can also significantly reduce the cost of training and support. English-language data access interface eliminates the pitfalls that accompany teaching nonprogrammers the skills required to perform sophisticated SQL queries. Natural language systems are also useful as SQL training tools, because they allow the user to see, at any point in a query, both the English and its SQL equivalent.

#### Finding the Tools to Meet Your Needs

When looking for a natural language tool, it is important to consider several factors: ease of use, performance, breadth, maintenance, and flexibility of configuration support.

(continued on page 47)

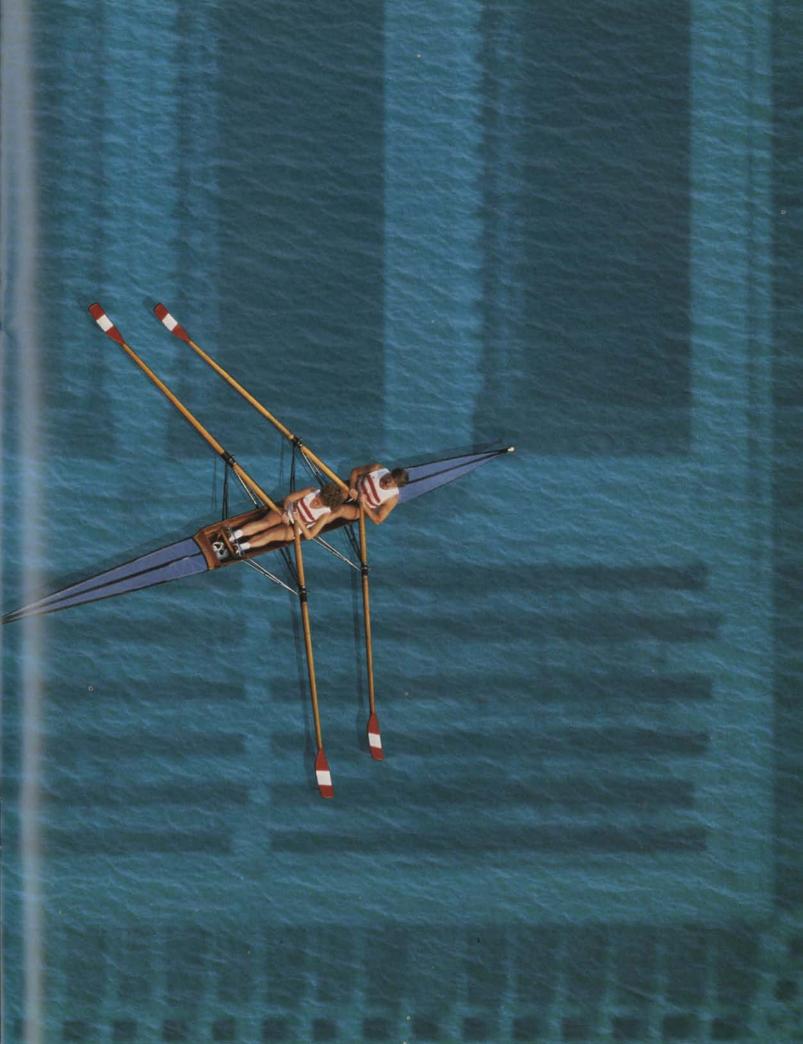


At The Palmer Group we specialize in helping you harness the full power of INGRES.

Manufacturing, engineering, technical and OLTP applications are our specialties. Most importantly, we pass along our expertise to your people so you can continue to develop and enhance your own applications. Our services range from INGRES training, consulting, design, application development and implementation to performance tuning. We have been providing these services since 1984. At The Palmer Group you will work directly with Certified Expert INGRES Consultants with in-depth experience and with the unique ability to communicate technical concepts. So make the decision to maximize your INGRES investment. Call your INGRES partner. Call The Palmer Group at (404) 448-7727 now.



Teamwork has its rewards. That's what integrated circuit manufacturer United Technologies Microelectronics Center (UTMC) discovered when it was asked to "find a complete integrated solution" for its divergent computer systems.



Pulling together data from four different databases into an integrated management information system was no simple task for UTMC, but it had to be done. The company management needed to develop reports drawing upon information in four different databases.

The Colorado Springs, Colorado, microelectronics supplier set out to integrate four distinctive systems residing on its VAXcluster. Each system was developed independently to serve a specific job function within the company.

#### **Uniting Disparate Databases**

The systems were developed over the past decade to serve different departments within UTMC. A VAX DBMS computer-aided-manufacturing (CAM) system was installed about ten years ago. State-of-the-art at the time, it still is used by virtually all semiconductor manufacturers.

An RMS-based financial system from McCormack & Dodge was added about two years later for applications such as general ledger and fixed assets. The system is designed for general financial work and doesn't permit UTMC to prepare the detailed reports required by the government. The INGRES RDBMS was added three years ago to enhance the RMS-based system.

Also in the early 1980s, an RS/1-based statistical system was added to assist the company's engineering efforts. This database provides UTMC engineers with statistical analysis information, quality assurance tools, and engineering data. The engineering database is linked with the manufacturing system to permit an exchange of information between these two operations. An orderentry system was developed in-house using the RMS database management system about seven years ago. UTMC is in the process of converting and improving this system using INGRES application tools and relational capability.

#### Glue to Pull the System Together

The task of integrating these diverse databases was launched in the first quarter of 1989. Early results were not encouraging.

"We were looking for the glue to hold together our diverse applications," says Tim Melchior, manager of business software and engineering for UTMC. "We needed an integration tool that would give us end-user report-writing capability drawing upon data residing in all of our databases.

"We were disappointed after studying closely what was on the market," says Melchior. "We learned we could scrap our present computer setup, pay millions of dollars for a replacement, and end up with a system functionally inferior to our present unintegrated one." Like its existing computer system, the solution wasn't to be found from a single vendor.

> Instead, a close partnership was forged among UTMC, Ingres Corporation, and Interactive Software of Denver, developers of the User Data

Management System (UDMS).

"To achieve the integration goals and reportwriting capability sought by our management, we knew that we needed a relational database solution," Melchior said. "And with UDMS and INGRES we have a relational product built on a relational platform and have joined them together with our nonrelational systems into a single database."

