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IMPLEMENTING NEW TECHNOLOGY

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How do you choose between competing technologies? What are problems to watch out for? What unexpected benefits were there? Specific topics include:

- Migrating from mainframe to client/server
- Automating the field force
- Large-scale networks

MR. JAMES F. TOOLE: The topics include migrating from a mainframe environment to a UNIX-based client server, CIGNA-Link, one of the world's largest local area networks (LANs), and automating the field force. Our objective is to offer practical advice and actuarial perspectives on the process of choosing and implementing technology, and to discuss its effects on the organization. We will be assuming some knowledge of computers, but not all of the presentations will be emphasizing technical aspects.

We are fortunate to have three very qualified actuaries as speakers. Our first speaker, Michael Levine, heads personal insurance in-force management at Met Life, where his responsibilities include the reserve valuation and dividend scale calculations for personal insurance products. Michael will be explaining to us why, in his case, migrating wasn't just for the birds.

I am very pleased to have Mariann Hunter with us. Mariann has been with CIGNA for 20 years and is currently vice president of Financial Systems. Her department is responsible for the development and maintenance of the financial systems within employee benefits. She will be discussing some of the history and impact of CIGNA-Link on her organization.

Our final speaker is Steve Weber. Steve is vice president and heads Corporate Technology Services for Aid Association for Lutherans. Steve was recently responsible for a major investment in field force automation and is going to tell us how and why this came about.

MR. MICHAEL LEVINE: First let me provide some background. The title of this presentation is "MetLife Personal Insurance Financial Management (PIFM) Actuarial UNIX Network." I've been fortunate to have had a wide range of assignments in personal insurance, as Jim mentioned, most recently as valuation actuary and dividend actuary. I mention this to make the point that we are using computers for the same things that most of you are -- pricing, reserve valuations, cash-flow testing, the usual range of actuarial applications. If anything stands out about our applications, it's the sheer volume. Within personal insurance, for example, we are responsible for about 16 million policies and about $25 billion of reserves. Otherwise, it's fairly routine stuff from an actuarial perspective.

Philosophically, I've had two broad goals in terms of our actuarial computing. First, I think it is important to be able to reuse code. If you have code that's serving one function, for example reserve valuation, you want to be able to incorporate that code into a similar function, such as cash-flow testing. The second broad goal is to perform as much work as possible in as great a level of detail as possible. I would rather use more cells than fewer cells, and I would generally like to be able to perform the work at the policy level, if possible.

Several years ago, we became increasingly dissatisfied with our computing environment, which primarily consisted of mainframe VM, with some mainframe MVS and some personal computers (PCs). It was expensive and slow, particularly at year-end, and it was somewhat uncoordinated. This led to our implementation of a UNIX-based network for actuarial computing. Now, before I go further, let me state clearly that I am not recommending that what I'm going to present here is the right environment for everyone in the audience. The broader point that I want to make is that it is important for actuaries to be involved in the process of developing an actuarial computing environment that is appropriate given the particular needs and circumstances.

I am going to cover three topics. First, a brief description of UNIX-based client server technology -- what exactly does that mean and how does it meet our needs? Second, I'm going to recap our efforts and experiences in the actual migration to the UNIX network. And, third, I'll give my own personal sense of some future directions for actuarial computing.

So, what exactly is a UNIX-based network and, more generally, why UNIX? We look at UNIX-based client-server technology as comprising four elements. The UNIX operating system is in the middle. This can be compared to a mainframe operating system like VM/CMS, or a PC operating system like DOS. Another critical element is the reduced instruction set computing, which is the hardware component or the chip component. The remote information systems center (RISC) is a particular chip technology that's ideal for numeric intensive processes of the sort that arise in our business. A third element is the networking protocols and standards, which facilitate communication between different machines and different devices. And the fourth element is the X-Windows graphical user interface. In the PC domain, that would be Windows or OS/2, but in the UNIX domain that's X-Windows.

The point here is that there are many vendors serving this market, but they are all adhering to standards. These standards are either officially nonproprietary or perhaps proprietary but basically licensed everywhere. It is not that important who is the hardware manufacturer, or whose version of the operating system it is, because all the manufacturers and all the software developers are more or less sharing the same set of standards for these four basic components.

In terms of the operating system itself, we see it offering the best of both worlds, and by that I mean the best of the mainframe and the PC worlds. It is helpful to step back and realize that UNIX was developed primarily in the academic, scientific, and engineering community. So it was developed to serve the kind of needs that I think are consistent with our needs. Mainframe development was driven mainly by the needs of large business enterprises for things like customer billing and so forth; it is

more business transaction oriented. PC operating systems were developed for what I would consider simpler applications, such as office automation. Now I realize everything has matured, but it is helpful to keep in mind that the UNIX operating system has some inherent capabilities that are consistent with the kind of things we're trying to do.

Multiprocessing is an operating system capability that allows multiple programs and users to time share on a single central processing unit (CPU). Mainframes have had this. PCs have not had this until some of the more recent developments made it possible.

Virtual memory is the operating system's ability to use storage on the disk to extend the actual physical memory. Storage on the disk is called "swap space." You might have actual physical memory of ten megabytes, but the system will enable you to run an application that would require 20, or 30, or more. In addition, UNIX systems have large, actual, physical memory and a good capability for interprocess communication, which means that different programs on different CPUs can talk to each other easily. The procedures, protocols and standards are set up for interprocess communication, and this facilitates a number of the networking capabilities.

Also, the UNIX operating system has some of the advantages of the PC operating systems. Graphical user interfaces are available, and are cheap or free. Different vendor hardware can interact with other vendor hardware. Many software development tools, such as debuggers and Fortran reengineering tools, are available, and they are generally not that expensive as compared to the mainframe types of tools. There is a generally abundant availability of software. You are not locked into IBM or a few other software vendors.

The next component was the reduced instruction set computer, which is the hardware component. Now, the UNIX operating system can run on a mainframe. It is not limited to any particular hardware. But the hardware that is becoming the emerging standard for our type of computing is the reduced instruction set computer (RISC) architecture. I guess the opposite of RISC is complex instruction set computer (CISC). The basic idea here is that a CISC chip builds many instructions into the hardware. Many things are possible but they each take multiple clock cycles. With RISC, the vendors have identified the instructions that are really essential for numeric intensive processing and they've reworked the chip so that these critical instructions are accomplished mostly in one cycle. So for the things that we want to do, RISC is a much faster chip configuration. And I should also point out though that this is mainly being optimized for Fortran and C these days because these are the primary languages of the scientific and engineering communities. I am not saying this rules out APL, or COBOL, or other languages you might use, but that would be something that you would have to research.

