Timesharing/Professional Services Workshop: Session 6: Technology: Later Development

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Timesharing/Remote Processing Services
Session 6: Technology: Later Development

Conducted by Software Industry SIG – Oral History Project

Abstract: Both the products and the means of delivering the services changed dramatically during the 1970s. In this session, the participants discussed the technological changes in computers, networks, and software that enabled the TS/RPS industry to grow significantly during these years. They also discussed the changes in the market that foreshadowed the coming demise of pure timesharing as a viable business. Topics covered include:

- What were the new developments in the operating systems and tools which fueled the growth?
- What changes were occurring in the marketplace that motivated the companies to expand the kinds of services they were offering?
- What was the impact of having high performance/low cost minicomputers available for use?
- What was the motivation to develop proprietary network systems?
- How large had the companies grown by that time period?

Participants:

Name	Affiliation
Burt Grad	Moderator, SI SIG co-chair
Dick Bayles	National CSS
Frank Belvin	Interactive Data Corporation
Chris Brook	GE Information Services
Rick Crandall	Comshare
Ann Hardy	Tymshare
Norm Hardy	Tymshare

Mike Humphries	Tymshare
Gary Myers	Tymshare
Dick Orenstein	National CSS
Nick Rawlings	National CSS
Ross, Ken	Ross Systems
Jeffery Stein	Online Business Systems
Mike Wyman	Interactive Data Corporation
Thomas Haigh	Historian, Univ. of Wisconsin
Chris McDonald	Historian, Princeton University
Doug Jerger	SI SIG member
Luanne Johnson	SI SIG co-chair
Ed LaHay	SI SIG member

Introduction

Burt Grad: We're starting session number six. We're going to shift things around a bit. Yesterday we had each of you talk about the formation of the company, how the company got started, and I basically cut you off after you got to when you were in operation and running. I'd now like to pick it up in the mid-1970s to some terminal point, when you were sold, when it lost its identity, some kind of time frame like that as to what happened next. And I'd like to do it like we did yesterday, talk about each of the companies. After your formation, then what happened later?

Then the second thing we're going to really work on is communications. This was obviously central and critical. We talked about it some and Chris [Brook] mentioned some things, but I really would like to talk about how that affected what you did, how it changed your models, what it did over time. We'll talk about the operations aspects, running these centers, what were the things that got involved in that. So our first two sessions this morning are to work on those two subjects. So, randomly picking, who wants to start? Tymshare? What happened to Tymshare after the early 1970s? You're in business, you're growing, what happens next, who wants to tell that?

Tymshare After the Early 1970s

Ann Hardy: Well, let me get started and then some of the other people can fill in. One of the big things that we did which changed the kinds of applications and business we could access

was upgrade our communications network. And certainly by 1974, if not sooner, Tymnet would dynamically route circuits so that if you could get to any node in Tymnet to call in, you were virtually guaranteed of getting to the host that you needed to get to because if some AT&T line went down, which they did frequently, Tymnet would figure that out. AT&T couldn't figure it out yet but Tymnet could figure that out and route around downed lines, route around overly loaded lines, which provided an awful lot better service and more reliability. The other thing we did in that timeframe is put an operating system into the nodes in Tymnet. They were actually multiprocessing little operating systems in there so that with Tymnet, the routing code didn't run out of the hardware, it ran in the operating system.

Grad: When does Tymnet get built and why?

A. Hardy: Because like we covered yesterday, AT&T was horrendously expensive and very inflexible and couldn't tell when their lines were down and when they weren't down, a whole bunch of other things.

Grad: So how did Tymnet solve that problem Ann?

A. Hardy: Well, why doesn't Norm talk?

Norm Hardy: Originally, we had data centers in Palo Alto and we had a data center in Los Angeles and that was a considerable expense. We tried time division multiplexers. We tried frequency division multiplexers and they were quite flaky. And Rick [Crandall] was trying the same thing in a similar period and he told of a different set of problems. We launched the Tymnet thrust about that time and there are a number of pages on my website and other websites that tell of the technical details but that got going and allowed us to shut down the Los Angeles data center. I think at one time we had four data centers, Palo Alto, Los Angeles, Inglewood Cliffs in New Jersey and Paris. I'm not sure those ever existed simultaneously but that was too many. We began to draw back, consolidate the computer centers even as we were growing the number of computers.

Grad: You say growing, you mean at each center now there were multiple machines.

A. Hardy: Yes, lots of machines in every center.

N. Hardy: At the same time, I think it's correct to say that we began to attract a number of applications where the customer application demanded wide geographical access. And so there were quite a few cases that I became aware of where [that was the need] and GEIS [GE Information Services] was serving the same category of customer.

Grad: The customer had sales offices all around the country, he wanted to have access from all of the places.

Rick Crandall: The whole world.

A. Hardy: All over the world.

N. Hardy: Yes. Now, I'm hazy on the dates but there soon became a time when Tymnet began to serve hosts that were not Tymshare hosts. But that's veering off to Tymnet as a company rather than timesharing services.

A. Hardy: That's 1972.

Grad: So Tymnet has a life of its own after a point in time.

A. Hardy: Tymnet got a life of its own, eventually. Just to ground the dates a little bit, LaRoy [Tymes] who wrote virtually all of the original code came to Tymshare in February/March of 1968. So everything happened after that. Before that we were trying all of these multiplexers that we talked about.

Luanne Johnson: According to the timeline on the corporate history site, Tymnet was booted in its complete form in November 1971.

A. Hardy: Right.

Johnson: Then the notation is, "LaRoy Tymes booted the Tymnet network in its complete form in November of 1971. It ran without a single system crash or reboot until March of 2003 when it was shut down."

A. Hardy: Right. It never went down. It improved. It changed and improved but it never went down.

N. Hardy: It was like the phone company. Little pieces of it go down but the network stays up.

Nick Rawlings: What were you running it on? I mean you were saying there was hardware. What was the hardware?

A. Hardy: Good question.

N. Hardy: The Varian Data Machines computer was the first widely deployed minicomputer. It was a 4K or 8K 16-bit words. About five or six years later we switched to the larger Interdata 7/32. Then we built our own.

A. Hardy: So by the mid-1970s we were building our own switches.

Grad: So Tymnet becomes the foundation on which you get all of your stuff coming in and out.

N. Hardy: Yes.

A. Hardy: Right.

Grad: And then later though you start to sell Tymnet services to other people.

N. Hardy: Yes.

Grad: Besides your own use.

A. Hardy: But the thing about it was also that because it had this operating system on it, it could do an initial analysis of data coming through. And make decisions about which host it was going to go to or perhaps even have enough information to give some response back to the customer while it was passing other information back to the host. So there were very sophisticated components of applications actually running in Tymnet.

Tymshare Acquisitions in the 1970s

Grad: What else happens in the company besides the creation of Tymnet? What else takes place during the 1970s?

A. Hardy: In 1974, I think it was, we acquired UDC [United Data Centers].

Gary Myers: I think it was a little bit later than that, I think it was 1976.

Johnson: Seventy-four according to the records here [in the Corporate Histories database] which is based on the Tymshare annual report in 1974.

A. Hardy: It probably knows more than we do.

Dick Bayles: We all know they're not accurate.