#### Creating a Close Relationship

The close relationship between Ingres and Interactive Software and the synergistic nature of their products provided the answer for United Technologies. Working closely with engineers from Ingres and UDMS, Melchior, programmer Diane Zand, and other UTMC software engineers achieved their goal. They developed an integrated solution using INGRES to build important new applications and UDMS to provide complete access to its multiple database engines.

"The cooperation between Interactive Software and Ingres to help UTMC solve its system integration problem is a good example of a business partnership at work," says Bob Karulf, president of Interactive Software. "Ingres has exclusive rights to sell the UDMS software to its customer base and we work together with them in sales and support of both products."

UDMS, a layered product that rides on top of operating system software, is a read and write environment that provides users with the tools for reporting, exporting, querying, and updating data from as many as 32 files. It has a friendly frontend and built-in 4GL, which makes it easy to use yet powerful.

"It is a visual, intuitive interface rather than being syntactical or language-based," Karulf explains. "UDMS is a perfect complement to INGRES. While INGRES is excellent for applications building by frequent users, UDMS is better suited for the infrequent user because of its "pick-andchoose" window-based facilities. For instance, a budget manager doing just one report a month can do so easily using UDMS."

Melchior, of UTMC, believes the INGRES/UDMS combination provides the database integration and report-writing capabilities his company is seeking. It allows the UTMC to develop reports for making crossdiscipline management decisions while retaining the time-proven advantages of their dedicated applications.

"UDMS gives us access, from a single program, to all of our databases. Its reporting capability was key to us. We can pull data from anywhere in the system to prepare a single report. And after looking at other relational systems during our search, we are certain that INGRES and UDMS form the environment that supports our multisystem needs," Melchior says.

INGRES has been a useful adjunct to the RMS-based financial reporting system. "The McCormack & Dodge system is just not oriented toward handling the detailed reporting required by the government. With INGRES, we can pull together information already in the financial system and figure actual costs to be compliant with government regulations," says Melchior.

#### An Array of Tools

In addition to its work under government contract for the military and aerospace industries, UTMC manufactures custom and semicustom ICs for other United Technologies divisions and other military and aerospace contractors external to the corporation. INGRES and UDMS are being used to develop a new order entry system and to manage all of UTMC's cost accounting and purchasing activity.

> UTMC also uses INGRES to convert and enhance its RMSbased order entry system. "INGRES's embedded SQL and Applications-By-Forms

are important tools in this development work," says Melchior.

Interactive Software is using INGRES's SQL preprocessor as the gateway to the INGRES databases.

The cursor's function within SQL is particularly valuable in joining multiple tables within the INGRES databases. Access to UTMC's other databases is achieved using vendor-approved file access protocols.

#### A Bright Future

"System integration will let us develop executive reports to support better management decisions," Melchior says. "We intend to provide management information similar to the type now available only through Executive Information Systems. For the first time, our management will have access to information across all business functions in a well-organized and timely manner." By John Kane

### Ingres Voted Number One with VARs

In a recent issue of VARBusiness magazine ("VARs are Tough on Their DBMS Vendors," November, 1989), VARs rated Ingres Corporation number one overall among RDBMS vendors. The survey was designed to probe resellers' opinions of four database management software vendors that are among the leaders in the industry. Ingres Corporation beat out Ashton-Tate, Oracle, and Informix in seven out of nine categories related to marketing and support. As the article notes, "VARs say [Ingres Corporation] knows how to take care of its customers, and this is reflected in its high scores.

"What VARs want," according to VARBusiness, "is simple: a knowledge-able person on the other end of the line who will work expeditiously to solve problems." Ingres Corporation took top honors in the provision for user support with a score of 6.69 while Ashton-Tate scored only 4.67. This category represented the largest point spread in the survey results.

Michael Gregory, product manager of relational products at Project Software and Development Inc., Cambridge, Mass., favored Ingres's score in the user support category. "The support I've gotten from [Ingres Corporation] has always been very, very good. They're responsive to user needs."

According to Mark Diedrich, VAR and business development marketing manager at Ingres Corporation, "The Ingres reseller program was the best-kept secret in the industry prior to the VARBusiness article. I can guarantee the marketplace will soon fully understand that Ingres Corporation has the finest products, sell-through marketing programs, and partnerships in this business. We truly are committed as a corporation to partnering with our VARs in order to deliver the highest-quality information integration solutions to the end-user community."

#### Ingres Announces Strategic Partnership Agreement with LPI

Ingres Corporation strengthened its program of strategic alliances by establishing a partnership agreement with Framingham, Massachusetts-based LPI. Under the agreement, the two companies will exchange software for use with their own products that will mutually benefit their customers. LPI will provide Ingres Corporation with their latest release of LPI-FORTRAN and LPI-COBOL compiler products for use with Ingres Corporation's strategic UNIX platforms. A few of the platforms initially included are The Santa Cruz Operation's SCO UNIX 3.2, Interactive Systems Corp.'s 386/ix, and AT&T's 3b2. Ingres will license a copy of it's INGRES database to LPI for internal use for research and potential support of the compilers.

"We are pleased to take this step with Ingres Corporation. Having the INGRES product family coupled with LPI compilers means that our customers will have additional flexibility in porting sophisticated applications across a wide variety of UNIX platforms," stated Steven W. Weingart, executive vice president of LPI. "This application portability is a key part of LPI's product strategy in support of the industry-wide move to open systems." LPI-FORTRAN and LPI-COBOL fully conform to their applicable ANSI and X/Open standards and have been validated at the high level by the Federal Government.

#### Softsel Outlets to Mass Market INGRES

Ingres Corporation will begin marketing the INGRES RDBMS and applications development tools through Softsel Computer Products, Inc.'s extensive reseller network. Under the joint marketing agreement, Softsel's more than 13,000 authorized dealers and value-added resellers in North America will carry INGRES products for DOS, OS/2, and UNIX-based PCs, workstations, and minicomputers. The agreement covers INGRES for a wide range of UNIX plat-



forms including Sun Microsystems' Sun-3, Sun-4, and SPARCstation machines; Apple's Mac II (A/UX); Hewlett-Packard's 9000 series; and selected IBM PC and compatible platforms as well as machines from Apollo, Altos, The Santa Cruz Operation, NCR, and AT&T.