Just some comparisons on some standard benchmarks. The 486 PC, according to some research we've done, can process about 1.5 million floating point operations per second. An IBM mainframe 3090 without vector facility does about 10 million floating point operations per second, and with vector facility it does about 16 million. These are $5-10 million machines. A UNIX workstation of the type on our network does 15 million floating point operations per second, which is ten times the speed of

the 486 PC. And the server on our network does 38 million floating point operations per second, which is 2.5 times the speed of a $10 million mainframe, and it costs about a $150,000. So this RISC architecture lends some real power to the numeric processes.

Networking holds everything together. I am not a networking expert, but the main point is that certain standards have evolved and everybody's using them. Ethernet is a physical standard, coaxial cable, things like that. TCP/IP is a low-level information flow standard. It "packages" information and enables the processes that are built on top of it to transfer information back and forth. TCP/IP is very important to the ability of a user on one machine, to be able to log into another machine and to transfer back and forth to the mainframe. Within the company, we use TCP/IP to interconnect different mainframe machines, so it is a fairly basic standard. Finally, we use a network file system, which basically lets any file anywhere on the network appear local to any user on the network.

X-Windowing is the graphical user interface. There are already some well-established C libraries on top of that windowing interface, so there are fairly standard icons developed now for different windows or different scroll bars and keys.

A word on client server and what I mean by that. Basically, in our context, a "client" is any application. A client (i.e., application) is going to make use of several types of "services" such as compute services, file services, and display services.

The UNIX server is providing compute services and file services (data storage). The workstation is providing compute services and also display services. The X-terminal is just a terminal with enough CPU -- there is a small chip in there -- that it can provide the windowing display services. You also can put PCs and mainframes on the network. I should also mention that our particular network has one big server, about 10 workstations, and 15 X-terminals.

An example of client server is using SAS. Does anyone here use SAS? SAS is an application. The user seated at the X-terminal would use the display services of the X-terminal. SAS runs on the workstation, so they are using the compute services of the workstation. And the data files exist on the server, so they are using the file services of the server. Running the SAS application makes use of the whole network and services provided throughout the network. A related point, which shows a nice feature of the network, is that you can add components piece by piece. Here's where some other cost savings are evident: for one gig-a-byte of storage on the mainframe, we were being charged over $10,000 a year. One gig-a-byte of storage on the network has a capital cost of $1,500. Now I know there's some allocation issues and so forth, but this is another real advantage.

The next item on the agenda is what we did in actually migrating to UNIX. Remember, in our context we were starting with a large number of mainframe-based Fortran applications, although we also had some PC-based spreadsheet applications. The actuarial students were working on the mainframes for reserve calculations and cash-flow testing, and the nonactuarial, clerical employees the financial reporting area were using the spreadsheets to organize different reserves into different exhibits and so forth.

We knew we needed additional speed and functionality, and we wanted some cost savings. We wanted to avoid the problem, at year-end, where we were competing with everybody else in the company who wanted the mainframe resources. We also wanted an actuarial environment that was big enough to support seriatim valuations. We didn't like the fact that at some point, within either the mainframe or the PC, the problems were just too big to be handled by the actuarial system, and that it became necessary to give a data file or a factor file to the corporate information systems areas and have them run whatever we wanted run. The particular reason we didn't want to depend on them is because as the applications got more and more actuarially complicated, it was harder and harder to explain to corporate technical people exactly what should be done. We felt that if we could keep it within our environment it would be easier to do things more quickly.

The first part of the process was procurement. When we started this in 1990, we realized it was a good buyer's market. There many reputable vendors out there like Sun, Hewlett Packard, Digital, IBM, Bull/MIPS, Intel. In addition to developing and marketing PC chips, Intel is in this market. There are a number of venture capital startups at the higher end, such as Convex, Alliant, and Silicon Graphics. These vendors have as their primary customers, the scientific and engineering communities, the defense industry and academia. They're interested in expanding into the business and financial communities, so they were kind of eager to look at our benchmark to learn what actuaries did.

We developed a request for proposals with several of our Fortran programs and we got some responses. Our initial selection was Bull using MIPS work stations, and this was something that our Corporate Information System (IS) Department had a lot of say in. IS at Met has a relationship with Bull. The Bull/MIPS equipment also did come in well in terms of price/performance. Then we went through a second procurement round, maybe a year later, and we settled on the IBM RS6000. IBM had been involved in the first round, but they were brand new in this area and they've now matured. Of course, we also had a corporate relationship with IBM so that wasn't a problem. Also, MIPS was taking a strategic direction that was getting out of this market. So, now, we are very much an IBM shop on our UNIX network.

As I indicated before, we have historically been a Fortran shop and UNIX has historically been most hospitable to C and Fortran. So, we posted some existing dividend calculation programs, projection programs for traditional products, and programs that calculated commissioners reserve valuation method (CRVM) reserves on universal life (UL) policies. The UL CRVM programs are used for tax and statutory reporting. The Ethernet connections enabled us to do this porting back and forth from the mainframe, and we discovered some interesting issues like rounding routines. IBM rounding in the mainframe is not the same as UNIX rounding and that matters if you're trying to reproduce historical cash values or other rates and values. Also, if you're using the indexed sequential access method (ISAM), or the virtual sequential access method (VSAM), which are essentially indexed or keyed files, there are different levels of support within UNIX. MIPS supported it, but IBM required us to buy some additional software. This is fairly common type of file structure in the mainframe.

By and large, the Fortran programs did not have to be rewritten, but the Shell or the Exec programs that invoke the Fortran had to be rewritten. Also, a lot of the Fortran input/output (IO) had to be rewritten. But this was kind of fun. It really wasn't that hard, and we rewrote the code so that it would run in both environments as opposed to supporting two distinct sets of code. We actually have a test within the code that determines whether it is running in UNIX or running in IBM mainframe. So, it's a bunch of if/then constructions within the code where it matters.

Then we starting developing some new things specifically within UNIX and this was where things really got moving. We have a program for seriatim UL valuation and projection work. My people tell me this program takes 90 megabytes of memory, and I believe them. Obviously, you can do this work without making use of all this memory, but you can do it in different ways and probably more creatively and efficiently when you can make use of it. Generally, the more memory, speed, and file capability you provide to people, the more they'll use it.

