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What new technological projects have actuaries been implementing lately? Speakers will describe their experiences, the successes, foibles, and impact of introducing new technology to their companies or clients.

MR. ALLEN J. ROTHMAN: I'll be discussing telecommuting and supporting distributed workers. I'm joined by Michael Demner, who is an actuary here in the Vancouver area, running his own consulting firm. He has been with several of the major consulting firms throughout Canada and in Chicago and will be speaking about pension administration systems and some new trends in that and how they're built. Brian Pollack is with Milliman & Robertson in Seattle and will talk about Lotus Notes. You will be seeing a demonstration of Lotus Notes and learning more about what it can do.

Very little was mentioned in your program about what we would discuss and that was deliberate—technology changes so rapidly, we're all having trouble keeping up with it. For example, Brian, who will be our third speaker, will talk about Lotus Notes. We've been planning the talks for about two months and the recent announcement about IBM purchasing Lotus changed everything.

MR. MICHAEL D. DEMNER: I will be talking about benefit administration systems on the PC. I have been setting these systems up for clients for a couple of years. I want to go through and show you how the system fits together and give you some background information about me and where I'll be going with this system.

In 1971, I started working in computers, mostly on mainframes. I moved out of that area for quite a time and then got back into it in 1987 with Towers Perrin in Vancouver in the pension administration systems area. That was a system that was originally developed from a mainframe system; the system you'll see is using basically a packaged software. For the last six years, I've been working on the design and the installation of these systems at Towers Perrin—major systems for large clients and some for small clients. I left Towers Perrin to start my own consulting business in 1993 in Vancouver and I've been doing that for a couple of years now. I do a combination of systems design and consulting, pension consulting, and group benefit consulting.

We will focus on the systems area. This is a relatively new concept in terms of the way I have put the pension administration system together, using different software packages to tie it all in. When I was at Towers Perrin, we basically designed one big system which you could install at a client's site and it would do everything for them: the pension calculations, producing pension statements, payroll interfaces, and the various year-end processes. That worked well for the bigger companies. For the smaller companies, it's very expensive. Here in Vancouver we have many small companies. Five hundred employees is a big company here. We have to tailor make the system designed to the smaller market.

That's what my target market is: the small to medium-sized companies, 200–500 employees, maybe up to 1,000 employees. Defined-benefit pension plans can be administered using in-house systems or by third-party administrators. I perform third-party administration using this system and I also market the system to organizations. I'm just local and prefer it that way, but I may be expanding later on. When I went out on my own, I wanted to move more into a family-oriented, local business rather than a big national organization. The overall concept relies on a data management system, and I'll show you samples of how the system works. The data management system maintains all of the data. This is the most important part of the system and must be flexible enough so that you can get data in and out of the system as easily as possible. It maintains current and historical pension data on the plan members. The spreadsheets do the calculations and then we have a word processor, which is basically the Microsoft Office Word for Windows, although you can use WordPerfect and some of the other packages to produce statements and the form letters and merge them with the database.

The system will run on a stand-alone basis or in a PC network environment with Microsoft Windows. The older systems didn't operate under Windows, but now they're all upgrading to the Windows environment. My system uses the Office Suite of software using an Access database together with Word, Excel, and Query, and we'll see an example of how these work.

The system requires the client to have some technical expertise. It's not something that you can design, give to a client and say good-bye. It does need some hand-holding, and some training at the beginning. Usually, I will sell these systems to clients who want the flexibility. They don't want a "black box"; they need to know how it works and be able to customize it and make changes.

The data management system uses an Access database. I'll go through a sample of how it works using Windows. You can use other databases, but this is the one I found most easy to use, and the most flexible. It has its own reporting features, as well as being a very versatile database. That's the basic database. The system is programmed in Visual Basic, another Microsoft product. It has screens and menus, so it's easy for the clients to be able to use and to move from one screen to another. I have some import and export features, and I try to develop very simple batch processes in the system. There's limited customization. Because it's going to be upgraded, I don't want to have it tailor-made to each individual client. However, I have built in some customization through client programmed modules which can be attached to the standard system.

Each screen maintains a different data file. For example, there is a screen showing the current employment data. You also can go into the beneficiary screen. There is also a screen showing the history on pensionable earnings and one showing the monthly records, so you can page up and page down between the various records. You can make changes on line, but you'll normally be inputting the data through a payroll interface process. We can access historical data on pension plan membership, so it has all the pensionable service year by year. We also can get information on the history of salary rates and employment status changes.

There are many features. We also can access some other menus. There are some batch processes like creating pension calculation files and pension statement files and they are

customized to the client's own specifications. The system stores all the data you need for the calculation process. The big part is loading the initial data and editing it in the system. You just hit the stop button to exit. This is a very brief overview of the data management system.