"This partnership is a major new direction for Ingres Corporation and adds to our already strong presence in the UNIX and PC marketplaces," said Paul E. Newton, Ingres Corporation president and CEO. "This step will help solidify our position in the reseller market."

Said David S. Wagman, co-chairman of Softsel's board of directors: "We believe INGRES is one of the best relational database products in the UNIX workstation market and are enthusiastic about making it available to our dealers and VARs. INGRES puts us solidly into the UNIX world with a successful, well-respected product and will help our resellers provide better solutions to their customers. We are particularly excited about offering the full range of Ingres products to complement our distribution of INGRES as a component of Open Desktop from The Santa Cruz Operation. In addition, it provides us with a mainframe-quality DOS database to supplement our already significant DOS product offerings."

## Adamation Introduces First INGRES-driven Application for NeXT

Adamation, an Oakland, California-based value-added reseller (VAR) for Ingres Corporation, announced the availability of Who's Calling, the first INGRES-driven application for the NeXT computer. The product utilizes the power of the INGRES RDBMS to monitor phone calls and other key client information.

Who's Calling includes a client database, dialer, tickler, calendar, and a variety of reports. According to Stephen Adams, president of Adamation, "Who's Calling is essentially a high-powered business productivity tool. But, no matter what industry you're in, it can help restore order to the critical, but all too often chaotic, world of client management, event scheduling, and phone communications."

"Who's Calling dramatically illustrates how quickly a sophisticated product can be brought to market when you use INGRES tools to build it," says Bill Smith, Ingres Corporation's UNIX product marketing manager. "It also represents the first product built on INGRES for NeXT that fully utilizes NeXT Step, the user interface on NeXT."

#### INGRES Available for Solbourne Workstations

Ingres Corporation has expanded the market for its INGRES RDBMS to include Sun SPARC-compatible machines from Solbourne Computer, Inc., Longmont, Colo., the leading manufacturer of Sun SPARC-compatible workstations.

INGRES has been certified fully compatible with Solbourne's SPARC-based workstations and servers. Solbourne's licensing of the SPARC architecture and system level software from Sun Microsystems allows the Sun-4 version of INGRES to run on the Solbourne system without modification.

"It is a good match for both companies," said Mitch Bishop, director of UNIX product marketing at Ingres Corporation. "Database developers can now use INGRES to take full advantage of the speed and overall performance improvements inherent in Solbourne's multiprocessor systems. These performance gains will be even more dramatic as advanced versions of INGRES become available for use on Solbourne's workstations."

"INGRES is a well-established database management system in the UNIX and Sun marketplaces and it is an important addition to our software lineup," said Allen Snell, director of third-party marketing for Solbourne Computer.

#### Ingres Ships Release 6 OEM Port Kit

Ingres Corporation is shipping the INGRES Release 6 UNIX port kit to OEM (original equipment manufacturer) customers. The new INGRES Release 6 UNIX port is a customized collection of source code and documentation which allows Ingres Corporation's OEM partners to implement INGRES on UNIX machines not currently supported directly by Ingres Corporation.

Release 6 is a high-performance, on-line transaction processing (OLTP) implementation of the INGRES relational database management system. It features INGRES's advanced multiserver architecture, which is important in meeting the evolving market demand for multiprocessor workstations. Release 6 also provides significant performance improvements over earlier versions of INGRES and a series of new tools designed to increase the productivity and ease of use for developers and end users alike.

In most cases, Ingres Corporation will provide technical support to OEMs during the porting process and additional enduser support after sales begin.

#### INGRES to Run on Cray Research Supercomputers

Ingres Corporation has announced that INGRES is the first relational database management system (RDBMS) to run on Cray Research Inc.'s CRAY X-MP and CRAY Y-MP UNICOS systems.

By combining INGRES with Cray
Research systems, users can take advantage of relational database performance
capabilities as well as a wide array of
enhanced INGRES application development tools. INGRES's unique client/
multiserver architecture ensures portability of applications and transparent data
access across divergent computers and
operating systems. In addition, the
availability of INGRES on Cray Research

systems will allow Cray Research to offer its customers industry-standard data management capability and the potential for large-scale applications integration.

#### Ingres Wins Documentation Awards

Ingres Corporation Technical Publications has won recognition from the Society for Technical Communication for four of its user manuals. The manuals are Introducing INGRES for the UNIX and VMS Operating Systems, INGRES/SQL Command Reference Summary, Using INGRES Through Forms and Menus, and INGRES/4GL Reference Manual. A certificate of achievement was presented for Introducing INGRES for the UNIX and VMS Operating Systems, while the other three were awards of excellence. Manuals were judged on the basis of writing, editing, graphics, and integration. The awards were presented February 10 in Sacramento.

#### INGRES Is the First Relational Database System to Run on New IBM RISC System/6000

INGRES is the first relational database to run on the new IBM RISC workstation. INGRES is remarketed by IBM and is the only product that enables customers to access database information across IBM's AIX and Systems Applications Architecture (SAA) platforms.

Access is provided between IBM's AIX and SAA environments by way of the INGRES DB2 and SQL/DS database gateways and the INGRES/STAR distributed data manager.

"With the announcement of the RISC System/6000, IBM has become a major player in the UNIX marketplace," said Christopher H. Greendale, Ingres Corporation vice president of marketing. "As IBM's premier relational database partner, we are uniquely positioned to fully support the RISC System/6000 family of products with the latest database technology."

#### INGRES Selected for World's Largest Conservation Database

INGRES has been selected by the World Conservation Monitoring Centre (WCMC) to develop the world's largest conservation database. The WCMC's massive database will collect and store information on the world's endangered species, their habitats, protected areas, and international wildlife trade, providing conservation groups and governments throughout the world with reliable, up-to-date scientific information on which to base conservation policies and decisions.

The information will be made available to governments, development agencies such as the World Bank and foreign aid programs, and conservation groups, as well as to industry and the media.

Duncan Mackinder, head of the WCMC's computer services unit, explained the need for the global database. "Good information is the raw material for good conservation. We have to put upto-date, quality information in front of the decision makers if we are to succeed in saving the thousands of species and habitats which now face extinction. We needed a powerful database with no limits on growth, that could integrate with the increasing number of worldwide environmental centers. INGRES met all of our open systems and standards requirements, and Ingres Corporation demonstrated a high level of commitment and support."