Another interesting thing is this point about distributed processing. The UL business we're handling is mostly based on one big monolithic program. But for the traditional products -- Met's been around for more than 100 years -- we have about 80 distinct modules handling the whole range of different traditional products developed over the years. We run the UL on the server, but with these 80 or so traditional product modules, we can parcel them out to all the different work stations on the network. So if we're running reserves, or cash-flow testing, or doing dividend work for the traditional, we're making use of all the work stations on the network. That took some development and we're probably not that far along with it. But this idea of distributed processing let's you really use all those cycles that you're paying for.

I think if you're going to migrate to a new environment you should make sure you have an editor that people are familiar with, because that's where people are spending most of their time. Our people were familiar with XDIT on the mainframe and so we purchased an XDIT package and put it on the UNIX network. V is the native UNIX editor, but that was a little hard for people to start working with when they were trying to learn everything else.

SAS has a good package on UNIX and it's written to take advantage of Windows and Motif. When you get into SAS, you're there with three windows and it has the scroll bars and the filters and file selection. Lotus also seems to have been written to take advantage of Motif, but we've discovered some bugs with it. I guess it's their first release. We've put WordPerfect there because as long as people are doing their work on the workstation anyway, they shouldn't be using a PC to write a memo. But that doesn't really seem to have been rewritten for the UNIX environment. It's a shell wrapped around an old DOS WordPerfect, but it works.

One of the very good features of UNIX is that it has a set of procedures and built-in systems functions that are generally source code control software (SCCS). This is basically version control software. I believe you can purchase a similar product for a PC, known as PCS, and there are several mainframe products. I think version control is an important thing and it's something that actuaries have tended to neglect. You write the program, and then other people modify it, and soon things get out of control. But here you put the program into a library, you check it out of the library,

and you check it back in. Only one person can have it out at any given time for purposes of modification. The administrator can control who has the authority to check it in or out, who has the authority to make changes, who can review changes and so forth. So, again, this is fairly cheap on UNIX. It's very expensive on the mainframe. I think there are some PC products emerging. I recommend this in general.

We've also found that it is best if you have all IBM, or all Sun, or all Hewlett Packard machines, because then your processes are what's known as "binary compatible" or "bit compatible." You don't have to recompile. You can work with a mixed set of machines, but you're going to have to recompile for each one.

And I was very fortunate to hire somebody who had been laid off from Convex Computer to bring him in directly as my main support here. I wouldn't try to do this if I didn't have somebody in the company who knows UNIX.

Let me finish up with some of my personal observations on the future of actuarial computing. Where are we headed in the future? First, we're going to be doing some more number crunching and process integration. We all know we're going to be doing more and more calculations, so I think you need this capability. We're increasingly trying to do things at the policy level, with greater frequency and for more complicated problems.

I think also there's more and more of a need for actuaries to work with the rest of the people in the company on the coordination of actuarial systems with administrative and marketing systems. We're still in an extract-driven mode and we realize that the administrative end is what has to be reengineered to make everything else work better. They can't reengineer it without our expertise in terms of what the data components mean, and how the policy rates and values are employed.

On the database issue, I believe that anybody on my network should be able to have access to any of the data. And I believe the network could support that. Still this will require a lot of disk. That's a lot of resources and, therefore, something that we really ought to coordinate with all the other users in the company that want access to the data. Another idea is that if the actuary developing a product can write code that can then be embedded in an illustration system or an administrative system that's an advantage.

If you can do things at a very detailed level you can make measurements of performance that haven't been possible in the past. One thing we're working on is branch office profitability. We've concluded that the actuarially correct approach is "value added" at the branch office level. This is conceptually clear, but it's an awful lot of data when you are trying to assemble all the policies for all the branch offices, and perform all the value-added calculations. We feel it's feasible now because we have the technical capability. In the past we didn't. It's certainly too complicated to be the kind of thing you'd give to a mainframe information systems (IS) programmer. So to address some of these performance measurement type of things, we must have actuaries working within the network.

I always quote Professor Robert Eccles because I think this is an interesting observation:

> [I]nformation technology has played a critical role in making a performance measurement revolution possible . . . Overall, the range of measurement options that are economically viable has radically increased.

Now that these types of performance measurement are possible, we should start to implement them.

The role of the actuary includes: insurance generalist, process integrator, and actual designer and coder. These roles are much the same as they have always been, but the key is to keep up with the increased demands of the profession and of the business, and the increased capabilities of the technology, so that you're continuing to contribute at the state-of-the-art level.

MS. MARIANN F. HUNTER: As most of you know, CIGNA is a worldwide financial services company. It was formed in 1982 by the merger of the Connecticut General Corporation and the Insurance Company of North America. We have over 52,000 employees worldwide. We have total assets of nearly $70 billion and our revenues in 1992 exceeded $18.5 billion. I would reiterate what Mike said -- there is no cookbook. What was right for CIGNA is not necessarily right for your company and, in fact, if you're looking for a cookbook, you're definitely going to find the wrong answer because the answer is within your own company. Hopefully, what you will get from this is a set of principles.

One of the distinguishing characteristics of CIGNA is our systems division. The division is led with a great deal of vision, energy and courage. One of the contributions that this division has made to the corporation overall is a vision of full communication and connectivity for all of our knowledge workers worldwide. I'm going to discuss the strategy for achieving that vision (someone told me that a vision without a strategy is a hallucination). This strategy is something that we call CIGNA-Link. Because of the implementation of the CIGNA-Link strategy, CIGNA personnel all over the world are able to send messages, documents, spreadsheets, and data files to any other CIGNA employee in a nearly real-time manner.

I'm going to share with you some of the history and benefits of implementing the CIGNA-Link strategy. So let me go back for a minute to explain what CIGNA-Link is. It is a company-wide set of policies and principles. It is an internal architecture that standardizes PCs, LAN, and the related operating systems. CIGNA-Link also is the term used to refer to the physical network of about 22,000 desktops linked worldwide.

Now you can't implement a vision without an opportunity. Now I'll tell you about the opportunity. In developing and implementing CIGNA-Link, we weren't addressing a problem as much as we were enabling the realization of this vision of connectivity. The key to the development of CIGNA-Link was the ability to seize an opportunity to implement the strategy, while resolving an immediate challenge. In other words, you have to know when opportunity is knocking. Our opportunity or our immediate

challenge was a move of 4,000 people from 17 different locations in the Philadelphia area to a new corporate headquarters building in downtown Philadelphia. The name of that building is Liberty Two and I'll refer to Liberty Two a couple of times. The key here is that we recognized an opportunity to take a step toward implementing a vision.