The pension calculations are performed outside of this system. They're done on a series of Excel spreadsheets. It uses something called Microsoft Query to link between the Excel spreadsheet and the access data base. You can have very simple to very complex formulas. It can be customized from client to client. If they have the knowledge, they can go in and make changes to the spreadsheets and the client can perform calculations for single or multiple plans.

Let me very briefly go through the spreadsheets. With the new version of Excel you can split a spreadsheet up into books and each one has a different aspect. One calculates the service, one does the average earnings calculations, one has the formulas and the actuarial factors, and they're all set out. It links through this Microsoft Query, so if you change the data, you export a file and this will pick up the most current data. The first book stores the basic data and the calculation parameters. It's all automated. Once you bring the new data into the spreadsheet, it automatically recalculates all the formulas. You can have supplements and bridges. Actuaries like to use spreadsheets and so I found this works well. Sometimes there's not an actuarial firm involved, but usually there is. The firm can have some input into the whole process. It can even design the Excel spreadsheet.

I produced the pension statements and form letters through Windows using a data merge process. You can merge the word statement with either the Access database or the Excel spreadsheet, depending upon the need for it, and you can have statement and letter variations. Usually you need lots of different variations for retirements and terminations, for example, single versus married. They can all be accommodated. The client can customize it. You can give the documents to them and as long as they have some basic understanding, they can go in and change the wording, and move things around in the document. Again, I find that the clients like that. Even though they don't always do it, they like to have the flexibility to be able to go into a document and put on their own logo and set the margins to their own specifications. The client can select different groups, different plans, and other combinations.

I have created standard reports using the only non-Microsoft product. It's a local company called Crystal Services. It has already expanded into the U.S., I believe, and has a very neat report writer. The data management system already has some standard reports in there. The good thing about Crystal Services is that it offers very flexible report design. You can export to Excel and Word and many other software packages. It's fast to run and modify, and you can compile the various reports and distribute them to your clients. They don't even need to have the Crystal Reports software.

The advantages of this approach is that it's flexible, and it can handle almost any plan. There isn't any limit. It doesn't take a year or eighteen months to install the system—the basic version is already there. Usually within about three months I can install the whole system with all the statements and the spreadsheets. It has a single source of data, or you can interface it to an external payroll system. You don't have different data bases where you have to input data several times, and you can link up various sources. You have to

know what you're doing to link them all up, but these days with Windows and different software packages, it's fairly straightforward to input information into the system.

My system is relatively inexpensive compared to the major systems, which is good for the small- to medium-sized clients, and there's definitely a role for the actuary in the process. As well as my input in the process, the plan actuary should also be involved in reviewing calculations.

There are some challenges. You need the client to have some technical expertise. You need to have somebody who knows about some of these packages. You need to link several pieces of software together and that's usually straightforward, but occasionally it crashes or doesn't work quite as expected. If you move things around to different directories, you have to change some of the spreadsheet macros, for example. The Access database tables may need to be modified. The more difficult it is for the client to move the system around without me knowing about it, the more protection I get from others pirating my developed software.

You have to keep up with new technology all the time. You can't fall behind your clients as they progress either. If you do, the system is not going to work very well. Future development—we've expanded the system to include group benefits, as well as pensions. Integrating the spreadsheets with an actuarial model is another challenge. Right now I have a separate actuarial modeling system, and over the summer I'll be integrating the two together so the client can actually derive its own actuarial factors. You can already do this through the pension calculation spreadsheets. I also plan to include more standard reports, add some data export processes, so it's easier to take information out of the system and expand the security system.

That gives you an overview of how my system works and it seems to be quite popular for the small- to medium-sized organization. I don't want too large a client because the Excel spreadsheet can get very large, especially for the pension statements. The pension statement spreadsheet includes everybody. If you have 1,000 employees, it's quite a big spreadsheet! That's about the only limitation I can see to this system.

MR. ROTHMAN: Is anybody supporting people who are on the road a great deal? That's the situation I'm in. I introduced myself as working for Actuarial Sciences Associates. I'm not sure you all know who we are. We're a subsidiary of AT&T and I currently am on assignment to AT&T where I'm running an office in Chicago. I spend three days in Chicago and two days in my office in Somerset, trying to support people in both locations. Thus, telecommuting became my pet peeve. I have two voice mailboxes, three computers, and I have phones all over the place. The only thing I don't have right now is a pager.

A quote from a *Los Angeles Times* article says, "Technology changes and things are happening relatively quickly." This isn't a very static environment. I picked up on it because it mentioned AT&T, and I guess misery loves company. AT&T has 123,000 management employees, not including global information solutions (which used to be NCR) and of these, 37,000 are currently in some form of telecommuting situation. Why would a company allow so many people to work away from the office?