The system presently holds 0.8 gigabytes of information and is expected to grow to 5 gigabytes in five years' time. The system will support up to 30 users and manage databases of between 50 and 100 tables, the largest of which will contain over 1 million records.

#### Japanese Ingres Operations to Expand

Paul E. Newton, Ingres Corporation president and CEO and Hidechika Kobayashi, president of Japan Systems Engineering (JSE) announced the strengthening of their corporate ties in Japan. JSE is the exclusive distributor for direct sales of INGRES products in Japan.

As part of the agreement, the current operations will be renamed Ingres Japan KK. The operations of Ingres Japan are also expanding to include a sales office in Tokyo's commercial district and a new office in Osaka. An existing facility, the Ingres Technical Center, will remain in its present location near Tokyo.

Newton commented that Ingres has increased its commitment to Japan with the posting of staff from Ingres Corporation and with the delivery of new Japanese products. Japanese INGRES is now available for DEC VAX/VMS and Sun Microsystems' Sun-3 workstation.

#### UK Software Companies to Build Government Database Products on INGRES

Peterborough Software Limited and West Wiltshire Information Systems (WWIS) have announced a partnership agreement. As part of the agreement, the companies will develop the WWIS Interlox system and Peterborough Software's Open Door human resource system into one of the world's most comprehensive database products for local government applications, using INGRES as the host RDBMS.

The new product consists of community charge, rent and rates management, finance and income management, housing, environment and site planning, election management modules, as well as a full range of personnel and staff management packages. All modules can be tailored to meet the specific administration requirements of local government.

The new Interlox product will be marketed by West Wiltshire Information Systems.

#### Banque Paribas Capital Markets Group to Develop Applications with INGRES

Banque Paribas Capital Markets Group, one of the world's largest international capital markets institutions, has placed an order worth over £0.5 million with Ingres Limited for the INGRES RDBMS. Banque Paribas will use INGRES to enhance its main capital market trading systems,



which will be accessed by the group's capital markets operations around the world.

The Paribas Capital Markets Group headquartered in London with operations in Paris, Frankfurt, New York, Tokyo, Hong Kong, and Sydney—is one of the leading multicurrency debt and equity houses in international capital markets. It offers a range of debt and equity services including origination, corporation finance, new issues, options, equity sales and trading, and research. The group is the world leader in the fast-growing ECU market and an acknowledged world authority in swaps in many currencies. The group is part of Paribas, Europe's premier investment bank with consolidated assets of \$123 billion and 1988 earnings in excess of \$440 million.

Banque Paribas Capital Markets
Group will develop fully integrated trading applications with Ingres running on DEC VAX 8800 and 6400 systems. The applications will be held centrally at Banque Paribas' London data center and the information will be used by over 1000 end users across the group's international operations 24 hours a day, seven days a week.

#### Ingres Ltd. Signs VAR Agreement with Leading Planning & Control Developer

Ingres Limited announced a new INGRES Partners VAR agreement with Metier Management Systems Limited, the world's leading supplier of planning and control software. Metier will develop an SQL interface to INGRES for its ARTEMIS 4GL-based product and project management system.

ARTEMIS is a powerful 4GL that supports a software kit, incorporating both

tools and materials, for building solutions to planning and control problems. ARTEMIS provides critical path planning techniques, full resource scheduling, a flexible report writer, and an Englishoriented command language, with highquality graphics facilities. It covers the major requirements of project management, including planning and scheduling, cost management, resource management, and maintenance control. The new interface will enable ARTEMIS users to input corporate information from a central database into the ARTEMIS planning and control environment.

#### Ingres Signs VAR Agreement with Leading UK ICL System 25 Software House

Ingres Corporation has signed a VAR agreement with Magic Systems Ltd., a leading UK developer of software for ICL System 25 users. Under the agreement, Magic Systems will develop System 25 applications software based on INGRES, ICL's preferred database and development solution for UNIX systems. Magic Systems demonstrated INGRES for the first time at the System 10/25 User Association European Conference in November 1989.

Magic Systems has already made a number of important technical advances in the ICL System 10/25 field. It is the only company to offer a full System 25 emulation on a microcomputer through its STEM software facility, which allows users to achieve System 25 functionality on a wider range of machines. It was also one of the first system houses to provide an easy connection between PCs and System 25s with its PC coupler slot-in card.

#### INGRES on CETIA Unigraph Workstations

France's CETIA, S. A., and Ingres Corporation have signed an agreement that permits CETIA to market the INGRES relational database management system and its suite of products on a worldwide hasis

CETIA, a branch of Thomson CSF (with revenues of 60 million francs), was created in November 1986. It is the first

French company to offer graphic servers and workstations. CETIA, has earned revenues of 83 million francs in 1987 and 128 million in 1988.

In addition to workstations and Unigraph servers, CETIA will offer an environment consisting of Uniframe software and Unigraph VME hardware. This will provide the integration of a heterogeneous network of computer-aided engineering solutions, especially in the area of software engineering for real-time systems.

#### INGRES, the Heart of French Television Channel 3

Like French Channel 5, French Channel 3 has selected INGRES running on UNIX System V for the development of strategic applications. These applications range from the management of audiovisual production to the scheduling of television programming. Channel 3 based its choice on INGRES's excellent response time and the ease of use of the INGRES family of tools. The television station has installed NCR Tower systems in several regions of France.

#### An Ingres Office in French-Speaking Switzerland

On July 1, 1989, Ingres Corporation opened an office in the French-speaking part of Switzerland, at Laussane.

With several important clients in the region, Ingres Corporation is already well established there. These clients include l'Hôpital Cantonal de Genève, la Loterie Suisse romande, and the prominent Ecole Polytechnique Fédérale.

The opening of this new office will permit Ingres Corporation to augment its market share and to better meet customer needs through training and technical support programs.

#### Ingres Chooses Dutch CASE Tools

Dutch CASE tool vendor Westmount Technology has announced the completion of a distribution agreement with

Ingres Limited. Under the terms of the agreement, all exclusive distributors of INGRES in Europe and the Middle East will be able to distribute Westmount's Integrated CASE tool, ISEE/INGRES.