Grad: Wishful thinking. <laughter>

A. Hardy: Nothing like having accuracy.

Myers: But Ann, maybe the actual documents were signed [in1974] but the real integration…

A. Hardy: The real integration didn't happen until later. I agree with that completely.

Grad: Now, UDC was?

A. Hardy: United Data Centers.

Grad: And what were they doing?

A. Hardy: They had a lot of data centers around the country.

Grad: They were service bureaus.

A. Hardy: They were service bureaus. But that wasn't the impact from that acquisition. The impact from that acquisition was the acquisition of Bernie Goldstein.

Grad: So Bernie comes in as part of the UDC deal and becomes a member of your board?

Myers: In answer to your question, UDC was a collection, I'd call it a confederation, of independently run data centers and as Rick knows, Bernie got familiar with all of these disparate service bureaus around the country because he was executive secretary or whatever for the ADAPSO organization. And so he established relationships with all of these guys. And then when he and Al [Eisenstat] put together UDC it was really an amalgamation of all of these data centers financially tied together only. That was the link.

Crandall: Would you care to say finally why you made that acquisition? Nobody figured it out at the time.

Grad: Well, that's what I was asking. That was my question, thank you.

Crandall: I spent a lot of time trying to figure that one out. <laughter>

Myers: I have a lot of scars on my back because I integrated all of those data centers into Tymnet and Tymshare.

Grad: Was Jim Mann still there at that time running UDC or not?

Myers: Yes, he was. And each of these data centers had an unusual product. Jim Mann, for example, was involved in DynaTax which is a tax preparation service. There was a fuel oil distribution outfit in the northeast.

Crandall: You had a cemetery application, didn't you? <laughter>

Myers: Not that I know of. But very disparate and unusually run data centers. And the real issue here was to technically hook them all up because one of the things that Bernie sold was that now you can become part of this big network and your applications can be spread over the whole world, and Tymshare, a marketing machine, will be able to sell it. Well, not all of those things really came to pass.

A. Hardy: That's right.

Myers: And maybe that's a good place for you, Ann, to talk about how it was all integrated because that was a huge task.

A. Hardy: There was a theory that all of these applications that were running in these different centers somehow needed the communications and most of them really didn't.

Grad: Because they were truly local service bureaus.

A. Hardy: They were truly service bureaus.

Myers: Batch.

Grad: Batch. Dick, you had a question you wanted to ask?

Dick Orenstein: No, I was just going to say I think at the time you just have to remember how significant a spokesman Bernie was. And that my guess is that he was the reason the acquisition plays.

Myers: I suspect that's true.

Orenstein: There was no business reason at all.

Crandall: A more direct way of saying it is if Bernie wanted to sell something it got sold. <laughter>

Orenstein: Right.

Myers: He can testify to that.

A. Hardy: I think that's probably more like it, right.

Grad: You've got UDC and except for the integration issue it wasn't much of a technology change. You were trying to make them online to the extent that was valuable. What else happens during these days. I'm sorry, Tom.

Thomas Haigh: We should note for people reading the transcript at this point that I did a biography of Bernie Goldstein, probably in 2004 in the first of the special [*IEEE Annals of the History of Computing]* Biographies Department [series] on ADAPSO and it had a little about UDC as well. [Editor's Note: *IEEE Annals of the History of Computing,* Vol. 26, Number 1, January-March 2004, pp. 85-89]

Grad: Let's keep going. What else happens?

Myers: I think we finally came to realize when we kind of pulled back the covers what we had there and it was really difficult to see how it would be integrated. Your point is well taken, Rick. I mean, a lot of us didn't understand why the deal was made.

A. Hardy: That's right.

Myers: But we were saddled with it, let's make the best of it. So what we did was go through each data center and look at people, we looked at customers, and we looked at applications. Some of the applications we pulled out. DynaTax was one good one. The R&D effort was in Wichita Falls, Kansas, quite a ways away from Cupertino where most of our technical people were located. But we tried to organizationally lace together those disparate organizations where there was value that we wanted to keep into our Tymshare organization. And the Technical Division really subsumed all of the technical people in Wichita Falls, Kansas.

The operations and marketing people really fell into the Data Services Division which is the division I was running at the time.

Grad: Hold just one second, you had a question Jeffery?

Jeffery Stein: No. I talked to Bernie one time, and maybe this is all old news that you all know differently, but Bernie apparently went to all of these small service bureaus and said, "Hey, look you're never going to get anywhere. You're never going to get have a payday because you're too small. Let's all bond together but you keep your independence and what we'll do is we'll sell this whole thing one day as a group. In addition to that, we can have a little buying power on buying cards and buying tapes and maybe sharing some legal information and all of that. But you keep your independence but we'll still kind of be together so we can have a payday."

Grad: That's Bernie's story and he sticks to it.

Stein: Right.

Myers: And like I say it was a confederation of service bureaus. There was really no central link.

Grad: They obviously weren't central to the future of the company [Tymshare]. That acquisition other than taking a lot of time and effort, wasn't really the direction Tymshare was going?

Myers: The strategic issue that I think Tom [O'Rourke] kept reiterating was that we needed to be out of the strictly hour-at-a-time timesharing business. And so what he wanted to do was spread geographically through the secondary cities in the United States which is where most of these data centers were located. And secondly, he wanted to pick up applications that he knew were generating some degree of money. So in terms of the strategy, that was the rationale behind the acquisition. But like I said, there were only a couple of applications that, when we sorted through the details, were good applications. One was the tax preparation business and we went on to assume the responsibility of maintaining and enhancing and growing it. Because in the tax business, every year you start from ground zero and build a whole new system to comply with all of the tax laws that were implemented during that period of time. We picked up two or three other tax companies that provided a broader range of tax preparation services. At one time we were the second largest tax preparation service in the country.

Grad: Any other applications that were that significant?

Myers: Yes, there was a medical application that we acquired in New Jersey that was pretty successful.

A. Hardy: Which Bernie acquired after that.

Myers: Yes, that's right. It was not part of the UDC family. There was a travel application business.

Grad: Did you ever talk about a model like ADP or somebody as being, oh, we'd like to be more like them? Was that ever discussed?

Myers: A lot of us knew ADP pretty well and ADP I would consider to be a homogeneous company where we were very heterogeneous. So I'm not sure the analogy in corporate strategy and culture would be appropriate comparing ADP to Tymshare.

Tymshare Technology Changes in the 1970s

Grad: So what's happening technically? What's going on here? You've got Tymnet built. Are you doing much with your timesharing systems? You're migrating to other machines?

N. Hardy: By acquisitions we went on to move into the PDP-10 area and later on the IBM 370. So that was the main thrust of the advancement, centralized technology advancements.

A. Hardy: Can you tell them what you did on the 370 because you changed some of that operating system which IBM then took?

N. Hardy: Well on each of these cases we had one or two or three full-time people working on the operating system of each of them. Adapting them to Tymnet, adapting them to our specialized charging, pricing, and generally putting in new features. And so it was really quite a dynamic operation. At the time you paid for VM but IBM delivered the source so you could modify it and improve it and we did a lot of that.

Grad: So you did switch over. You were using VM/CMS by that point in time.