One possible reason is that you need much less space when you have telecommuters. There are also legal pressures such as the Clean Air Act of 1990 which established mandatory targets for vehicle occupancy. Companies are going to alternative work solutions so that they can meet these goals, not necessarily because they want to. There are, of course, advantages to the company and I'll get to those later.

Those of you who are in a systems department will find that sooner or later you'll have people outside your building who you will have to support. There's a great deal of different hardware out there you'll have to learn about. There are also different ways that you will find people hooked into your office electronically. Then there's the software that you're going to need and the implications in all of it. Brian will talk about Lotus Notes, which is "groupware."

Let's begin by examining various ways that space can be allocated. Everyone is familiar with a dedicated office, dedicated workstation environment. This is the one that we all grew up on. The longer you work, the harder you work, you move up through the company and you get the bigger office, the corner office, whatever. This is the standard environment and everyone knows how to support it. We may not be doing a good job supporting it, but we know how to. One person, one office. The big problem is if you use the 2,000 hour a year rule, you see that you're only using it 23% of the time. Companies look at it and ask if they cannot be much more efficient. Some companies have sent people home: "Go home, do your work at home." Now you've got the problem that since you've only moved the office out of the building, you still have to support it with a centralized staff. We'll get to some of the implications on that later.

Another alternative is a shared office. I found myself in that situation at Actuarial Sciences Associates. Because I was on the road so long and so often, they felt that it was a more effective use of my office to have more than one person using it. One of the big drawbacks as we start moving forward through this spectrum is you start losing privacy. When you have your own office, you have your desk, your shelves, and your file cabinet. In a shared environment, you start to share things. Since you're sharing a desk, you may not want to leave certain things there. Everything has to be locked up if it's confidential and that has an analog for the PC also. Will there be one PC per office or one PC per person? If you have more than one person accessing to a PC, how do you effectively safeguard the data that the person leaves on it? A shared office can work; however, a problem that we've run into is that there can still be space conflict. You can't always force people to be on the road on certain days. I'm on the road at least three days a week, but those three days aren't fixed. This created a problem when the person with whom I was sharing the office and I both came in on the same day. There just was no room in the office for us both to work and get anything accomplished.

This leads to "hoteling." Here you have the absolute minimum in privacy or in private ownership of your office. It works just like a hotel. You have an occupancy rate. You make reservations in advance. The days that you're in the office you reserve a work space for the days you will be in the office. You come in, they give you a cubicle or they give you an office and you work. This leads to a completely different set of support requirements. Where do you keep all your stuff? How many PCs do you need? Does everyone have his or her own?

The final configuration I'd like to discuss is the virtual office. In a virtual office environment, your office is wherever you are at the time. Some of us who are on the road a lot end up with this or possibly a combination of a virtual office and hoteling. We carry our PCs, phones, and files, and we try to do our best. One of the things I'll talk about when we get into the software is how do you give people access to needed corporate data when they're on the road.

What are the hardware requirements for supporting telecommuters or "road warriors." The most obvious configuration is the dedicated desk top PC. With a dedicated PC, you have your own PC, you put a password on it and you shut it off at night. As with a dedicated work space, it's idle when you're not there.

Next we come to shared PCs. I started talking about this when I talked about the various office sharing arrangements. How do I insure that you don't get to my data or that I don't get to yours? I'm a pension consultant. I could have my clients' employees' salary histories on my computer and that is highly confidential information. If it were on paper, I'd make sure it was locked away at night. If it's on a PC and I'm sharing that PC with somebody, how do I prevent that information from getting out? There are various things you can do. You can password protect spreadsheets. You can partition hard drives. You could have everyone use a removable hard drive or just not store anything, but that isn't much of an alternative.

A more viable alternative is to use laptops. This way people carry their PCs with them wherever they go. With a laptop you also solve some of the security problems. You have the security of a dedicated PC but it's portable. Unfortunately, if you look at it from a financial standpoint, it can get frightfully expensive. You will spend over $5,000 for a very good laptop. Add a docking station or some sort of bus extender so you don't have to plug things in every time you go into an office and you're talking about big dollars. Another problem with laptops is battery life. How many people here use laptops? How many people have been able to make a flight without the thing going dead?

FROM THE FLOOR: Only a short flight.

MR. ROTHMAN: Some of the manufacturers have come out with new ideas. The laptop I use has a removable floppy drive. You press a button, the floppy drive pops out and you can put in another battery. When you're on a long trip and you know you will not need the floppy drive in transit, you can put two batteries in the computer. Of course nobody's using the same size batteries, so you're stuck with a proprietary design which costs $200. The other problem is carrying all the different adapters and rechargers you will need. None of the laptops seem to run on the same voltage or have the same pin configurations. You're carrying all this junk with you but it looks impressive and the screens are great.