Now what did we have in place at these 17 different locations? In preparing for the move, a number of business interviews were made with the people that were moving. We identified that for those people, we had multiple vendor products for hardware and software. A whole variety was being used across the locations, and there was an uneven use of word processing and electronic mail. It was a "let the flowers bloom" philosophy with islands of automation consisting of stand-alone PCs, terminals, and spreadsheet applications. We really didn't have a handle on the size of our investment. So, in moving these people, we were faced with the problem of having to move Wang, IBM Displaywriter, IBM PCs, Apples, DEC, and all flavors of LANs including Novell, IBM, and Apple talk.

Now there are problems with this level of variety. It's all well and good to allow folks the autonomy to choose their own desktop tool, but what we found was that when people moved (and we have a fairly mobile population at CIGNA), it was hard to keep their productivity uninterrupted. There was a curve in learning the technology that the new department was on or there was a problem with connectivity with their new coworkers if they brought their old PC tool. I experienced this myself when I moved from a shop that was predominantly Apple MacIntosh to one that was dominated by IBM PCs. The first couple of weeks I said, "Where is my GUI interface and what do I do with this mouse now?" So, the variety really presented a problem.

The other problem that's involved is you invent wheels more than once, one for each kind of vendor. It was also difficult to exchange information and data and applications across departments. If you had a good application for doing your budget, you couldn't easily move it from one department to another or share solutions to common problems.

Finally, we found that we had aging equipment and an explosion of software with which to contend. So, we found that a single standard would be a good idea and this move of 4,000 people was our opportunity to go to a single standard. All these situations, coupled with a need to move all these people, led to the conclusion that we would go with one standard and one standard would be the strategy by which we would realize that vision of full connectivity.

Now Emerson said, "There's always a best way of doing everything," and I'll admit that as an individual user I really resented being dictated to when it came to something as personal as my PC. Some people like Apples and some people like IBMs and we were about to dictate what someone could use.

Having identified that we were going to go with one standard, we had to decide what that standard would be. Some of the basic decisions that had to be made were what would the standard desktop PC be, what operating systems would be made available, and what would the standard software be that would be on every workstation. We did vendor analysis with the philosophy that if the selections were

going to be good enough for Liberty Two, they would be good enough for all locations, and therefore, good enough to be the corporate standard. We proceeded to develop and implement a 4,000 node network for the move to Liberty Two. We have the largest token ring local area network in a single building at Liberty Two.

We had four basic hardware alternatives. We could go Wang based, DEC based, IBM based, or Apple MacIntosh based. We then decided what our criteria would be and weighed each of those four potential architectures based on, first of all, the potential investment in hardware that would have to be purchased in order to implement that architecture. In other words, what machines did we have, and what would we have to purchase? A second consideration was the performance of the prototypes of each of the four alternatives. We looked closely at each of the four alternatives relative to performance. A third criterion was the learning curve of our employee population, what they knew, what was the base of knowledge, and what they would have to learn. Finally, there is connectivity to each other and to the mainframe. We also looked at the cost of doing nothing, continuing with the "let the flowers bloom" philosophy.

On the other side of the balance sheet, the benefits that we envisioned included: reducing telephone tag with the increased use of electronic mail -- a vision that electronic mail would over time replace the memo; overcoming time zones in an international operation; and, most importantly, increasing productivity through the rapid exchange of information and data. In other words, this would give us increased positioning.

There also were different levels of vision at play here, and there was some very interesting political phenomena that went on. At one level, there was a notion that we could eliminate or significantly reduce paper interoffice mail by linking the secretaries. We would link all the secretaries together and then we wouldn't have all this interoffice mail, but we'll keep our PCs in our offices just the way they are. This became an alternative to consider, especially when we considered the cost of all the PCs that might have to be purchased or replaced or upgraded. The other level of vision, however, involved eventually linking all the knowledge workers to each other and to the applications and data housed in the mainframe and extending this linkage eventually out to the customer. Now this made an argument for the direction of standardizing and linking everyone. Finally, the president of the information services division basically said we can talk about cost benefit forever, but if it's the right thing to do the vision is what matters.

You cannot mandate immediate change. What you have to do is focus in on the standard with every new purchase or every upgrade and eventually evolve to the standard across the corporation.

With respect to the operating system, the departments have the option of using DOS, OS/2, or Windows. Most have chosen Windows and that is becoming more of an accepted standard. The CIGNA-Link standard for software currently includes WordPerfect for word processing, Lotus for spreadsheet applications with AttachMate for connections to the mainframe. We also use Jetforms, Outside In, and Network Scheduler as standards on the network. An interesting aside here is that we tried to standardize a graphics package and there was a tremendous user revolt. Some have

claimed that this was the ultimate clash of a group of left-brain analysts trying to put rules on right-brained creativity. At any rate, the bottom line is that there is no graphics standard and there's not likely to be one. Microsoft's Network Courier E Mail is used to connect all the users. In addition, some lines of business are now producing client forms on Jetforms and linking clients into the network to allow efficient passing of data from the client to our applications.

Even though the standard has been implemented, it periodically gets challenged. I can imagine you're wondering what if somebody actually told me WordPerfect was the only word processing application I could use? However, some of the sustaining advantages that this standard has given us are compelling. Let me just go through some of those advantages for you.

First of all, we have leverage with the vendors when the whole company is on one standard. Now remember, we're talking right now about 20,000 users with more to be put on-line. The leverage that's afforded in negotiating with both hardware and software vendors is paying back significantly. A second advantage is the use of Jetforms. We've begun and are rapidly increasing our use of automated forms across the company. For instance, when I return to the office I will call up an automated expense form, fill in my expenses, and it will crank through my travel expense submission and submit it. Third, when a standard provides the answers to many of the basic hardware and software decisions, it releases the energies of folks to concentrate on quality rather than production. In other words, we've got the technical people solving the technical problems and we've released the knowledge workers to do their jobs.

The network also promises to become a fax gateway both across our own locations and with our clients. We're very close to identifying what our fax standard will be for the network. The standard also allows for the standardization of training and the establishment of a usability lab for new users and for new applications. In addition, with a common platform, we could contract for training with vendors. We were able to get a training package put together and train everyone that came onto the LAN with that same training package. Finally, when you have a standard, and a business connectivity problem comes up such as communicating with an outside client or moving to an electronic fax, you don't have to solve it more than once. You solve it for the standard and you're done. The network is in and it's working. The cost of maintaining and operating the network is charged back to the users on a per-workstation basis.

Now, in the spirit of continuous quality improvement, an employee survey was conducted to see how the CIGNA-Link network has been received and what opportunities exist for improvement. Seventy percent of the managers said that CIGNA-Link has made the work of their department overall more productive. Improved communication and reduced interoffice mail were cited as the reasons for this overall productivity improvement.