A. Hardy: We didn't switch over. We added.

N. Hardy: Yes.

Grad: You left the other ones alone but you added this in your new systems? So what's happening on revenues late 1970s, early 1980s, do any of you know?

Mike Humphries: Well, before we get through with the technology, I think an important thing is that for the PDP-10s, we produced MAGNUM which was one of the first commercially viable relational database products. And it gave us the capability to do a lot more in serious applications without having to program every line. I suspect that for some of my customers one of our flaws was we hadn't yet figured out how to do serious applications without burning up incredible amounts of machine cycles doing it because I had several customers that were really perpetually angry about the cost of running it. But it was really powerful and I think we probably had something that we didn't quite know how to handle the way it would be applied in the marketplace but it was a big deal. It was a really powerful feature-rich relational database management system although we didn't call it that.

Rawlings: That's how we saw it, too. That you had a really good system and you didn't know how to sell it.

Humphries: I certainly didn't in my office. I had some customers and all but we never said, "Okay, here's the sweet spot, this is where we should be applying it so we can cut the sales cycles and get lots of revenue." I showed up one day and it was like a World War II movie. I had the CFO of one of our customers that was using a MAGNUM application and it was a German guy. He was so angry he was actually spitting when he talked about what I was going to do about his bill and all. And that's the kind of thing that makes you think before you sell the next one. <laughter>

Grad: How much revenues by the end of the 1970s?

A. Hardy: Don't we have the annual report?

Humphries: I believe it was somewhere between 70 and 80 million a quarter.

Grad: A quarter?

Johnson: Let me do a selection on the financial data.

Haigh: Actually, while Luanne does that, I was just wondering, do you think there's a particular fit between relational technology and timesharing as much as the strength of it was seen as the ad hoc reporting? Was that a niche that gave relational technology a chance to develop at a time it wouldn't have otherwise been as competitive?

Humphries: You mean, did we apply any leverage to the development of the relational data base?

Haigh: I'm thinking more in terms of the big picture. I never thought about this before, but as the hierarchical and network products were very well adapted to the high volume batch applications and early on relational [database systems were] being marketed as a decision support technology, it just seems like a natural fit between that and timesharing services.

Grad: Using it to get information, isn't it true [that it's important] to have a timesharing capability with that relational database capability?

Humphries: Yes, you make a good point. Everything that we'd done on timesharing that I could see was best suited for ad hoc because the value was really clear there. The application I was talking about where the guy was so upset, was a medical billing system. It was a company that supplied medical components to dentists and doctors and our system did the billing for them. So you know you might well argue whether that was best suited for a timesharing version and the expense that went with that or should that have been more like batch with some remote entry or something. I don't know.

Tymshare Revenues in the 1970s

Grad: You think it was $70 to $80 million a quarter?

Humphries: I think that's about right.

Johnson: I've got it here from the annual reports. 1976 revenues $81.8 million, 1977 $101.2 million, 1978 $148.6 million, 1979 $193.1 million, 1980 $235.8 million.

Grad: So consistent growth. Part of it depending, I'm sure on the acquisition of UDC that pushed some of those numbers. Company position in 1980 what did it feel like?

A. Hardy: Well, we were doing a lot of acquisitions with Bernie's expertise at acquisitions. And acquiring companies that, in theory, would use the interaction of the network. So we acquired online bill payment, online reservation systems, and the medical system that Gary mentioned. The other thing that we were doing at that time wasn't timesharing; we were selling Tymnet's ability to connect various networks.

Grad: Was it a separate division at that point in time with separate sales and everything else?

A. Hardy: It was forced out of the company by Telenet actually.

Grad: Oh really?

A. Hardy: Because of the regulations. Telenet went to the government and tried to get Tymnet out of business because we weren't regulated properly. So we had to spin out Tymnet and get regulated properly at which point, of course, we could do much more than Telenet was in terms of connecting networks.

Grad: Who's Telenet? Whose product was that? Is that their own company?

Chris Brook: It was Larry Roberts.

Grad: We're going to break on Tymshare there. So we're up to 1980. Tymnet is now split off as a separate operation.

A. Hardy: It's a subsidiary.

Grad: It's a subsidiary. And for the rest of the business you have a whole bunch of new applications, things that you're selling on a timesharing basis, a whole set of these applications that you've acquired. Is that a correct picture?

Humphries: Gary, would you characterize it as timesharing or like a remote…

Myers: No. There was the mother lode timesharing which by that time was really diminishing in total sales volume. And then Bernie and Al were adding more acquisitions, most of which was either RJE [remote job entry] or batch work and that didn't have anything to do with timesharing.

Grad: So the timesharing technology was no longer significant.

Myers: Yes.

A. Hardy: Right.

Rawlings: There was something else that happened. You guys started selling FOCUS on your VM system in competition with our RAMIS business and also later with our NOMAD business. And so I remember that very well.

Humphries: You're right and that was a big boost.

Rawlings: And to a certain extent what happened was that many of the people who might have gone to MAGNUM went to FOCUS, I think, at least that was the way we saw it.

Myers: Internally we had a lot of contention. There was a group of people who really loved the [Scientific Data Systems] 940 for the ease of use but it didn't have the power. And then there was a group of people that really liked the power of the [DEC] PDP-10 but other than MAGNUM we didn't have very much in the way of tools to use it. And then there were a lot of people who really loved the 370 because of the power and VM and the security of the virtual machine. Express and FOCUS were the first two application tools, if you will, that we used that really opened that service up and that really made a huge difference. But you can imagine a finite number of people and we're growing and adding people. Where do you train them? Who supports what? And so inside we had a huge resource allocation issue depending on what machine, what customer, what application and I think that really contributed ultimately to the spreading of our resources so we weren't very effective.

Comshare After the Early 1970s

Grad: Okay. I've got to break the time on Tymshare. Rick, you're next. Talk to me a little bit about Comshare, what happens to Comshare during the 1970s and where you go.

Crandall: Okay. Around 1977 or so we started hearing from some timesharing customers that they'd like to buy a copy of Questor which was our sort of 4GL language or System W which was our financial decision support system. They wanted to buy it for in-house use. And we didn't have it set up for that and we didn't believe in it religiously, mostly because I didn't understand what the business model would look like selling software. And some of the story, I think, is in the account that's already been taken.

Grad: Again, his oral history can be viewed at the Charles Babbage Institute website. [http://purl.umn.edu/107231]

Crandall: In 1978 and 1979, the first year I was chairman of ADAPSO, the second year John Imlay was chairman of ADAPSO. And the two of us worked very closely together because we decided that ADAPSO needed a major image upgrade and a major increase in fun at the meetings, as well, as additional members. John was chairman of MSA chairman which was a software company and I was chairman of a timesharing company. In that process of working closely, he actually taught me what the software business model would look like. I didn't understand the concept of maintenance. And that was a missing piece; that was a really key missing piece, for me.