Other types of hardware you'll need to support road warriors are modems and faxes. These allow people to keep in touch when they're on the road. The problem is that people will have to carry cords and adapters so they can plug into different phone lines. PCMCIA modems use a flat four-pin connector which can be very fragile. You might be well-advised to carry two of them. Also, if you leave them in the PCMCIA slot, they can drain your battery.

The third area that alternative work arrangements impact is telecommunications. The most familiar form is plain old telephone service. It is relatively slow but has one very big advantage: it's available everywhere. No matter what hotel I'm in, I can call any place else in the world. Line speeds go up as high as 28.8 kilobaud. Leased lines are the opposite end of the spectrum. They are very fast, but both ends of the connection must be predefined. For example, if you get a T-1 line, you get 24, 64 kilobaud channels for what appears, at first, to be a maximum through put of 1.5 megabits per second. With multiplexing you can do all sorts of sleight of hand. Actuarial Science Associates has a leased line running between our Somerset, NJ, office and our Boca Raton, FL, office. We have two channels dedicated to video which can't be compressed, giving us a video connection at 128 kilobaud. The other ten channels are split so that we have five dedicated for voice and five dedicated for local area network (LAN) traffic. Both of these types of traffic are compressible, so we can have 12 people in Florida using the New Jersey server, we can have at least five phone calls going between the offices, and we can have a video conference all running simultaneously using one leased line. The disadvantages are that it's expensive and, as I said before the ends have to be predetermined. Hence, you can support somebody on the road with a leased line unless you know where that person will be.

Switched 56 service is similar to a leased line in that it gives high-speed connectivity—64 kilobaud per circuit—but is digital phone service in that the circuit has a phone number and can call any other number. You're not buying a leased line, you're buying access into a network. With two switched 56 circuits, you can video conference with other units throughout the world using apparently normal phone lines.

Integrated services digital networking (ISDN) is touted as the latest and greatest even though it's been around since the 1980s. When it first came out it was a solution searching for a problem; some people even said that "It Still Does Nothing." Now it has become "I Sure Do Need it." I'm starting to get a lot of pressure to install ISDN, especially from people who are working at home, or who need access from their home. A major advantage of ISDN is its high speed—you're running at 128 kilobauds on standard two-channel ISDN as opposed to the 28.8 kilobauds you can get with a modem. It's also relatively inexpensive—Packard Bell is offering home ISDN service for $23 a month, which is not much more than you would pay for cellular phone service with no calls.

What you're able to do with ISDN is access any other node on the network and gain high-speed access to the Internet. You are predefining all of your ends of the connection but letting the phone company connect everything for you. If you need to support somebody from home who has to get into your LAN, ISDN is a more suitable alternative than using a plain old telephone system. Your initial installation costs will be higher, though. You will need channel service units (CSUs) and data service units (DSUs) and your initial investment could run as high as $5,000 per remote node.

There are, however, security issues to be addressed. I have responsibility for the LAN in Somerset. I still feel very uncomfortable having people dial into "my" LAN. The Internet is a potential nightmare. Hackers can find out what your vulnerabilities are and gain access to your data. As a result, you should evaluate how much nonleased line remote access to your LAN you need or want.

There are four ways that you can have remote access. One of them uses a "gateway." Here you dial into a computer which is attached to the LAN allowing you access to the LAN. You can set it up with an 800 number to make it easier for remote users to call in from the road without using a credit card. Security is going to be a problem. How do you make sure that the people who get into the LAN are the people who are authorized? One way is to use passwords. Everyone on your LAN should have a log-on password but once this is compromised, you're out of luck. An alternative is to use a dial-back scheme. You can have the gateway machine take the incoming call and once the caller is identified via a logon and password, call back to a predefined number. This doesn't allow for mobility, though. It's fine for somebody who will always be calling in from home or from a remote office but if you're out on the road you can't easily use a dial-back mechanism.

Another remote access method is remote control. Some of you may have used Close Up or PC Anywhere. You leave your PC on, go home, call into your PC and take control of your PC and its connection to the network. You're limited, of course, by your modem and line speed. Running graphics-intensive programs can be frustrating. Run a Windows application and you'll want to go back to DOS. But it works and it's a way of giving people access not just to the LAN, but to their PC and its files that they've left back at the office.