Besides multiuser support, ISEE/ INGRES offers the unique ability to generate INGRES/4GL directly from diagrams made with ISEE/INGRES. Because the product runs under X-Windows, the INGRES developer is able to create a powerful window-based testing and debugging environment for applications.

Westmount will provide all necessary marketing and sales support to the distributors through Ingres Limited. Special training programs have been developed for distributors' sales and technical staff for Westmount's CASE products.

#### **Ingres Announces Partners** Group Agreement with Ferranti Infographics

Ingres Limited has announced a new Ingres Partners Group VAR agreement with Ferranti Infographics Limited, the leading systems integrator in the European CAD/CAM marketplace. Ferranti Infographics is using INGRES in the development of a new engineering data management system for the control and administration of product design information in CAD/ CAM environments.

The new system, Mazurka DATA MANAGER, written in INGRES/4GL, may be used stand-alone or as a completely unified part of the Mazurka system. It allows users to define and manipulate product structures, and use file access control, data archival, and retrieval mechanisms. Additional functionality is available to allow change control, configuration management, and project monitoring control.

#### Introducing INGRES/Windows 4GL

We are moving away from a world of character-cell terminals toward one in which multitasking, graphics "microstations" (workstations, X-terminals, and personal computers) dominate. As this trend continues, application developers will need tools that take full advantage of workstation capabilities, without compromising productivity or portability.

Ingres Corporation is addressing this need with INGRES/Windows 4GL, a major addition to the INGRES application development product line.

#### Dramatically Increases Programmer Productivity

INGRES/Windows 4GL revolutionizes application development for workstations, giving programmers up to ten times the productivity of competing solutions.

tion applications. The visual editor lets programmers rapidly build graphical user interfaces, while the 4GL reduces coding to a fraction of that required using comparable 3GL-based tools.

#### Access to All Workstation Capabilities

Developers are immediately productive using INGRES/Windows 4GL (with full access to 3GL procedures when appropriate). Unlike tools that are compromised to work for both terminals and workstations, INGRES/Windows 4GL provides complete access to all workstation capabilities — without forcing the developer to learn a totally new way of programming and hundreds of complex window toolkit programming routines.

#### **Guaranteed Application Portability**

Applications developed with visual editors are not tied to any particular windowing

environment.
INGRES/Windows
4GL insulates the application from the underlying toolkit and, at the same time, provides access to all of its features.

### Interoperability with Other Applications

An application developed for DEC windows, for example, can move immediately to a Motif environment, without change. End-user organizations can now take full advantage of

workstation features without being locked to a particular vendor. At the same time, VARs can build custom workstation applications quickly, and market them across a variety of workstation platforms. Because the INGRES/Windows 4GL Runtime System links to the native window libraries, the resulting applications are



"good citizens" — taking on not only the native look and feel of the workstation environment, but also able to interoperate with other applications.

"Many of our major customers are moving to workstations to achieve substantial productivity gains for their users," says Bill Smith, Ingres product marketing manager. "Some have made the rude discovery that programming in 3GL to a windowing toolkit has a devastating effect on their delivery schedules — and that it requires substantial retraining of their programming staff. I can't tell you how relieved they are to discover that INGRES is ready with exactly the right product, exactly when they need it."

INGRES/Windows 4GL will be available as an optional product on Sun-4 (SPARC) and VMS workstations by calendar Q3 of 1990, with other workstation platforms to follow.



INGRES/Windows 4GL links with the native "window toolkit" to give your application the look and feel appropriate to the user's system, without sacrificing interoperability or portability across different windowing environments.

The product accomplishes this by integrating visual editors and a full-function, object-oriented 4GL with a complete, rapid development environment for easily managing both small and large applications.

This combination makes it easy for developers to build sophisticated worksta-

# When you bought Ingres, you bought the best RDBMS in the market today. But, are you using everything you paid for?

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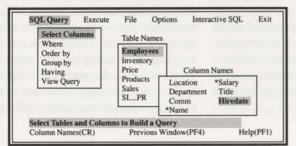
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#### The Logic of Entente

An alliance is a lot like a marriage. There may be no formal contract. There is no buying and selling of equity. There are few, if any, rigidly binding provisions. It is a loose, evolving kind of relationship. Sure, there are guidelines and expectations. But no one expects a precise, We need to measured return on the initial commitment. Both partners bring to an know much alliance a faith that they will be stronger together more than we than either would be

ful.

When one partner is weak or lazy or won't make an effort to explore what the two can do together, things can come apart. One-

separately. Both believe

abilities the other lacks.

And both have to work

make the union success-

diligently over time to

that each has unique

skills and functional

sidedness and asymmetry of effort and attention doom a relationship. If a wife goes out and becomes the family's breadwinner and does all the housework and raises the children and runs the errands and cooks the meals, sooner or later she will rebel. Quite right.

If the husband were in the same position, he'd rebel too. As soon as either partner starts to feel that the situation is unfair or uneven, it will begin to come apart. Alliances are like that. They only work when the partners do.

It's hard work. It's all too easy for doubts to start to grow. A British whiskey company used a Japanese distributor until it felt it had gained enough experience to start its own sales operation in Japan. Japanese copier makers and automobile producers have done this to their U.S. partners. It happens. There's always the danger that a partner is not really in it for the long haul.

But the odds run the other way. There is a tremendous cost — and risk — in establishing your own distribution, logistics, manufacturing, sales, and R&D in every key market around the globe. It takes time to build skills in your own people and develop good relations with vendors and customers. Nine times out of ten, you will want to stay in the alliance.

Inchcape, a British trading house with a strong regional base in Asia, distri-

butes Toyota cars in China, Hong Kong, Singapore, elsewhere in the Pacific region, and in several European countries. It also distributes Ricoh copiers in Hong Kong and Thailand. This arrangement benefits the Japanese producers, which get access to important parts of the world without having to set up their own distribution networks. It also benefits Incheape, which can leverage its traditional British connections in Asia while adding new, globally competitive products to its distribution pipeline to replace the less attractive offerings of declining U.K.-

based companies.

do about what

makes effec-

tive corporate

relationships

work.