Now speaking personally, CIGNA-Link has changed the way I work, some good and some not so good. With the introduction of electronic mail, I now have three sources of communication and transactions coming in, electronic mail, voice mail, and interoffice mail, and that is certainly a challenge for both time management and

organizational skills. However, on the flipside, in writing this speech I was able to draft it, send the draft to coworkers for review, get it to my PC at work all from my PC at home. In the past, this would have taken many steps and involved many more people. In addition, I've seen the advantages of the standard in moving people around. This is the part I find very exciting. Clearly, there's no downtime associated with bringing someone new into the department and having them change tools. Interestingly, there is the ability to continually improve on applications and to share those applications across departments. As people move, they tend to bring with them the ideas on how to use the tools from their old department and they adopt the best of their new department. So, we're getting past the technical to the real work. As the possibilities unfold, the character of CIGNA-Link as an enabler has taken form.

I will give you some examples of applications where we would have been able to do it without CIGNA-Link, but it wouldn't have been as easy. First, we have installed a system for geographically dispersed sales offices which links all the offices in a given division and they all share the same database for prospecting and sales data.

We have established common applications for electronic medical records in which we're currently piloting where patient records are being displayed on a terminal in the doctor's office and linked back to a central application. Interestingly, we thought being able to pull up electronic medical records would save time for the doctors. What we're finding is that they're spending more time with the patient because they're demonstrating their new toy. Once we get past that, we intend to roll this out to multiple health plan and provider locations.

We have something that we call our layered language applications which are graphical user interfaces. Basically, we've put in an object-oriented front-end which allows the specification of a group's health plan benefits. We've put that side by side with an application that provides for the automated transmittal of benefit information into the home office.

Now, how has this changed the life of financial people? Well, financial reporting results are developed on applications within the lines and on local area networks within the financial departments that are, of course, all linked to this main CIGNA network. They can be electronically sent to support organizations as results are developed and then further sent on from locations that are widely dispersed to corporate headquarters in Philadelphia. Remember Liberty Two, the first people that we put on the LAN? The spreadsheets can be shared and transmitted, so we're talking about transmitting actual data and spreadsheets. The increased speed of data sharing will allow for more time to be spent in analysis and review by both regional management and corporate management. Also, we've been using the network scheduler to allow for efficient scheduling of results production schedules and results meetings.

So to review, CIGNA-Link is a standard. It's a standard of hardware, of software, and of operating systems. More importantly, however, it has been an enabler. It has been the key to worldwide connectivity of offices and workers. It has been the key to shared applications. And it has been the key to effective vendor negotiations. And it promises to be the key to opportunities to share information, data and applications in the future.

Now the lesson to be learned here is not so much one of software, or of hardware, or what we chose. The lesson really is one of having a vision and having a strategy for achieving that vision -- knowing when to go toward the vision when all the tactical and year-to-year practical evidence may not be compelling. Recognize when you're taking that first step up the mountain. Take advantage of a set of circumstances that will allow you to go toward that vision (such as the need to move 4,000 people from different locations to one), and recognize the cost of lost opportunity by not seizing a chance to implement that strategy. It seemed like a fairly local decision at the time, but it was one that had a vast impact on the corporation.

MR. STEVEN A. WEBER: I've been in the technology arena now for about six years or so. It's almost like coming home in some respects. Working with some of the techies has been interesting at best. I know that we as a profession tend to get beat up a lot, or at least I do. The latest actuarial joke is usually told to me and a lot of the ones have related to the fact that actuaries have no personalities, or something like that. Well, let me tell you, I have some techies on my staff that are so shy they could not lead the Society of Actuaries in a moment of silence.

My talk is going to be about implementing new technologies in the field. I work for Aid Association for Lutherans. We are a fraternal benefit society. We serve Lutherans and their families. We have over $13 billion in assets, and about $65 billion in individual life insurance in force. We have 2,100 agents throughout all 50 states, and while some of them work out of offices, by and large, most of them work out of their homes. Some of them actually have fairly large geographical areas they have to cover. The situation almost screams for portability. So I'm going to talk about the problems we faced in putting this new technology in the field, what we did and why, and some of the results we got. Finally, I have some closing observations on this entire topic. Hopefully, you will see some overlap here with the other panelists.

When I thought about the problems, I put them in two pots. The first one is from the perspective of the home office. One of our major business issues was trying to improve the productivity of the field staff. It had been flat for a number of years and in order for us to reach our long-range goals, we had to improve that. There also was a lack of corporate focus on field automation. We had, I think, at least four different areas in the home office working on it. To say we were coordinated, is probably overstating it a little bit.

Much like Mariann, we had multiple versions of hardware out there. We had five versions of Data Generals. We had a Toshiba and even had some two diskette machines. While these two disk machines were really slow, we also had hard drive machines that weren't much faster. In addition, we had agents who went out and bought their own stuff. So, it was really the same type of issue Mariann had.

The additional issue we had was how do we implement new technology in a field staff located in all 50 states? How do we train the people? How do we support them? And when things go wrong what do you do? And, believe me, when you work with technology, things do go wrong.

You will notice there were more issues on the field side. First, the field had very little involvement in the technology up to that point. And the involvement they did have

was driven by the techies in the field staff. There are a couple of those out there. The field basically felt technology was being done to them.

The attitude of the field staff was not very good for a couple of reasons. They thought we were shifting costs from the home office to them, in general, and that field automation was one way to do it. They also said the costs were too high which was probably not too surprising. We might have said the same thing if we were in their shoes. This point is a little more subtle, but the message from the home office was, "Well, you really don't have to use the technology, but let me tell you how you have to use it." Now I don't know how much contact you have with the field staff, but there's at least 2,100 different ways of doing things out there and when you tell them this is how you've got to do it, they don't respond very well. The third item is training. When we'd given them new technology in the past, we didn't train them. We just gave it to them and said "Read this and now use it." Thus, they were very concerned about that. Another item is the technology they had just took too much time. It was slow and it was really just a hindrance. Maybe the best way to summarize all of this is that they didn't feel that it was any benefit to them.

Now what was our response to all of this? We had a five-step approach to dealing with these home office and field problems. Just like Mariann, we put together a vision statement. Now to actuaries that may seem like a fairly trivial or nonconcrete thing to do, but, believe me, it made everybody talk the same language; everyone was focused on how we wanted to use technology in the field and, above all, top management supported it more than any return on investment (ROI) calculation we could have done. We also did a ton of pilots. We tested a lot of things. There are a lot of variables in the technology world. I've often thought that actuaries could really play a nice role in this via various forms of multivariate analyses. You need to do pilots to find out what all the variables are so you can manage that whole process. We also improved the communications, and I just want to make one point about that. We focused it and coordinated it, but to be honest with you, I don't think we increased it. I think a lot of times we think improving means increasing. It wasn't in our case. We did set up a field team so we got direct field input and field involvement and finally put together an integrated plan. Everything fit together, the rollout, the training, the hardware, the communication, the whole shooting match.