A third way to address this is with remote-enabled applications. Microsoft mail has a companion package called Mail Remote in which you dial into a mail server (a computer gateway) on your network. There are two major problems with Mail Remote. (I don't know if they exist with other packages similar to it.) While it allows you to get into Microsoft mail and retrieve your messages, you can only retrieve your messages. When you first configure Mail Remote, your system administrator has to give you a diskette which configures it to only log in as you and only retrieve your messages. If you're on the road with one of your co-workers and both have to retrieve mail using Microsoft Mail Remote, you have to have either two computers or two installations of Mail Remote on the same machine, which is difficult. Another shortcoming is that even though Microsoft Mail is tightly integrated with Schedule+, Microsoft's group scheduler, which I'll discuss briefly later, you can't use Mail Remote to access or update Schedule+ files.

The fourth way to allow access to corporate data is through the use of agents. Those of us who grew up in the mainframe age are used to batch processing and that's basically what you're doing with an agent. Agent-based massaging allows you to call in, get a process started and then hang up. Similar to a worm, it goes out into your LAN, does what it has to, gets the information ready for you, and when you call back in it has it waiting for you. This saves call time, but requires additional software and hardware.

Another type of software you will need to support telecommuters is communications software. Once you have decided whether you will use leased lines, a regular telephone system, or whatever, you have to decide how you will communicate. There are many different fax software packages and even more different communications software packages. The two problems you will face are compatibility and standardization. Once you have established a standard, how are you going to make sure that everyone in all locations on all PCS, whether at home or in shared offices, whether desktop or laptop, all have the right version?

The last type of software I'd like to mention is groupware. Brian will speak more about this when he discusses Lotus Notes. The type of groupware I'd like to discuss is a LAN-based group scheduler. With an increasingly mobile workforce, how do you keep track of where everyone is? How does my secretary know where I am or where to reach me? The package we use at Actuarial Science Associates, which I alluded to earlier, is Microsoft Schedule+. It allows me to maintain my schedule on-line and to grant access to it to co-workers so they can see where I am, where I'll be, what the phone number is, and so on. Another, very valuable use of a scheduler is to set up meetings and reserve resources (conference rooms, overhead projectors, and so forth).

A recent study by the Gartner Group found that when companies went to a telecommunicating environment, they needed to triple their support staff. This is logical when you consider problems such as training, troubleshooting, and repair for remote (and ephemeral) sites. So if you look at telecommuting as a way to save costs, for example rent, you see that while you can close down offices, you're going to triple your support staff. And they have the headache of supporting rogue software and hardware that's going to break at the most inopportune times and in the most inaccessible locations. Before you embrace telecommuting, think it through.

MR. BRIAN S. POLLACK: I appreciate being invited here. I have been working with Lotus Notes for the past 18 months. The first six were spent investigating the package and convincing myself that it offered our firm some competitive advantages. The next six were spent convincing the firm that it offered competitive advantages. A large part of that process was accomplished using Lotus Notes, which I will explain later. My most recent six-month period has been devoted to implementing Notes on a gradual basis.

We have about 115 users, which is one in every ten employees. I would expect that number to increase to one in five by the end of the year. We currently have about six to ten useful Notes applications available to our users. By the end of the year we hope to increase that to two dozen. We are in a growth phase, and I will talk about implementation and some of the problems with implementation as we go along.

By way of background, I have been with Milliman & Robertson (M&R) for 11 years, all of it in Seattle. I headed the company's computer subdivision up to three years ago when we folded the group back into the main company. At that point I took on some broader responsibilities beyond the scope of information technology. Pleasantly, I retained the responsibility of helping to guide the strategic choices on technology within our firm. M&R has 26 offices. They are geographically dispersed throughout the U.S., as well as in Tokyo and Bermuda. We have affiliates in over a dozen foreign countries. Decentralization creates the need for coordination. The difficulty with coordination is that it tends to be extremely expensive, so one always searches for ways to reduce the costs of coordination, and to make it more efficient. I believe that Notes offers a workable way to achieve many types of coordination in a geographically dispersed environment. It tends to be an extremely cost efficient way to create shared pools of information, and for the firm to carry on technical discussions beyond the boundaries of any single office.

I will try to answer three questions. First, I want to define the class of software we call groupware. Second, I will introduce Lotus Notes, and present a short demonstration.

Last, I will talk about the IBM purchase of Lotus. I will try to give my thoughts on how that may impact Notes.

Historically, I have not been a user of Lotus products. I used Lotus' spreadsheet package, 1-2-3, when it first came out and continued to use it for several years. At some point Lotus introduced a new version which added a graphical interface, but it accomplished it in a fairly clumsy way. I decided to switch to Excel and never went back. Most of M&R operates in the Windows environment, with small installations of UNIX and Macintosh. Perhaps 60–70% of our purchased applications are Microsoft products. We have no corporate policy on allowable software. We tend to choose software on its merits. Nevertheless, compatibility is advantageous in itself, so even though we lack central standards, and given that decisions are made at local offices, we don't stray down too many esoteric paths.