In practice, though, companies do start to have doubts. Say you've started up a Japanese alliance, not invested all that much, and been able to boost your production at home because of sales in Japan. Then you look at the actual cash flow from those sales, and it doesn't seem all that great. So you compare it with a competitor's results — a competitor that has gone into Japan entirely on its own. It's likely that you've forgotten how little effort you've put in when compared with the blood, sweat, and tears of your competitor. All you look at are the results.

All of a sudden you start to feel cheated; you remember every little inconvenience and frustration. You yield to the great temptation to compare apples with oranges, to moan about revenues while forgetting fixed costs. You start to question just how much the alliance is really doing for you.

It's a bit like going into a marriage counselor and complaining about the inconveniences of marriage because, had you not married, you could be dating anyone you like. You focus on what you think you're missing, on the inconveniences, and forget entirely about the benefits of being married. It's a psychological process. Alliance partners can easily fall into this kind of destructive pattern of thought, complaining about the annoyances of coordination, of working together, of not having free rein. They forget the benefits.

Actually, they forget to look for the benefits. And most accounting and control systems only make this worse. For instance, if you are running your own international sales operation in Japan, you know where to look for accurate measures of performance. You know how to read an income statement, figure out the return on invested capital, consolidate the performance of subsidiaries.

But when you're operating through a partner in Japan and you're asking yourself how that Japanese operation is doing, you forget to look for the benefits at home in the contribution to the fixed costs of R&D, manufacturing, and brand image. The financials don't highlight them; they usually don't even capture them. Most of the time, these contributions — like the extra production volume for OEM export — are simply invisible, below the line of sight.

Companies in the United States, in particular, often have large, dominant home-country operations. As a result, they report the revenues generated by imports from their overseas partners as their own domestic sales. In fact, they think of what they're doing not as importing but as managing procurement. Exports get recorded as overseas sales of the domestic divisions. In either case, the contribution of the foreign partner gets lost in the categories used by the U.S.-based accounting system.

It takes real dedication to track down the domestic benefits of a global alliance. And you're not even going to look for them if you spend all your time complaining. The relationship is never going to last. That's too bad, of course, if the alliance really does contribute something of value. But even when alliances are good, you can

outgrow them. Needs change, and today's partner might not be the best or most suitable tomorrow.

Financial institutions shift about like this all the time. If you're placing a major issue, you may need to tie up with a Swiss bank with deep pockets. If you need help with retail distribution, you may turn to Merrill Lynch or Shearson Lehman Hutton. In Japan, Nomura Securities may be the best partner because of its size and retail strength. You don't need to be good at everything yourself as long as you can find a partner who compensates for your weak points.

Managing multiple partners is more difficult in manufacturing industries but still quite doable. IBM in the United States has a few important allies; in Japan it has teamed up with just about everyone possible. (There has even been a book, published in Japanese, entitled IBM's Alliance Strategy in Japan.) It has links with Ricoh in distribution and sales of low-end computers, with Nippon Steel in systems integration, with Fuii Bank in financial systems marketing, with OMRON in CIM, and with NTT in value-added networks. IBM is not a jack-of-all-trades. It has now made huge fixed-cost investments. In the eyes of Japanese consumers, however, it has become an all-around player. No wonder IBM has achieved a major "insider" position in the fiercely competitive Japanese market, along with handsome sales (\$7 billion in 1988) and profits (\$1.2 billion).

Sure, individual partners may not last. Every business arrangement has its useful life. But maintaining a presence in Japan by means of alliances is a permanent endeavor, an enduring part of IBM's strategy. And acting as if current arrangements are permanent helps them last longer. Just like a marriage. If you start cheating on day two, the whole thing gets shaky fast.

Why does the cheating start? You're already far down the slippery slope when you say to yourself, "I've just signed this deal with so-and-so to distribute my products. I don't need to worry about that anymore as long as they send me the check on time." You're not holding up your half of the relationship. You're not working at it. More important, you're not trying to learn from it - or through it.

You're not trying to grow, to get better as a partner. You've become a cash register, a coupon clipper. You start to imagine all sorts of grievances. And your eye starts to wander.

When a dispute occurs in a transnational joint venture, it often has overtones of nationalism, sometimes even racism. Stereotypes persist. "Americans just can't understand our market," complain some frustrated partners. "The Germans are too rigid," complain others. "Those mechanical Japanese may be smart at home, but they sure as hell are dumb around here." We've all heard the comments.

It does not take companies with radically different nationalities to have a "clash of cultures" in a joint venture. Most of the cross-border mergers that took place in Europe during the 1970s have resulted in divorce or in a takeover by one of the two partners. In Japan, mergers between Japanese companies -Dai-Ichi Kangyo Bank and Taivo Kobe Bank, for example - have journalists gossiping about personal conflicts at the top between, say, ex-Kangyo and ex-Dai-Ichi factions lingering on for ten

years and more. Good combinations Ciba-Geigy and Nippon Steel (a combination of Yawata and Fuji), for example — are the exception, not the

rule. Two corporate cultures rarely mesh well or smoothly. In the academic world, there is a discipline devoted to the study of interpersonal relationships. To my knowledge, however, there is not even one scholar who specializes in the study of intercompany relationships. This is a serious omission, given the importance of joint ventures and alliances in today's competitive global environment. We need to know much more than we do about what makes effective corporate relationships work.

We must under-

stand that success

requires frequent,

rapport-building

meetings with at

least three organ-

izational levels: top

management, staff,

ing level.

Having been involved with many multicompany situations, I do not underestimate this task. Still, we must recognize and accept the inescapable subtleties and difficulties of intercompany relationships. That is the essential starting point. Then we must focus not on contractual or equity-related issues but on the quality of the people at the interface between organizations. Finally, we must understand that success requires frequent, rapport-building meetings with at least three organizational levels: top management, staff, and line management at the working level.

This is hard, motivation-testing work.

No matter what they say, however, many companies don't really care about extending their global reach. All they want is a harvesting of the global market. They are not interested in the hard work of serving customers around the world. They are interested in getting next quarter's ROI. They are not concerned with getting back to strategy or delivering long-term value or forging entente. They want a quickie. They want to feel good today and not have to work too hard tomorrow. They are not serious about going global or

challenges of globalization will not go away. And

best mechanisms that companies have found to bring strategy to bear on these challenges. In today's uncertain world, it is best not to go it alone.

and line manageabout the painstaking work of building and maintaining the alliances ment at the worka global market demands. Yet the relentless properly managed alliances are among the

> Kenichi Ohmae heads McKinsey's office in Tokyo. He is the author of The Mind of the Strategist: The Art of Japanese Business (McGraw-Hill, 1982), Triad Power: The Coming Shape of Global Competition (Free Press, 1985), and Beyond National Borders (Dow Jones-Irwin, 1987).