So what did we do? Over the course of about a 12-month period starting August 1991, we gave 2,100 agents new hardware, new software, and a new network. We split it in two efforts, one started in August and one started in June 1992. There was really only one reason for that: because we wanted to manage the whole change process around technology. And if you get nothing else out of what I say, please note that when you implement new technology you have to manage the change process. People don't like to change and this whole process subjected the field to a lot of change.

What did we do on the hardware side? We gave the field three choices. They had the option of one laptop made by Toshiba, a desktop made by IBM, or both. We gave them a laptop, obviously, to deal with the whole portable nature of their job. You have to look at each situation and apply your technology to where it fits best. We also gave them three standard printers or, in other words, much like Mariann said, we standardized. Now I have been away from actuarial work for six years, but even

I can figure out all the permutations and the combinations related to this finite set of hardware and printers.

On the network side, we put together a countrywide network that linked our field staff with one another and with the home office. Thus, they could send electronic messages to one another or the home office and vice versa. The basic capabilities are electronic mail, sending and receiving various reports, and access to policy values. One thing we did to better manage costs was outsource the administration of the network, the service, and the distribution of the hardware to two other companies. Now, outsourcing the technology really can be kind of a fad-type thing. When we were doing this, the question was, why not outsource in the technology world? The reason we did it is because it was a good business decision.

On the software side, we rewrote all our software to give it a very consistent look and feel. Everything looked the same. We reduced the number of keystrokes the agents had to make and we also integrated all the software together. They really liked this last feature because now they could pass data back and forth between illustrations and financial needs analysis and they didn't have to rekey any data. Now our techies had a lot of trouble with that, as you might guess but it did save our field staff a lot of time.

We accomplished all this via two training events where we brought our field staff to the home office. We trained them on all of this, both in August 1991 and also in June 1992. So that's how we rolled the project out. But why am I telling you all of this? Because I wanted to show you how we addressed the issues that they highlighted.

Remember the home office problems? We dealt with the multiple hardware situation via standardization. We dealt with the remote field staff issue by outsourcing. On the field side, we increased the involvement by having a field team participate in the process. We dealt with the training by having these two major training events. Any time you implement new technology, you have to deal with the issues that your customers have. If not, it will never be successful.

Now, similar to Mariann, we had some decision-making criteria we used in going through this process. While there are probably a few more these next five criteria were the most important. Obviously, we went to our field staff, our customers. We tried to use quality principles and focus on the customer. In other words, what did they need to do their jobs better? Whatever we did had to be compatible. We talked about costs and the tradeoffs of that. We wanted to have performance. Obviously, it had to work faster than what they currently had. And there had to be service and quality standards on the part of our vendors.

Now remember I said we solicited field input in this whole process. They used the following three questions as their criteria: (1) Does this support the way I do business with my members and prospective members? (2) Does this help me overcome obstacles I encounter in the way I do business? (3) Does this provide me with additional opportunities to improve the way I do business? This may be a lot of words, but I would focus you on "support," "overcoming obstacles," and "additional opportunities" to improve the way people do business. Whenever you implement

new technology, you have to support how people work. You can't just give something to them. They have to see a benefit to it. So we said to the field staff, "use these three questions and then give us feedback based upon whether or not you think the things we're working on are going to meet our objectives. If not, we aren't going to implement them."

We also dealt with cost/benefits as well as part of this whole process. We did a corporate ROI calculation, but not a project ROI calculation. We factored the costs and the benefits into all the corporate modeling we do and, if we came up with an acceptable corporate ROI, that's as much attention as we gave it. Now, I would highlight what Mariann said before. Having a vision statement and having top management support made all the difference in the world. So that type of project calculation really didn't make a lot of difference.

The second point on costs is we shared all these costs with the field. Because we did that with the old platform, it wasn't a change to them. We did a present value calculation that utilized expected lease income from the field staff reflecting hires and terminations and compared that to the annual cost of the hardware, software, the network, including fixed and variable costs, amortization, depreciation, and maintenance. As part of that exercise, we wanted to make sure we came to a trade-off between an acceptable subsidy level from the home office, and what the field was currently paying. We wanted the cost of the new platform to be less than the old one. Why? Remember cost was one of the field issues. If the new technology cost less than the old, it would be a very concrete benefit in their pocketbook.

Our field satisfaction numbers went right through the roof. They were beyond our wildest expectations. These are field people who previously were in the 50s, 40s, and 30s in "satisfaction" and now are in the high 90s. We also beat our recruiting, our sales and our productivity goals in the last two years. Now I do have to make a caveat related to that. Remember I said that increasing productivity was a corporate priority or major business issue. In our corporate plans, we probably had three, maybe four initiatives to try and improve productivity and this field automation effort was just one of those. We never really went back and tried to determine what the specific impact was of the field automation. I would say that's probably a good task for a group of actuaries because it's a very good multivariate type of analysis.

We tremendously reduced help desk calls despite all the technological changes we made in the field staff area. The number of calls we received were less than they were before the techno-logy change. This was really surprising to us. On the network side, the agents got a tremendous benefit because now they could send information in over the network and realize large savings on their phone bills. We exchange a tremendous amount of messages on a monthly basis, 125,000-160,000 within the field and to the home office.

Here are my set of observations on implementing new technology and other things that we learned so far. First of all, training is absolutely a key. Don't even think about implementing any type of new technology without some type of training. It can take on various forms, but don't do it without some type of training. The second point is the people that are going to be using technology need to perceive a benefit. You have to deal with their current problems. You have to put it in the context of

how they do their work and, above all, don't make them any worse off than they were before you started. People get very concerned when you take things away from them. The third item, and Mariann talked about this quite extensively, is standardize whenever and wherever possible whether it's hardware, network, or software. It doesn't make any difference. You will save time, you will save cost and, as Mariann says, you can easily add things.

Now, the question that is often raised goes something like this, "If I don't standardize can I still tie things together?" By and large, the answer to that is yes. Technology has advanced to the point where you can, in effect, tie just about anything together. The problem is you spend a tremendous amount of time and money, and you're always fixing something. So if the question is "can it be done?," the answer is yes, but you pay a lot for that.