M&R uses cc: Mail for company-wide E-mail, and Notes is our groupware choice for the foreseeable future. When we chose cc: Mail there were a number of competitive alternatives, but cc: Mail allowed us a wide range of platform choices and compatibility. Lotus Notes, when we chose it, was the leading and, basically, the only product in its class. What is groupware? The textbook definition is as follows: workgroup software enables groups of people to communicate, to share information, and to automate their work process using computers. I want to underline several important clauses in that definition. The first is "groups of people." Groupware doesn't work if you only have one or two users. You need a comfortably large number of people to make it useful.

The second important clause is "to communicate" and the point here is that if the group works in contiguous cubicles with the ability to talk freely, then groupware is probably unnecessary. It becomes important when these people are geographically dispersed, when they work in different time zones, when they travel regularly, or when they commonly work out of more than one location. The greater the dispersion the more useful groupware becomes.

The last important clause is "to share information." If the group doesn't have commonalties in their work then groupware is superfluous. There has to be a need to share information that underlies the move to a groupware solution.

Another textbook way of describing groupware is to divide it by purpose into three main categories. The first of these is communications-centric tasks. These are characterized by a host of ad hoc massaging: E-mail, passing spreadsheets between users, and so on, where the primary commonality is simply the exchanging of ad hoc information.

The second category bases itself around moving structured information. This is characterized by significant commonalties in a group's work. Examples might be the routine use of master spreadsheets, work papers routed for review, or forms processing. There are several groupware products that specialize in this area.

The last form of groupware is for transaction-based information. I will not talk much about those. It would contain airline reservation systems or on-line inventory systems. These systems tend to have specific needs. First of all, they tend to have real-time processing requirements, and they often involve huge databases. So they often are hosted

on large platforms, and their needs in terms of telecommunication are a step beyond what I want to talk about.

I want to return to the category of managing structured information, because I think this is universally useful. There are three different branches to this type of software. One is useful if your organization bases its work around the use of forms. If you have that need, you will want to look at work-flow automation software that incorporates forms-based front ends. Products in this category include Beyond Mail Forms, Lotus Notes, and probably a dozen others.

If you use editable documents, for instance WordPerfect, Lotus, and so on, and you share these around workgroups, giving people the opportunity to read and edit them, you will want to explore general work-flow automation software. Lotus Notes can do a good job here, and there are a number of other specific packages that aim at this market.

If you're dealing with images of documents, that is, scanned images that are kept in picture form, first of all you probably have huge hard disks or optical storage units because you'll need them. You can look in the direction of one of two kinds of software to help you, either work-flow automation software which has strengths in images, like KeyFile; or image management software, such as Docubase and several others. Again, Notes has some capabilities in this area as well.

Basic organizational communications fits into this category as well. It breaks down into several subcategories. The first is sending simple messages. Here, you have E mail systems, such as Microsoft Mail, cc: Mail, WordPerfect Office, and Notes. If you want to manage schedules you'll be led in the direction of group schedulers. If you want to carry on continuous group conversations, you'll be led to conferencing software, bulletin boards, on-line services such as CompuServe and America On-line. If you want to have structured group conversations and discussions, you'll be led towards electronic meeting support software. Meeting Room is an example of this. If you want a group of people to look at documents concurrently and to be allowed to make changes to it, you'll probably be led to white board software. Intel Proshare is an example of this and there are several others. Obviously this breadth of software means that your organization must first decide on its needs. If your company has core capabilities, core necessities in one of these areas, then you probably want to explore one of the packages that is designed specifically for one of those areas. They tend to be focused, they tend to have a little more depth to them. They certainly have a higher learning curve, but if you're going to base a company on one of these core capabilities, you should be led in that direction.

On the other hand, if your company has needs in several categories, you may want to find a good general purpose system. Lotus Notes appears to be the preeminent product in that light.

Notes is almost impossible to describe. It took me four or five months of use to begin to understand some of its capabilities and I think in some ways I have only scratched the surface. Over that time I have developed several metaphors which help describe its functions. The first one describes its E-mail capability. E-mail for those of you who do not use it, is best described as the way you would like the U.S. post office to work. You can send and receive mail. You can send and bulk postage to a number of recipients at one

time. Lotus Notes has a simple but elegant E-mail capability and as such, it works like the post office.

Notes also works like a public library. It has the ability to store and retrieve documents. It also has the ability to store and retrieve pictures and sound and video. We will look at this later, but most of the fields in Lotus Notes are "rich text" fields. These fields can contain a wide range of objects, and you will be able to view these objects as long as your computer is set up with the proper software and/or hardware to view pictures, to hear sound or to play video.