Once I began to understand that, then I went back to Comshare and we started figuring out how to redesign ourselves as a software company because it was clear that timesharing was going to die out. Little did I know what an aggressive plan that was going to be because we eventually had to replace 100 percent of the revenue. At that point, I think, we were somewhere between $100 and $120 million in revenue in timesharing. So we picked decision support as the entry point into the software world. We already had begun to bring IBM processors into our service array. We had acquired a company in Chicago called something like Computer Research or Computer Logistics, I can't remember what its name was. But it brought in some IBM processors which is the base that we used for developing our software products because that's clearly the platform you'd want to sell software on. And we created a MVS version of System W.

At the same time or during that process, the IBM PC was released in 1982. And so we created what became, I think, the first software product that had a compatible micro version to the mainframe versions. And, right in that period, IBM had its big Love In – Burt, was that 1982 with Sam Albert? – which was IBM selecting a range of software companies, not including the database companies, and having them come into a big meeting and telling us that they're now opening the kimono. That they now love us where they used to hate us and they wanted to start doing partnerships. Most people that walked out of the room didn't believe it and I decided to believe it. And so we went through a very bureaucratic process with IBM but eventually wound up with one of the first, maybe *the* first, of those kinds of arrangements right at the time when IBM was introducing a concept called the Information Center, which we all know about. So System W on MVS and the IBM PC became the first significant product, at least certainly from the outside, positioned in the Information Center. And that had a huge positive impact on us because trying to reposition yourself in the mind of the market where you'd been a timesharing company all through the years – in fact one of the earliest ones – and now you're saying I'm a software company, nobody believes you. But if IBM says you're a software company, I guess you're a software company.

Grad: At this point in time, 1982, did you still have significant timesharing revenue? Or was that still the bulk of your business?

Crandall: Yes. Well, we didn't have any software sales in 1982 yet.

Grad: So that was still your business, yet you saw it going downhill. Why? What did you think was happening?

Crandall: People were going in-house.

Grad: Why?

Crandall: People were starting to do the math. If you had mature customer relationships and if your sales reps had crawled along enough corridors and companies started adding the pieces together they started seeing $50,000 a month, $100,000 a month, types of bills. And they started saying we could bring a computer in and do that especially as the operating systems from the manufacturers got better and better and it looked much more feasible to them. And, of course, the DP guys didn't attribute much value to the service side of what timesharing companies were delivering to them.

Grad: That's my question, so it was strictly a numbers thing. Nick, you were saying something.

Rawlings: I said support, you were saying services. But in a sense it was the support that we weren't getting credit for in these customers. They were just seeing the CPU.

Grad: So did VM make a difference here? Was it the 4341? What made the difference that all of a sudden the economics seemed to make it so much more attractive?

Crandall: I don't know. No, because MVS was an incredible operating system. I will tell you that once we released the version of System W in MVS, our revenues almost doubled. So it was very desirable for customers to be able to do this interactive computing or support of the interactive population on MVS. A lot of customers didn't want to have to bring in VM to do this work. So that was a good move from IBM's standpoint, at least from our experience.

Grad: But you're still a large timesharing company then in 1982?

Crandall: Yes. Relatively.

Grad: At $100 million?

Crandall: Yes, I mean it wasn't a GEIS but it was sizeable.

Grad: You hadn't gone into the applications business like they were talking about with the tax program.

Crandall: Well, we had our own. Remember, we had developed a human resource specialty but on the timesharing system and also this telephone industry application.

Grad: Okay. So you had some of those as well that you built.

Crandall: We did. But they were all delivered via the timesharing service business model. So, that was a big one. But the other really big thing that happened and if you were going to ask me what was the best, neatest, most fun thing in my career was this next step and I don't remember whether it's in the original story but it was at the time I was between marriages. And I got a call from a girlfriend that I was dating in Washington D.C. who was working for a publication. And she said, "You've got to get into the White House somehow." She said, "There's something going on there. They've got some sort of a test thing with word processing or whatever from Xerox and you've got to see it, it's completely different."

And all she told me is it was called Altos. I couldn't figure out how to get in there but I did know that Bob Adams who had been an executive at Scientific Data Systems became in charge of the non-copier stuff going on at Xerox when Xerox acquired SDS. I knew Bob well because obviously we'd been a customer. I called him up and I came up with some story about how we had this magic new graphic stuff coming out of research and I heard he had something going on and we ought to get together and talk about. So he tried getting out of me on the phone what was this stuff. Of course, I had made it up <laughter> and I said, "No, no, I'm coming out there and we can get together."

So I went out and we met at Xerox PARC. I signed some non-disclosures and he took me in to show what I now know also motivated a bunch of other efforts in the country, which was the mouse-based, disk-based graphical system that at the time they called Altos. And I was blown away. This is really humorous. I think I still have these notes and I'm going to dig them up because I know you want records and so on and I think these notes would be really humorous to have. I feigned that I had stomach problems from my flight on the way out and used that as a reason why I had to go to the bathroom every 10 minutes or so <laughter> and they would flash up screens and I was so blown away with it that I would run into the bathroom and I'd take out paper and I'd draw the pictures of the screens I was seeing.

Grad: I thought you were an honest man.

Crandall: I didn't want to forget anything and I know I still have them somewhere.

Grad: That'd be great.

Comshare's Transition from Timesharing to Software Products

Crandall: And when I got done with all of that, I went back to Comshare and I just grabbed all of our R&D guys and said what I had wanted to do for a long time was to come up with a way of using computing that non-technical executives would fathom and they just weren't doing all of the keyboarding and all of the stuff that lead up to that. So we conceived two versions of

what we subsequently called an executive information system, one of which was based on a mouse and we actually created our own mouse which looked more like a mouse than typical mice do. It had kind of a hump top and the tail came out this way. And I remember the Associated Press somehow picked up on it and took a photograph of one our very attractive girls who was a tech rep with about 12 of these things that looked mice running towards her. And this photograph wound up in about 300 newspapers around the world, which I still have. <laughter>

Grad: That would be great.

Crandall: We also had a touch screen version. We found somebody who would create the Mylar, or whatever it is, overlay that would go on so you could literally touch the screen. And we built these monitors into walnut wooden cabinets. I mean we're talking about 1983 or 1984. And then, we set one up inside Comshare and we ran our own information delivery that way. We had it in conference rooms and board rooms, we had it all over. And we started to incent the sales force to send in customers. The deal was if there was at least one person whose name was in the annual report of the customer, the sales rep got $300. <laughter> Because with all of the sales forces, we try to get them to sell high, none of them ever do and this one did it. And we would get in three or four executive teams a week from large companies.

Grad: What were you selling?

Crandall: We were selling a non-technical executive access to the information they needed to run their companies.

Grad: Running on Comshare?

Crandall: No, this is a software product.

Grad: Strictly as a software product. So this was not trying to grow your timesharing business?

Crandall: Not at all. No, this was converting ourselves into a software business.

Grad: So by this time, you had given up on timesharing hadn't you?

Crandall: [The product] was released commercially in 1984, which we made a big deal of with the George Orwell thing and so on. And we introduced it to IBM who picked it up also and that helped. We also introduced it to Warren McFarlan at the Harvard Business School who

went nuts and installed it in the dorms for the Advanced Management Program. So I would get phone calls from CEOs of random large companies saying we just got trained on this thing, I want one. And they would literally fly to us after their AMP session with Harvard. It was unbelievable.

Grad: My point is though you didn't use that as a means of growing your timesharing business?