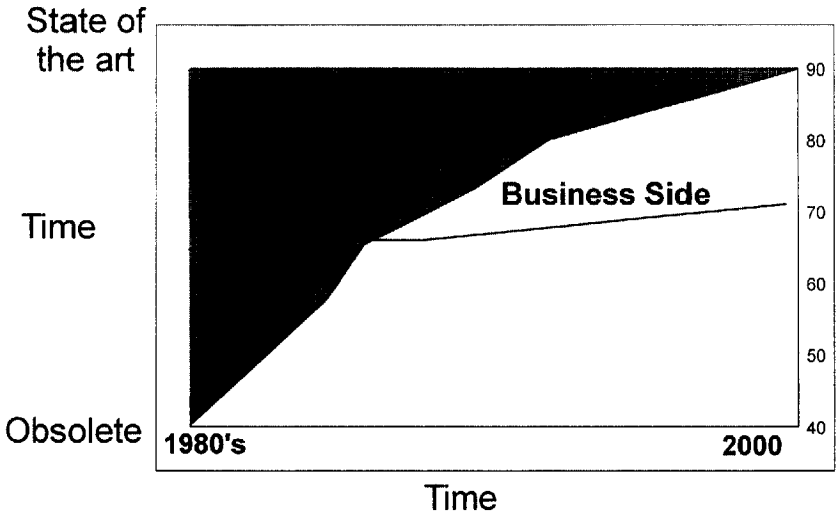
The fourth point is when you implement new technology, run dual systems for a period of time. But don't run them forever, otherwise you won't realize any benefits. But run them in the short term, because it lets people deal with the whole change process. They're easily able to compare the old system with the new system and then actually see the benefits without feeling like it's been forced on them. When we started sending reports out over the network, we received the following feedback from the field: "Don't get rid of those paper reports. We use them everyday. We want to still get the paper." So we ran dual systems for awhile. We sent information over the network and also sent them through the mail. Well, about two months after that happened, we got this deluge of E-mail notes and phone calls from the field which basically said, "Why are you sending us all this paper? We don't want it anymore." Well, what they had found was they got electronic reports overnight. They got the paper probably a week or two later, so by the time they got the paper everything was out-of-date. But they had to come to that realization themselves. That's what dual systems do for you.

Both Michael and Mariann said technology is not an inhibitor. You can do anything you want. Sometimes some of the technology is kind of immature and some of it might be a little unstable and some of it might cost quite a bit, but you can basically do anything you want.

The final item you have to deal with is the whole obsolescence issue. Chart 1 provides some context for you. In the 1980s, technology took a long time to become obsolete because product cycles were very long and there were a lot of constraints. What tended to happen is it became obsolete quicker on the business side than it did on the technology side. In other words, people were saying, "I really want to do this and I really want to do that but I can't, because the technology can't." So the business people had all these needs they wanted to fill, and they couldn't do it. Well, folks, the opposite is true. Technological obsolescence is going on everyday. Products are coming out three or four times a year. When we put out the Toshibas in the field in 1991, there were nine models to pick from. Within six months, Toshiba came out with three more models. Two years later there were probably close to 200 models to pick from in the laptop market. Products are coming out everyday that have more power, and they are lighter and faster.

Now, the problem is on the business side. Business obsolescence hasn't changed much in terms of time frames. Why is that? Isn't all this extra power and speed going to help people do their jobs any differently? Why doesn't the business side keep up with the technology side? There are really two reasons. One is that capital outlay to implement new technology is not cheap, especially when you're dealing with a lot of units. A lot of extra work is needed when you install new machines. The second reason is the people issue. People don't take to change very quickly. If you give them more speed what does it really help them do? Not much. So if their current machines can do what they basically need to do, they don't need a lot of the faster, quicker machines. You're always going to have this gap, and that's the biggest issue that technology companies have to deal with right now. A lot of the people in the business community don't need the product or business can't turn it over as fast as they're making it.

CHART 1
Obsolescence Issue



Those are my observations. I'd like to close with a quote that I think really describes the technology situation, particularly implementing new technologies. It's a quote by the late Bart Giamatti, the former Commissioner of major league baseball. While I don't think he said this quote in the context of technology, I do think it applies when you deal with new technology: "Order without freedom is oppression, but freedom without order is chaos."

MR. KEITH J. DUBAS: In the PC magazines, whenever they review UNIX, they say there's about three or four different versions of UNIX out there. Could you clarify which version of UNIX you're using?

MR. LEVINE: On the IBMs we're using the AIX version of UNIX. MIPS' version was very standard, while IBM does have some slight modifications. That's why I think it

is better to stick with a single platform, but I think that if you bring in somebody who knows any UNIX, they can adapt. The basic concepts are the same.

MR. DUBAS: My second question is more of a networking and office-at-home question. A lot of people, actuaries and staff in general, have their own personal work stations at home. Has anyone been successful with licensing? If the office has a software standard and it gets upgraded, it's a burden to everyone with home stations to keep up.

MR. WEBER: That is a problem, particularly in the situation in which you give loans to people to buy machines because you want to encourage computer literacy. People do want to remain compatible with the home office wherever they work. I'm not sure we have the right answer, but we've tried a couple of things. One is that you own the software in the home office and lease it to people or let them use it while they're employees and then you upgrade over time. That's probably the safest thing to do from a cost standpoint because then you control the upgrades. There is a package out by IBM (I believe it's called HOP) which, if you telecommute into a mainframe, I'd recommend for anybody. It's very cheap and it's very easy to use.

MR. GEORGE L. DE GRAAF: I'd like to hear any comments you might have on network security.

MS. HUNTER: Are you talking about security of data or security of hardware?

MR. DE GRAAF: Data.

MS. HUNTER: That's something that we have wrestled with tremendously. It depends on where your data is housed. Mainframe data at CIGNA is probably our most secure because we have the right kind of discipline around the data center and restricted access to the mainframe. The servers are probably the next most secure because you have trained administrators who are attending to that. We are still trying to raise the awareness of individual users about the data that's housed on their personal work stations. We're using such things as videos to frankly scare people enough to keep their data secure.

MR. WEBER: We do a lot of the same things. Our field uses passwords that get changed periodically. Certainly, in the home office, we have passwords to log on to systems and to get into the network. We have a corporate-wide LAN that's managed out of our data center and we do backups about every ten or fifteen minutes. We also have a set of security policies we're putting together. It's kind of ad hoc at this point, but some of them are part of our technology strategy right now. Our strategy in dealing with data is to keep all our corporate data on the mainframe. Our philosophy is to make copies of those files and move them down to servers or PCs so people work with copies.