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training provided by our partner. We also have an opportunity to communicate our clients' needs to our partner's engineering departments, and even exercise some influence over the direction of the product. In the case of our relationship with Ingres Corporation, we have fullation's headquarters in Alameda to see for themselves. I spend time with these clients. I also serve as a liaison between the two companies' engineering and marketing departments, and help optimize joint sales operations worldwide.

The advantage of this arrangement

is that, since ICL is based in the UK and operates worldwide, we don't have to struggle with the time and space differences when dealing with the large number of interactions that our partnership entails. We can renew commitment to our shared values as often as we like.

well-established national corporations will need more technology to support their broadening across the continent.

What this means is that companies like ours, even while we must continue, as Ms. Kurtzig says, "to do what we do best," are going to have to "think internationally," more diversely, and across a broader base. We recognize that we cannot do it all ourselves and now have a well-developed attitude toward strategic partners who do what they do best. Products that are technologically superior and easy to use will be prominent in this broadening market, because Europe is about to absorb a large dose of advanced technology in a relatively short time. At the same time, technology by itself is no guarantee of success, because it changes so quickly. Good partnerships that keep abreast of advances in technology are crucial to success.



time managers assigned to the relationship and 150 software specialists all over the world who are thoroughly trained on the software.

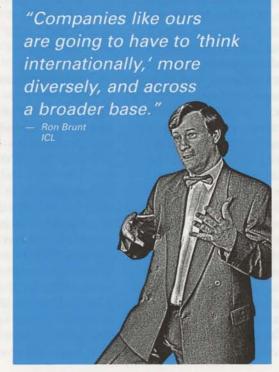
Mr. Brunt, your company, ICL, is the largest provider of computer systems in the United Kingdom and has a significant market presence in Europe. ICL has made a heavy investment in Ingres in both technology and expertise. You personally are a British citizen working for a company headquartered in London, yet you have an office at Ingres Corporation headquarters in California and live nearby. Why?

As Mr. Holland says, partnership is like a marriage, and it is harder to make it work when you are 6000 miles apart. I serve as the focal point for ICL in the headquarters of Ingres Corporation; I can make things happen between our two companies. ICL believes that INGRES is the leading product in database technology and application development tools, so many of ICL's major customers who are looking for an RDBMS will be strongly influenced by ICL's commitment to INGRES; some come to Ingres CorporFrom ICL's European perspective,

what does the "globalization" of business that Ms. Kurtzig was talking about imply?

Europe is as big a market as the U.S., and it's rapidly changing. The revolutionary

nature of the changes there including the development of the Common Market in Western Europe and the democratization of Eastern Europe — implies that there will be a rationalization of all industries. I think the key players in high technology will be broadening their base. Europe, currently, is a very dynamic market and is a long way from saturation. Many areas are still in need of information management technology and



(Viewpoint, continued from page 32)

A natural language system must, first and foremost, be easy to understand and easy to use. Help commands, and the actual English language interaction, should make users feel as though they are conversing with the computer, not translating back and forth to English.

Performance is important; easy access to information for mission-critical applications is meaningless if the system is slow, and cannot generate timely responses.

And while English is easy for humans to use, it is also one of the most complex languages for computers to use. Words, tenses, and phrasing of queries can often be interpreted in many ways. A good natural language system will have a robust set of built-in vocabulary and concepts library that users and programmers can build from. Any type of phrasing used in the English language should be intelligible to the computer.

The system should be easy to maintain. Training and support overhead should be minimal. And the natural language system must fit with current operating systems, hardware configurations, and future MIS plans. Finally, the system should operate across a broad range of platforms and operating systems in today's networked environments.

#### **Turning Data into Knowledge**

Before the development of tools such as natural languages, programmers spent hours writing lines of SQL code, while end-users waited impatiently for the information they needed. Today, thanks to advances in the development of relational database and natural language technology, it's becoming easier for both groups to work happily and productively. This is the next step toward the ultimate goal - to turn raw data into useful knowledge.

By Paul Ricci Natural Language, Inc.



Paul Ricci is vice president of marketing for Berkeley, California-based Natural Language, Inc. (NLI).

(Assessing Earth's Atmosphere, continued from page 15)

instruments. This system, incorporating the INGRES RDBMS and applications, will convert UARS observations into the processed, catalogued data products essential to rapidly analyze and understand the complex atmospheric process.

A key feature of the UARS data management plan is to link NASA's central computers with a network of minicomputers located at scientific institutions around the world. In addition to principal investigator scientists studying data as it is received, there are ten theoretical groups with specific areas of responsibility for data analysis and interpretation.

Throughout the UARS flight, which will last between 18 months and 5 years, the investigators will analyze data and update observing strategies to maximize the scientific return of the mission. This approach will enable the scientists to respond to unusual events such as solar flares, volcanic eruptions, or sudden warming of the atmosphere.

Following the mission, scientists will continue to carry out analyses and modeling studies based on an extensive set of atmospheric data. These studies will be made easier because of the database management capability of INGRES. After the entire project is completed, the data will be turned over to the National Space Sciences Data Center and made available to the scientific community.

Studies of the vast body of data should provide investigators with an understanding of changes in the upper atmosphere that can lead to policy decisions addressing the human role in such changes. If the mission is successful, the information gathered will be made available to governments around the world, enabling them to address more effectively the role of human activities in altering upper-atmosphere properties. Through this investigation, the U.S. space program will have taken "another giant leap for mankind."

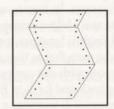
By John Kane

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# Focus: A Competitive Advantage



When used to describe a software company, the word "focus" really means "competitive advantage," both for the software vendor and for the customer using the software. Although a vendor company's "focus" is seldom one of the criteria for selecting a software system, it should probably figure at the top of the list.