Crandall: No.

Grad: This was part of your transition entirely to the new business.

Crandall: This was used strategically to change us to a software company.

Grad: Did you then sell off your timesharing? What did you do?

Crandall: No. We just used all kinds of means to slow down its decline rate.

Grad: And really all you were doing trying to stop it from slowing down [too fast]?

Crandall: Yes, which is what we're doing at Novell right now with NetWare, absolutely déjà vu all over again. By cutting multiyear deals for additional discounts, by figuring all kinds of ways, adding some additional service. Just all kinds of ways to try to preserve the revenue and slow the decline rate. But it was declining at anywhere between eight and 12 percent a year.

Grad: Ten percent a year erosion average.

Crandall: But it did take all the way into the early 1990s. We had 940s still running in 1991.

Grad: Unbelievable. Nick, you had a question.

Rawlings: We were talking about what happened with Tymshare and their network, I didn't really hear what happened with Comshare. Maybe I missed that.

Crandall: We did create network technology. We did create a front end processor for the network. It was nowhere near as sophisticated as Tymnet but it did allow us to front multiple processors. It didn't really do dynamic load balancing. It was an operator-controlled thing. But it did have some error correction stuff in it. And it was our own, just like everything else, but we

never had as a business goal to have the network itself as a value to be sold separately. We watched Tymshare doing it and we just didn't have the technology for it.

Grad: Thank you. Rick, thank you. Ed LaHay, has joined us today. He's an old time friend of ours from IBM and about seven other companies. Currently, Ed is with Oracle and making sure that their contracts are all very high quality and will make money for the company.

Ed LaHay: Not necessarily in that order. <laughter>

Grad: Ed's worked with us in SI SIG, off and on for the last eight or nine years and we've always appreciated his help. And he's joined us for the day.

Let me move ahead. And let me do IDC next, what happens with IDC during the 1970s-1980s.

Interactive Data Corporation After the Early 1970s

Mike Wyman: I had to pull up the timeline from the IDC website to figure out what was going on back then. Of course, it's an expurgated history of IDC strictly focusing on our securities industry processes. I think it was already mentioned that we were acquired in the mid-1970s by Chase Manhattan Bank. And they started becoming a larger piece of our business. We sold a whole bunch of business to Chase at substantial discounts. We also were part of the division within Chase which had two other operations and one was Chase Econometrics which was offering economics consulting using data which was stored in databases on our system. And models generally were built with the XSIM modeling language. There was another company that was a sister company of ours that was part of Chase called Manugistics if I recall correctly. I can't remember what they did. I want to say they did payroll.

Bayles: I remember Manugistics. I think it was time accounting and payroll.

Grad: Yes, I think so.

Johnson: Manufacturing?

Grad: No, they weren't manufacturing.

Crandall: That's the i2 competitor, right?

Grad: I think so. They became that later though. I don't think it was manufacturing.

Crandall: No. It was advanced forecasting.

Grad: Yes, that's what it was.

[Editor's note: According to Wikipedia on 10/21/2014, Manugistics and i2 Technologies were both providers of supply chain management software and services.]

Wyman: Anyway, there was probably zero synergy between Manugistics and the other sister organizations. So that was probably not a relevant part of the history of IDC. By the late 1970s, our business was starting to change. It consisted of primarily the Chase Econometrics business, the modeling business provided by Dynamics Associates and their XSIM product, and more and more emphasis on the securities industry. As Frank [Belvin] mentioned yesterday, in 1972, we had acquired the pricing services division of Standard and Poor. And by the end of the 1970s we were in the business of selling data both interactively by timesharing and also in bulk.

Grad: So you were primarily a data services organization by that time, delivering it through a timesharing mechanism? Is that a fair or an unfair characterization?

Wyman: We were migrating towards that. In other words, general timesharing was starting to fade away as the minicomputers became more prevalent. So our focus was primarily where we could provide value that was difficult to replicate in-house. And, obviously, if your products revolved around large scale financial and economic databases those aren't easy to replicate in-house. So people still needed to use our computers. Of course, people saw more and more value in the data and less and less value in CPU cycles.

Grad: Were you still selling independent timesharing services other than in relation to these applications?

Wyman: To anyone probably who was stupid enough to buy them, we probably would, yes. But there was not an emphasis on general timesharing?

Grad: Frank, any comments, you want to add to that?

Belvin: I left the company during that time.

Interactive Data Corporation Revenues in the 1970s

Grad: What were the revenues? Any ideas, ballpark?

Wyman: My sense by the end of the 1970s is we were at about $100 million between Chase Econometrics which eventually was merged into IDC and then spun off again at a later point in time. But the combination of Chase Econometrics and IDC was probably around $100 million.

Grad: Any significant technological work going on during that period of time? Did you get into a Tymnet kind of a thing? Or did you find a need for that?

Wyman: By the end of the 1970s we had our own x25 network which had been started back in the early 1970s based upon Comten hardware.

Grad: But you were just doing that for your in-house use. You weren't trying to market that separately.

Wyman: We weren't trying to market it separately. There was some thought of integrating it into Chase but that never happened.

Frank Belvin: Did we sell it to American Can or somebody?

Wyman: Back in the early 1970s, we sold our operating system to American Can and did facilities management on their own machine.

Grad: So that was part of that picture.

Wyman: Yes, I'm trying to recall if we sold it anyplace else.

Rawlings: American Can was a neighbor to us in lower Stamford and they actually were trying to get some of our customers because they thought, well, we might as well go into the timesharing business.

Grad: This is one of the things I was going to ask. A ton of companies went into the various processing services businesses during the 1970s, right?

Rawlings: Grumman Data Systems, Lockheed.

Grad: Every one of the aerospace companies did.

Rawlings: Right.

Orenstein: I actually made a call on American Can before they purchased from you.

Rawlings: Did you?

Orenstein: Yes, I remember that.

Rawlings: So you lost the sale. <laughter>

Bayles: It's all your fault.

Orenstein: The guy was such a turn off. His desk was up on a pedestal…

Bayles: It's the customer's fault.

Orenstein: You're sitting in his office on a couch and his desk was actually a step up and I just said I don't know how do you do this? I think I probably called on [Vincent] Learson at IBM a few weeks before and he was in a regular office. This guy was on some kind of a pedestal. I said, he's going to fall off there.

National CSS after the Early 1970s

Grad: Okay, let's move ahead. National NCSS, tell us about the 1970s. What goes on there? Who wants to tell that story?

Orenstein: We had so much money and so little thought that we wound up going public in January, I think 8th or 9th.

Bayles: Eighth or seventh, right.

Orenstein: And by July, we were essentially forecasting being out of money, not because revenue wasn't growing but expenses were growing so much faster. I mean we just had no financial system to keep up with us. So, sometime in the summer of 1970, we had a real personnel retrenchment.

Bayles: It was the first week of August.

Orenstein: And basically by the quarter that ended in November of that year we were able to show, I think, a meager profit.

Grad: So it was all a matter of lack of expense control?

Orenstein: It was all a matter of a *complete* lack of expense control. <laughter>

Rawlings: Well, exuberant growth.

Bayles: In cost.

Orenstein: We were growing like crazy.

Grad: You started new locations and things like that, didn't you?