Like any good public library, you need the ability to search and find contents quickly. Lotus Notes has a couple of ways you can do that, either with indexed searches or with nonindexed searches.

Lotus Notes also serves the purpose of a private club. It allows you to get together with your peers. You can set up areas where discussions on particular subjects are hosted. People that have common interests can join in on an open discussion and leave their own contributions. The end result is a well-structured group conversation.

Like a good private club you may occasionally want to invite outside guests to visit, but you may not want them seeing the back rooms of your club, only the attractive front rooms. Lotus Notes allows you to bring in outsiders safely, with a sophisticated security system that would probably please the most suspicious system administrator.

Notes has a straightforward application development environment as well. It is fairly simple to create a new application, based on a variety of templates that are provided. More involved programming certainly involves more extensive knowledge and training, but I have found that as application environments go, you can do a significant amount of development with a minimum of developer training.

I would also point out that Lotus Notes contains embedded mail features, and this is where the distinction between Notes and E-mail often gets blurred. Notes does have E-mail, but its unique strength is in embedded mail. To build on our metaphor of the public library, imagine digging through reference materials and finding an article that is especially interesting, but you have a comment and a question for the author. Embedded mail allows you to mail a message back to the author of the document at the push of a button.

I want to give you a quick overview of Notes. When you first come into the program you are presented with a metaphor of file folders. Each one can contain a myriad of databases, which are represented visually by tiles. The file folders let you organize your databases under logical classifications which organize your work.

As I mentioned, each tile represents a database. Behind each of the tiles is an organized collection of related data. Let's use my mail database as an example. We go into a database by double-clicking on the tile. I arrange my mail messages by date. This is not the only way to logically arrange them. Notes provides flexibility as to the organization, using the term "views" to distinguish each snapshot of the database. Each view of a database is a unique look at the underlying data in that database. The views in this

database allow me to look at my mail by sender, size, or date. A user can make up his or her own views, say by some category or subject content in the message.

Another database we will look at is what our firm calls its "technical update" database. This acts as a simple library system. These technical documents are written by our systems and programming group in Seattle to help educate the users of these systems. Within the database we have cataloged issues back to February 1992. These documents are graphical-based which has some significant advantages. The fields in databases are termed "rich text" enabled. They allow you to put in formulae, pictures, distinctive fonts, sound, and so on.

One of the features of Notes is its ability to connect one entry in a database to another entry in the same or another database called doc-link. Say in a document on 415 limits there is a doc-link to additional information on factor tables contained in another document. If I double click on the doc-link symbol, it takes me to the other document. If I then escape out of this document, I am left back where I started.

We spoke about the need to be able to find information quickly. There is a simple way to search for this information. DEX is the name of a data preprocessing tool that we use at our company. To look for every occurrence of DEX that is mentioned in each of these technical updates, I use the find function which then puts a little check mark next to all the articles where it appears. Some of these were easy, it only had to look at the title, but some of them were buried away into the technical update. Very quickly and very efficiently this mechanism allows you to search and find items of interest. This is a simple search, but the mechanism allows significantly more detailed and complex searches.

I mentioned earlier that our firm's decision to use groupware used Notes to facilitate the group decision-making process. Normally in our firm ad hoc committees meet in Chicago for a day or more of discussion. Obviously this entails hard expenses as well as significant loss of time for the committee members. For a fraction of the cost, we were able to put together a Lotus Notes database and over the course of about two months, carry on a structured discussion. The investigation was more detailed, and allowed others to view and participate in the process. In a very real sense, the product sold itself to the firm.

There is another database, which is intended to distribute research on employee benefits issues. It is organized by topics, for example, 401(k) plans, accounting rules, contracts, and so forth. We monitor news items and paraphrase their content into this database.
A few comments on implementing Lotus Notes into an organization. The key to Notes is its ability to true up databases across a network of servers. On a scheduled basis, servers communicate to each other, synchronizing information that is new or has been changed in each database. This is a process that the program calls replication. You can set replication to automatically occur at specific times. Similarly, if you have a number of servers, the process moves around the organization's servers until all databases are identical. There are several replication patterns you can choose, depending on the size of the firm. It may take several hours depending on the size of the organization and the amount of new information to be transferred.

Another implementation concern is to balance the number of users and the number of applications. If you do not have enough users then the application designers get frustrated

by the lack of user feedback. If you have many users and no applications, the users get frustrated because there is too little to look at. You have to build up users and applications in your organization concurrently.