Vendors that cross marketplaces probably try to transfer strategies and tactics that may not be applicable. We can all think of examples of companies, both big and small, that have successfully specialized in a product or service. When the success goes to their head, as it were, they move into product areas beyond their expertise. Sometimes, the loss of focus causes them to suffer consequences fatal to the business.

As customers become more demanding, vendors must work harder to keep them happy. To be successful in a chosen market-place today, a vendor must understand the often-subtle expectations of its particular customers. If, for instance, a company develops and markets specialized application software, management should focus on putting 100 percent of its R&D efforts on increasing existing products — functionality and ease-of-use, rather than trying to develop new markets.

A focused strategy allows vendors to become specialists in their respective markets. It also allows them to produce the highest quality products and services available and, ultimately and most importantly, to satisfy a vast range of customer needs.

#### Focus as a Key Criterion

In evaluating software, there are a number of proven ways to evaluate product functionality. Evaluators should define requirements, see product demonstrations, check references, go through trial periods, and perform other tests to provide a framework for testing the product "fit" before finalizing the purchase.

Another set of criteria applies to the vendor as a company. These criteria should

include factors such as years in business, financial stability, size of customer base, company vision, and services offered. All of these characteristics answer one important question for the prospective buyer: how well will the software vendor support my company?

Unfortunately, "focus" is a key characteristic very often left out of the traditional vendor selection criteria. But it's important to recognize that a company's focus offers two important benefits to the customer.

The first is in the area of technological expertise. If a company has a focused strategy, such as databases or applications, then it will have a very high level of technical expertise in that market. If research and development engineers are continually committed to improving performance, user interfaces, and comprehensive product functionality, the vendor is better able to deliver new technological developments to the end user. The result is a satisfied customer.

Focus also allows a company to provide excellent customer service, and this is of primary importance to customers. Good customer service encompasses not only hotline support, but also peripheral services such as training, programming, and implementation assistance. When the vendor has a focused strategy, each consultant and analyst is totally dedicated to the product at hand. Again, the result is a happy customer.

#### Partnerships for Complementary Markets

One example of a focused company is Ingres Corporation. Ingres has spent years and millions of research and development dollars on its product lines and on building the infrastructure required to provide ongoing support to its end users. The typical end-users for database and tools software such as INGRES are MIS professionals, the majority of whom have had substantial training in data processing techniques and who are comfortable

working with computer systems.

On the other hand, application software users require a much wider choice of support services according to their skill level. As suppliers of financial accounting, distribution, and human resources applications, we at Ross Systems must meet the needs of very different end users; hence, we have a very different focus. Sometimes, our end users have never touched a computer system before. Therefore, the support provided for these customers must be on a totally different level.

Unlike database users who typically have a very structured, methodical approach to solving problems, the typical applications user relies completely on the vendor for solving almost any problem. Customer support products such as documentation, training materials, and user guides must be constructed to address a first-time user or someone who has nontechnical levels of experiences.

As focused companies, neither Ingres nor Ross Systems attempts to service both experienced users and first-time users with the same strategy. Rather, the two companies partner with key vendors who have focused in other, complementary markets.

As technology gains sophistication, so do user demands. In order to keep a competitive edge, vendors must make every effort to focus on meeting the needs of those users. Without a complete and thorough understanding of the users' needs, any vendor company — no matter how apparently successful — is bound to falter or fail.

By Joe Southworth Ross Systems



Joe Southworth is vice president of marketing for Ross Systems, a leading provider of financial, distribution, and human resource application software based in Palo Alto, California.

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Washington, DC	Intelligent Database	12	Portland, OR		1	New York, NY	OLTP
Denver, CO		17	Calgary, ALB Cincinnati, OH		2 2	San Francisco, CA	
San Diego, CA		17	New York , NY		2	Trumbull, CT	Manufacturing
Minneapolis, MN	ì	18	Dallas, TX		3		
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Irvine, CA		19	Cleveland, OH		16	Canberra Melbourne	INGRES 6.3
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Los Angeles, CA		24	Salt Lake City, UT Washington, DC	UNIX	17 17	Sydney	III OILO 0.0
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Milwaukee, WI		25	Detroit, MI	Automotive	23	UNITED KINGD	OM
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Seattle, WA		26	Rochester, NY St. Louis, MO		23 23	London	INGRES Event
Somerset, NJ	Telecom	26	Chicago, IL	Intelligent Database	24		
Westchester, NY	Aerospace	26	Ft. Lauderdale, FL		24		The second second
			Santa Clara, CA		24	TRA	DE SHOWS
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Paris	Introduction	25					
UNITED KINGDOM		TRADE SHOWS			8		
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Düsseldorf	Introduction	24	Salt Lake City	N.A. INGRES	6-10		
München	Introduction	26		User Association			
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	DADE CHOMO		London	User Group Meeting	1-2		
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INGRES User

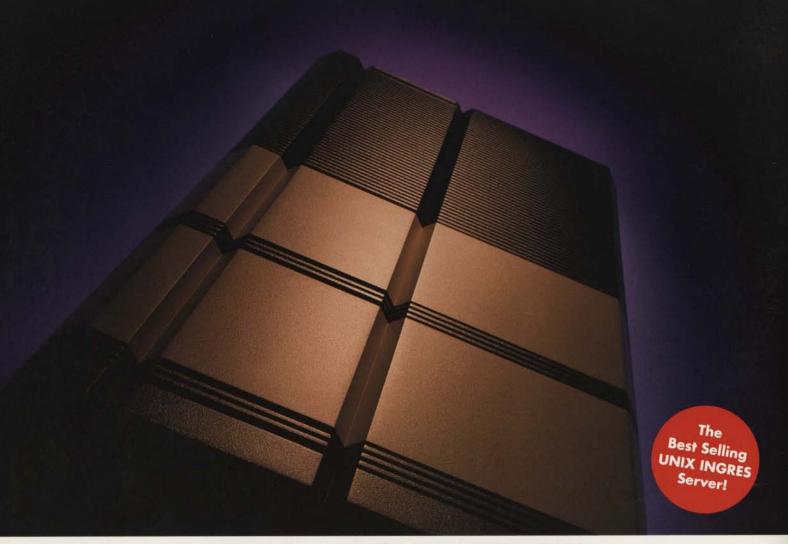
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