Orenstein: Yes, lots of locations.

Bayles: We started a Brown University Research Center.

Orenstein: Once we got ourselves kind of established on a profitable program, then we tried to do the same thing everybody else did which is how do you get some other revenue that isn't just machine revenue and none of which worked. I mean we tried product marketing, we tried various products. We tried to come up with products. I guess the first thing we did that was we wound up buying this RTW [ready-to-wear] thing in 1974.

Grad: This is the rag business they were in.

Rawlings: I would guess that that was 1976 or 1977.

Orenstein: It was 1974 because I was still CEO.

Bayles: So it's all your fault.

Rawlings: That's right.

Orenstein: Well, maybe it was Weissman's fault.

Rawlings: It was Bob Weissman. He was given $4 million to go acquire something and he didn't acquire anybody for years and years. And so then he was told, "Bob, you've got to acquire." So he acquired RTW.

Orenstein: Well, it was also a service bureau. But we kept trying and that didn't really work out either. We kept trying to find something different and it was, I guess, in 1973 or 1974 when we started the NOMAD effort which turned out to be the same business – basically operating system type things. Tools, let's call it tools as opposed to applications, which we were successful in by having the timesharing tool. We were very successful ultimately with NOMAD being another tool.

Grad: Let me interrupt for just a second. Mike, you had FOCUS running on your timesharing system didn't you, once Gerry Cohen had left Mathematica.

Humphries: Seventy-five is about right for Tymshare getting FOCUS, yes.

Grad: Did that become a very significant factor for you guys?

Myers: It was a very good product and it really complemented the audience to whom we were selling.

Grad: Did you make money off of it?

Myers: Yes. We made money. We had a big commission that we had to pay to Gerry.

Grad: Because you didn't mention that when you were mentioning this other application areas.

Myers: Well, we should have. Yes, Express and FOCUS were very closely aligned to the same kind of target audience.

Grad: Okay.

Orenstein: So anyway, we were expanding geographically. We expanded into Europe. We had partnerships. We sold a machine facilities management thing to Standard Oil.

Rawlings: It became Chevron.

Grad: Yes, Chevron was the new name on that.

Orenstein: Somebody mentioned ADP earlier. ADP tried to acquire National CSS in 1974 but I had such a hard time with Frank Lautenberg. I'm not sure I can remember any longer all of the reasons why I didn't want to do this but he certainly was high on the list. <laughter> And

then we had our own turmoil with more financial stuff and so Bob Weissman became CEO and I just stayed on the board. And he tried to do the same things. Actually, he picked up the ADP thing but they weren't interested any longer. Well, you've talked to him probably.

Grad: We all have.

Orenstein: So I don't know all of the reasons.

Grad: Well, Dick you were still around weren't you then?

Orenstein: Yes, he tried some other applications and ultimately wound up with… What was that business?

Bayles: SalesNet?

Orenstein: No, not SalesNet, the microfilm business.

Bayles: Zytron.

Orenstein: Zytron. Okay, and then Bernie Goldstein came to work at National CSS as chairman and wound up on the negotiating team and the company was sold to D&B because, in fact, one of the reasons was the timesharing business wasn't going anywhere and all of these attempts to do something different weren't working.

A. Hardy: When was it that Bernie became chairman of NCSS?

Orenstein: Right after he left Tymshare.

Grad: Well, he and Tom had a difference of opinion, I gather, and that was some time I thought in 1977.

A. Hardy: They may have had a difference of opinion but Bernie was very involved for much longer than that.

Humphries: I recall him being in my Los Angeles office in 1978 for a meeting.

Haigh: According to my definitive *Annals* biography, he left in 1979.

Rawlings: That's my view that he arrived in 1979 having not sold Tymshare to D&B because Tom O'Rourke wanted to keep it. That was sort of my rumor mill.

Grad: That's what I heard too.

Bayles: And by April, we were sold.

Rawlings: So he showed up at NCSS and said, "Make me chairman of the board and I'll sell you to D&B." And so we made him chairman of the board and he sold us to D&B in April of 1979.

Grad: Let me follow up this point with you, Dick, what's going on in the timesharing business from that standpoint in the mid to late 1970s.

National CSS Technology Changes in the 1970s

Bayles: We were still growing although the growth rate had slowed dramatically and we continued to try to leverage the software, the VP/CSS and to a much lesser extent NOMAD, which is another whole discussion. So we embarked on a venture which at the time seemed reasonable. We protected ourselves from a financial point of view by funding through a limited partnership where we're the general partner. And what we did was commission the manufacture of a minicomputer that looked like a 370, a relocating 370. It was called the NCSS 3200.

Rawlings: Largely designed by John Skodon.

Bayles: And that actually looked like it had some real possibilities. Of course, until IBM came out with the 4300 series.

Grad: The 4341 was the change.

Bayles: Yes, the 4341, the 4300 series, which in one sense validated our business plan and then destroyed it.

Rawlings: We also, though, decided we were selling a bundle. You couldn't just buy our 3200.

Bayles: You got the operating system.

Rawlings: You got the operating system and I think you also got NOMAD.

Bayles: And NOMAD, right. All of the applications.

Rawlings: And you got a tape drive that didn't work.

Bayles: I don't remember the tape drive thing. So that was 1977, I'm guessing that we did that.

Rawlings: Probably.

Bayles: We had a whole floor devoted to assembling the machines, not in a manufacturing sense.

Grad: So the idea was that you thought you could create a hardware product to sell your timesharing service? Or are you going to sell the machine to the user?

Bayles: We're going to sell the operating system.

Grad: So you were going to go out of the timesharing business in that sense…

Rawlings: No, you'd take a customer who was a large timesharing customer and didn't want to pay $100,000 a month or whatever and say, well, buy one of these boxes and you continue all of those applications that you were running.

Grad: But essentially, what that meant was you were giving up on the growth of timesharing and you were going to look for an alternative to use your capability.

Bayles: We were projecting that it was not going anywhere.

Orenstein: I think you're mixing up some words.

Grad: Tell me.

Orenstein: Only in the sense that nobody was giving up terminal access to computers. We were giving up selling CPU time on a per CPU basis. We were going to sell a fixed price machine. The customer was going to see the same thing, terminal access to a computer.

Grad: But he was going to own the machine wasn't he?

Orenstein: Yes.

Grad: So that's no longer your timesharing business as a service, you're selling the timesharing capability to a customer.

Rawlings: The technology of users getting to computers interactively rather than putting in batch jobs.

Bayles: I mean what it essentially was we leased the software to SoCal where we provided tech support but it was their machine. And then we did a facilities management deal with B of A [Bank of America] where we were trying

Grad: Was it your intent that you would be the facility managers for these companies that would buy your machines?

Bayles: No.

Grad: Did any of the others try and build your own computers to sell? Because essentially you were going to compete with IBM then?

Bayles: Well, IBM wasn't in that market at that point.

Grad: They were offering VM. I could get VM.

Bayles: The VM was a very big machine.

Orenstein: [System 370 Model] 155.

Grad: I could get VM on a small machine by then.

Rawlings: No.

Grad: It was running on DOS machines by the late 1970s. That's my belief. I may be wrong. I think I'm correct.