I would like to offer a few comments on the IBM purchase of Lotus, the positive, negatives, and unknowns. On the positive side Lou Gerstner, the head of IBM, was quoted as saying, "Lotus will become the focal point for all groupware for our company." If he is true to his word, the financial muscle of IBM can do nothing but help Lotus and help Lotus Notes. Lotus was not the best capitalized firm, it was not the best operating firm in terms of return. IBM has a great deal of money. If IBM incorporates Notes as its core product for groupware, then Notes has a long and very successful life ahead of it. As well, the marketing muscle of IBM can do nothing but help the product. I also look to IBM to add value in its core expertise of enterprise networking.

I foresee some possible negatives in the purchase. I don't think IBM has ever understood PC software. It has made disastrous choices from day one. I hope that it chooses to rely on the expertise of Lotus in the PC market.

Another possible negative is if IBM decides to use Notes as a way to compete against the Windows operating system. I think that would hurt many of the installed bases of Notes. The bulk of user investment is in Windows and if IBM uses user reliance on Notes as a means to slight Windows in favor of OS/2, I think it will be a mistake.

The last negative is right out of business school: cultural differences that could make the union of the two firms fall apart. Lotus is a very independent firm and very idealistic in its approach. IBM is a very structured firm, although it is breaking down a bit. Those are two very different cultures. It will be important that Lotus be able to retain its independence so that it can retain its talent. If Lotus loses its talented developers it will be a problem.

There are a few unknowns as well. *Computer World Today* surveyed readers asking, "How willing are you to buy Notes from IBM now that IBM owns it?" Sixty percent said it would have no effect. Twenty percent said they'd be more willing to buy it. The sum of those two, 80%, indicate that people would be at least willing or more willing to buy from IBM, which is a good sign.

The unknown then is determining what IBM's strategic direction will be. Has IBM thought it out? Will it stay in the PC market with consistent offerings? Will it do it effectively and support its users?

Version four of Notes is due out in mid-summer, which translates in marketing lingo to first quarter of next year. IBM's ability to release that update will be a good signpost to judge how IBM is doing.

The last unknown is that Lotus was doing a good job of putting together various affiliations with other firms, including AT&T. That affiliation promised to deliver a public notes network. That was very attractive for some of our smaller offices. It is unclear whether IBM will allow that to go forward, and I notice that the public announcement of the Network Notes product has been put off indefinitely.

The other product that I was interested in prior to the purchase was called InterNotes, which automated the publishing of notes data into an Internet web page. I am not sure where that product stands now. In general, we are looking for signs of IBM's strategic direction. But I do think that unless they make a mistake, the likelihood is fairly good that notes will remain a very viable product.

MR. ROTHMAN: Brian, we've talked about suites and OLE. Is interoperability going to kill open systems?

MR. POLLACK: I like the suite concept. I like the idea of interoperability. Nevertheless, I don't use all of Microsoft's products and I don't use all of Lotus's products, nor do I think I ever will. I look at certain core consistencies, such as open database conventions or OLE, as the solution that I hope for from the industry. I hope that the industry settles on one or two conventions that link competing products.

MR. DEMNER: I think it depends on who you're dealing with. In my business, I'll probably be dealing with small- to medium-size companies and I'll probably focus on one type of suite. If you're looking at large international companies, then I think you may want to focus on suites available to work between them. I think there's a market for everything and hopefully there's enough room. Microsoft is very good, but I think you need some other products in there to keep it on its toes.

MR. POLLACK: Has anybody played with cellular modems out there? Listening to Allen's talk it was interesting because I carry a cellular phone and I carry a laptop. The thought struck me that it would be convenient at times to send information over my cellular connection. I found no lack of problems in being able to do that and not because the technology doesn't support it, but more so because there is an absolute lack of any convention in the modem world and the cellular world to allow you to do it. It seems that it is one area where commonality is nonexistent.

MR. ROTHMAN: Let me re-emphasize the word *security*. You start using cellular technology with your laptop and anybody who is out there can pick up your transmission. There have been plenty of articles in the papers about people picking up the codes off cellular phones and then you have a million calls to Brazil charged to you. It will happen with this, too. You have to worry about what you're transmitting over a cellular medium. If it's client data, you want to be very cautious about putting it out there. The same problem with cordless phones. Does anybody have a cordless phone? Most people have them in their house. Anybody hooked to a private branch exchange (PBX)? Cordless phones are available for them. You'll find that there will be increasing pressure from people who like the idea that they can take their cordless phone out of their office and pick up their phone calls anywhere else in the building. Even outside the building, just as you can take your cordless phone out and sit by the pool. The problem is anybody can pick up your conversation, so you have to be careful what you say over the phone. You also have to worry that the person at the other end might be using some form of wireless technology.