MR. LEVINE: Our IS people basically treat UNIX as somewhere in between the mainframe and the PCs. But we've adapted a number of the mainframe type of procedures such as, IS people putting new applications up on the network. The users can't do that. IS people have what's called root directory control and the users don't.

Also, we have not allowed phone access to the UNIX network partly as a result of the security concern.

MR. JEFFREY M. ROBINSON*: I've got a couple of questions for Mariann and Steve. Both of you mentioned training, but what forms did it take? Did you teach the teachers who then taught it to the rest of the staff? Did the vendors do the teaching? Did you have it in one location? The way you train is important and on a project of this size it's the key.

MS. HUNTER: For the original LAN, training was done in Philadelphia by vendors. After that, we trained the trainers. For instance, when my department went onto the LAN, we had the usability lab in place. We were able to bring folks down to the lab in 10-15 person groups and run them through a course that we call "Life on the LAN," including such exercises as sending electronic mail to one another. That was conducted by a member of the central IS training team (who had been trained by the folks in Philadelphia) and our local area administrator. So our local area administrator actually did the training for the people that he would support. And that "Life on a LAN" course is kept up to date and used for new employees and new applications.

MR. ROBINSON: Do you have to retrain people? People forget.

MS. HUNTER: People for the most part haven't and this could be a testament to the fact that it's bringing value added. We haven't found the need to retrain because people are using it everyday.

MR. ROBINSON: Did you train at the application where the work was being done or did you remove people from the normal phone calls and demands of their superiors?

MS. HUNTER: We removed people from their daily routines. Now we do have local administrators throughout the building. In fact, the various buildings are geographically carved up so that there are teams of people that support the first floor or the second floor and they are available for troubleshooting purposes. Formal training is done in the usability lab away from the work area.

MR. WEBER: We do many of the same things Mariann and Mike talked about. I think there's a right answer for your situation, but it may not be the same one we had. People are anxious to move to a solution right away and it really depends upon your situation.

I'll give you a good example. What we did with the field staff is put things into the context of how they work, not say "now do this and do this," but actually put it in the context of how they approach a client. So we developed a lot of the training materials ourselves. Our manual gets rave reviews for a couple of reasons. One, it's thin. Second, it has a lot of pictures. And the third it's organized in terms of how they operate. But I think we felt we had to take that approach because of where they were at. There was classroom training, there was individualized help, they had a lot of time to practice on things, and we did bring them into the home office.

* Mr. Robinson, not a member of the sponsoring organizations, is President of Life Insurance Financial Essesntials in Parsippany, New Jersey.

MR. ROBINSON: One other point. In any large project, I find the morale of the troops is one of the biggest factors. You have ups and downs. You must have small wins to keep them interested in a project. Steve, I think you said that you must have a benefit from putting in new technology, but you also have to keep the morale up, because when they start losing they get discouraged.

MR. WEBER: Well, I will mention one thing we did, but I can't honestly say we did it intentionally. As you implement technology, sometimes it's better to be lucky than good. Remember we talked about having this field team? We brought about 20 people into the home office and had about six meetings with them over that two-year period. Field people are generally either really high or really low. Well, throughout the whole process they were tremendously positive and very, very helpful because they felt they were being heard. We had people in those meetings that were going through the low periods. I remember one of our programmers saying the integration was never going to work. Listening to people on the field staff talk kept the morale up because they were really positive.

MR. ROBINSON: The last question is primarily for Mariann. You brought out all the positive but what were the negatives? What were the big tradeoffs or the things that you gave away for the advantages that you gained?

MS. HUNTER: Let me just hit on a couple of them again, speaking from personal experience. When you bring over anyone that is not already on the standard platform, you have a learning curve. I personally experienced downtime. Several of my staff did and that is frustrating. It is a "why are they doing this to me" kind of situation. The other thing that we have that has been a negative is the Paul Masson version of using technology -- "Use no technology before its time." We learned our lesson the hard way about really needing to make sure an application was singing before rolling it out to a lot of people. What you do has very high visibility across the corporation, so it better work when you roll it out.

MR. JOHN A. WOOLSEY: How do you get data from your administrative systems to your UNIX network? Do you have some kind of a port to your mainframe that makes it transparent or do you pull extracts?

MR. LEVINE: This is all evolving but currently we're in an extract-driven mode and I think most people are in the actuarial area. We have a policy level extract of the UL data and we put that right on our network. Our network can handle a million plus policies. We do generally accepted accounting principles (GAAP), Statutory, tax reserves, cash-flow projections, and experience studies. I feel we have total control over the UL data within our network using an image of the administrative file. The network is not large enough yet to handle all the seriatim traditional policy data, so some actuarial work is being done on the mainframe in the IS area, basically the standard statutory reserving. We're working with a 700,000 cell roll up that does fit on the network, and that's what we're using for projections, dividend work, and cash-flow testing. But we're moving in the direction of getting the entire policy level traditional business onto the network where we think we can control it. We anticipate coordinating this with related marketing applications and administrative applications, so we're not all reinventing the wheel.

MR. JOHN MICHAEL CROOKS: The question I have is with the number of home users I think that Steve probably has. Do you have any control over, for instance, diskettes that go in? What I'm trying to get at is viruses with remote networks. Have you had any problems with that and do you do anything to address it?

MR. WEBER: In both the home office environment with LANs and everything else we have a virus scanning program that is run every month through our corporate LAN system, much like the automatic backup system I was telling you about. We also include as part of the software that we give to our field staff, a virus scanning package that is run automatically for them, particularly when we do new releases or upgrades. So we do tend to scan in both the home office and the field. Does that get at what you were talking about or not?

MR. CROOKS: Somewhat. We have had problems where, for instance, an agent in the home office would get a disk, stick it into his machine, and a few minutes later crash the whole LAN. We have plans and procedures where any disk coming into the home office needs to be scanned first by IS personnel just to make sure it's been done properly. You don't have that kind of control on a home situation.

MR. WEBER: Well, in the home office we do two things. One is we have a standard that says if anything needs to get installed on the corporate network, we install it. Then we periodically scan what's on their PCs and what's on the network to see what kind of supported or unsupported stuff is out there. In the home environment, they can basically put on whatever they want. We don't control that or manage that; if it messes up the data they're dealing with at home, it's generally on the PC level. They have no access to our mainframes or anything like that. They can probably read things off our mainframes, but they can't do any damage from home.

MS. HUNTER: We also use the virus scanning. In fact, you're talking about one of the negatives. It takes a tremendous amount of time (it's all relative I suppose) to boot up in the morning because when I turn on my PC it goes through its virus scanning and the LAN goes through all its virus scanning and so forth. Awareness helps -- again, that gets back to a training issue.