Rawlings: I don't think so.

Bayles: I certainly don't remember that. You could run a single user on a DOS machine, a single MVS user.

Grad: Well, we ran multiple virtual machines. I may be wrong.

Bayles: Okay.

Grad: But my point is that all of you seem to be saying you didn't see the future growth in the timesharing business as a service.

Bayles: Right.

Grad: You were looking for alternative paths as to how you could take advantage of your timesharing knowledge and skills.

Bayles: And software. It was really software.

Grad: And software. Right, the software, and find some way to capitalize on that even if the third party timesharing service was going to go away.

Bayles: Right.

Humphries: Burt, Ann is going to have to answer your question because it was after I left and I think after Gary left. What was Laszlo Rakoczi's project to bundle all of that stuff on the DEC equipment and sell it the same way that NCSS was?

A. Hardy: Do you remember that? You put everything on DEC and sell the DEC machine?

Humphries: He was taking some of the applications. It was the same model they just talked about. He saw the timesharing business disappearing. This was Rakoczi's effort at a coup. So I forget which model it was but it was one of the PDP smaller machines. They were going to bundle several of the applications that looked like they were popular in the operating system modifications. And sell those with exactly the same business model that you guys…

Myers: I don't recall that model, Mike.

Humphries: No, it happened because of Rakoczi. This was when everything started to pull apart because there's Bernie Goldstein who's kind of like if you're a hammer the whole world looks like a nail. <laughter> We had had all of this harmony I thought and Laszlo Rakoczi

fought O'Rourke and [Ron] Braniff and everybody else. He wanted to get into that business. The other guys weren't convinced. So the business never happened but he did all of the design work and made the proposal. That had to be late like 1979 or 1980 or something like that. You guys don't remember?

A. Hardy: I don't remember.

Humphries: We should get Rakoczi here, I guess.

Myers: Mike, I think there were some proposals but to my knowledge nothing was sold. The thing that we did was very much like NCSS. We packaged, first the 940 and then a DEC 10 and then ultimately a 370. And would leave that machine on our premises and sell bulk service. We called it an FM, facilities management, arrangement. I know our first one was at Lockheed.

A. Hardy: Right.

Myers: And that was very successful because what we did was fix the cost which appealed to the financial people at Lockheed and we provided the same services. So we would do the AC [application consultant] support of the users in the field and still fix their costs and they'd have access to all of the software and the interactive services.

Grad: So what you keep saying is that as they used more and more timesharing services, the cost was accumulating to a level where you could pay for a whole damn machine by doing that. That's what I've heard all around the table.

A. Hardy: Yes, the price of machines was dropping.

Bayles: And then the question was how could you get service bundled and still buy the machines…

Grad: So you felt that the value add was in the service.

Bayles: The tech rep support and the additional software…

Rawlings: Yes, we believed that our software was superior to what you could get from VM.

Grad: So the software, the service, and some of the things that were available, that was the package you felt had the value.

Bayles: What we ended up doing with SoCal, the machine was on their premises. Bank of America was on our premises.

Grad: Dick, my question is an obvious one. Why did you feel you had to build your own machine instead of using a DEC or using something else?

Bayles: DEC couldn't run the 360 code.

Grad: There was no IBM machine that you could pick up on at that point?

Rawlings: Correct. They had no smaller relocation machines.

Bayles: A 158, or a 148, would do it but those were expensive machines. I mean you could buy a 3200 for so much less

Rawlings: You could buy 10 of ours for one of those.

GE Information Services after the Early 1970s

Grad: Let's talk about GEIS and then we'll talk about Online Business Systems. So what's happening, GEIS is getting bigger and bigger and bigger.

Brook: First of all, I need to look back at my notes. I misspoke yesterday. I was confused about the time period. In 1974 we were probably $180, $200 million. And 1978-1979 was $300 million. So it was kind of going up in $100 million increments every four or five years. Going back through all of this stuff, we did the same thing as Tymnet. We'd already created this cloud for the network where people came in this end and came out that end and we somehow got them magically to whatever system they wanted to get to or needed to get to. It was fully dial up.

We did all of the input recognition like everyone did and you type in your H's or whatever it was or carriage returns depending on your system. The network was fully self-configuring. We had full redundancy everywhere. All boxes – not the little tiny ones – but everything above the first level was dual connected for redundancy. We had one line north, one line south so it was all diversity routed which avoided some of the AT&T issues, one went down and the other one kept going. And then we'd bring it up automatically. We'd send diagnostic messages over the line. That told us how fast the line was.

In cases where we used satellites in addition to terrestrial links, like over the Atlantic, for instance, we'd have a terrestrial link and a satellite link between each set of boxes to give us the redundancy. Sun spots would come up, the satellite would go down and we still have the terrestrial link and you're all familiar with this. So everything was set up that way. Where we had switching centers, we had dual switching centers so everything connected through both A and B nothing ever went down. That was the theory. And it worked fairly well so eventually more and more of this came on. We did all kinds of fuzzy logic to make things run there. So by the end of it we had this network running in the middle.

At the same time as everybody else did, we looked into going into the public data network business because we had this very, very large network and all of our customers said yes, we'd love to get on board and use your network. Telenet came knocking on the door and said, "You can't do that." GE immediately said, "To hell with it. There's no way in hell any GE business is going to be regulated." So you cannot do that. So we said okay. I mean, we had the whole thing set up business plan, pricing, customers, the whole thing. And then we'd say, "What is Tymnet doing?" Well, Tymnet was sort of doing regulation but there was some interesting stuff. I'm sure you wouldn't say a word about it. But we were kind of interested that Telenet was pushing the regulation stuff and everybody had to be that way. And they kept screwing you guys every so often.

Grad: Who were the other the networks. There's Tymnet. Was ComNet there in the ball game at that point?

Brook: No, there was Tymnet and Telenet.

Grad: I thought CSC produced a product like that.

Brook: I think they had something. I don't think they were significant players.

Grad: They thought so.

Brook: Well, yes, I'm sure. But I don't remember…

Grad: You don't remember any other names except those. Okay, go ahead.

Brook: Not people who were going to go in the PDN [public data network] business.

Grad: Okay.

Brook: Various people came into it but I don't think they really got off the ground very well with it. So we backed off of that which turned out, I think, in hindsight was a horrendous mistake because we could have made a fair bit of money. All of our existing customers were very big international companies signing up. At this point, we were pushing applications by 1980. We were still working in the network adding interfaces to more devices for X25 in and out. All IBM devices. We had IBM hosts running on the system as what we called background. We had foreground which was like the old Mark III, the new Mark III system had gone through several upgrades.

Grad: Were you still using Honeywell and GE computers at that point?

Brook: Yes, Mark III always was the Honeywell – and later NEC – 645s, 6000s. NEC became the new provider of those when Honeywell shut down the 6000 line. NEC took it over which was actually a good move because we got fiber optic communications inside the boxes which speeded the hell out of the thing. So they were there and we were running redundancy amongst the shared load. Eventually, by the 1980s, we consolidated. We had a center in L.A., a center in Cleveland, which is always our main super center in the U.S. There was one in New Jersey in Teaneck and the main super center in Amstelveen, just outside Amsterdam in Holland and Rockville, was our headquarters. We narrowed it down to Rockville, Brook Park, which is Cleveland, and Amstelveen. So everything got narrowed down to the nearest data processors.

Grad: You didn't have one in Asia?

Brook: Not really. We were working on one with our Japanese affiliate over there, but the cost was too expensive and the communications was such we thought that we could just bring everything over. And as I said yesterday, we ran the Japanese market in Amsterdam to get the time zone difference. It was good and bad. That worked very well except we couldn't get fully redundant access from Japan to the States. We were promised by the phone companies – I'm sure you heard the same story, "Absolutely, we got one up here and one down here." And when we traced it there was always one piece in the middle that everything went through.

N. Hardy: Yes.

A. Hardy: That's right.

Brook: And when it went down that was the end of that. There was nothing you can do about it. And so we ended up with just the three super centers and we had network centers all over the place, sometimes with larger nodes and what we called NTOs, network transmission offices, which had central concentrators in them.

Grad: Let me ask a question, because it's relevant to all of you, how big was the communications bill during this period of time of your total cost? Was it as much as your hardware costs? Was it twice your hardware costs? Was it a tenth?

A. Hardy: Do you remember?

N. Hardy: Millions of dollars a month. But I don't remember it closely.

Grad: Was it the largest single cost other than people?

A. Hardy: Yes, probably.

Crandall: I'm remembering it was a number like eight percent of revenue, whereas hardware was almost double that.

Grad: So hardware was larger.

Crandall: We didn't do as much networking. I mean we were global and all but we weren't as redundant. We didn't do as much as Tymshare or GE.

Grad: Did you all remember anything? Nick, Dick?

Bayles: I think, first of all, the IDC and our cost structures from a hardware point of view are substantially different.

Rawlings: 940s and PDP-10s.

Bayles: Yes, 940s and PDP-10s and 168s are a whole different class of expense.

Grad: Yes, that's true.

Bayles: So my guess is we're closer to Rick's thing where it was half or less than half of the hardware expense. What we didn't cover when we were talking about NCSS was the communications aspect of things. We did front end concentrators in probably 1972. I talked to the guy last night who's a little hazy on dates. But the distinction between us and at least GEIS, was they didn't have a shared memory pool, a shared disk storage pool, so that essentially a user was dedicated to a machine on which his storage was permanently attached. Which meant that the front end concentrators had to know what user ID belonged to what machine. This is in the 1972 timeframe. We went to an X25 network which probably rolled out in 1975. It was all of

the usual rerouting on PDP-11s as the host machine. And just by extension – Dick, correct me if I'm wrong here – one wonders whether we never even considered entering the public data network business because of reasons of regulation or because of shortsightedness. I don't know which.

Orenstein: Yes. <laughter>

Bayles: But if you look at why Dun and Bradstreet was interested first in Tymshare and secondly in NCSS, I think it was in a large part the network because they had an enormous collection of branch offices and an enormous data transmission problem that they didn't want to replicate themselves. So they were looking to buy Tymnet. I think buying Tymnet was more important than buying the timesharing business.

Orenstein: I think they saw this as distribution. We talked about this yesterday. They saw it was a distribution mechanism for their services.

Bayles: Right.

Grad: Let's finish up the GEIS story, do Online Business Systems, and then we'll take a break. Go.

Brook: We kept expanding, putting more stuff in the network. I was looking through my notes here and we finished up with what we called multiple switching centers where we had about five clusters of central concentrators all of which had dual switches. And then we went up a level and interconnected the switches and they were all dynamically divided and so on. And we finished in 1984.

Grad: Let me focus you a little bit. How much of your work at that point was what we would call timesharing? And how much was all of these other kinds of things? You mentioned EDI and things like that yesterday?

Brook: By 1980, timesharing as such was around but it was probably not more than about 20 percent at the most. The strictly interactive stuff. I mean like everybody else said, what we were doing is we were running applications. A very large soft drink company, for instance, did a lot of their work on us. So I spent quite a few trips going down to Atlanta. We were doing data processing for a lot of the large companies, global companies.

Grad: I guess most of you are saying they saw the timesharing business as the best you could do is try and hold back the demise?

Brook: There was still some of the old time engineering in Fortran. There was a lot of stuff written in Fortran because it was convenient and it had been optimized for business operations. But people doing the old fashioned ALGOL job, run an application, check out what this number comes to, that's gone. I mean that came back a little bit later when we went into GEnie [General Network for Information Exchange] but at this point it was all business applications. And our marketing thrust was strictly in the problem solving mode. You know, if somebody's got something they want to do, especially a big corporation, and they needed global access. That was the big selling point was the network.

Grad: Okay, so the network was key.

Brook: So I can go from Europe, Asia, U.S., wherever.

Online Business Systems After the Early 1970s

Grad: We're going to come back and talk about this. Let's finish up this session here with you, Jeffery, talk about what you were doing.

Stein: Well, the situation at Online Business Systems is much different than everyone else's in terms of what was being offered but we still had the same problems. And they were kind of broken down into two segments and that is that information processing was becoming more prevalent. People were becoming more educated. They knew more about it. And back in the 1960s, I mean, it was kind of like foreign and you wanted to stay away from it. The other thing, too, is that as hardware came down in costs, the perception was that well, my gosh, we can do this ourselves.

So, again, from 1969 to 1977, we were in a shared data center. We were facility managing and all of that but we still had the similar problems. Someone would come to us and whatever the application would be, running transactions, batch processing or just selling time, they would say, "Well, my gosh, we could get an XYZ computer in" and, of course, they'd always sandbag it because they would just talk about the cost of the computer. They wouldn't go into the maintenance. They wouldn't go into the power. They wouldn't go into the floor space and the personnel and the systems programming and all of that. Someone was in there sandbagging because they're trying to build their empire or whatever they're trying to do.

So we would just sandbag them back and say, "Fine, if you're going to get that computer, what are you going to do it, buy it?" "Well, no, we're going to lease it." "Well, how long are you going to lease it for?" "Well, we're going to lease it for four years." "Okay, well, would you sign a four-year contract with us and, of course, if you're going to lease the computer for four years, you're going to guarantee a payment on a lease that's going to be x-number of dollars." And

they'd say, "Well, yes, okay." So we would negotiate in essence a lease, a processing contract, with a minimum. And we'd be taking haircuts. We would lose battles, too, where you could give them a computer, you could give them all of the services and you could *pay* them and they would still want to have their own computer <laughter> because they would have a more important job and they would get a raise and they'd be more important in the organization and everything like that. So we would lose those people. We had the continual struggles.

Grad: How big was the business in 1980?

Stein: In 1980, we were $10 million. Again, we had no capital. We were self-funded. And not the multi hundreds of millions of dollars as the gentlemen here and the ladies in the room. But in 1989 when we sold we were $30 million.

Grad: So still a relatively small business, focused business.

Stein: Comparatively speaking. Yes, it was. It was big to me. <laughter>

Grad: You were making money?

Stein: We made money every year until 1980-1981 when I did my first acquisition and I basically screwed it up. I paid too much and didn't consolidate and it was really a tough, tough road for about five years. Really tough.

Grad: We'll come back. Our time is up on this session.

