ORIGINAL - Return to Linda Rapp - MKO-3

MS-1-1

_____: What is the story that you, Bill ~~Sheekles~~ Strecker want to tell Digital customers in the Digital community about Digital's style and philosphy of computing, and why did we imagine that way, how do we figure it out, what do we understand way back when you started in on the competition_____build the structure.

_____: Okay, in order to simplify things I was going to have sort of a reference point, and the message that I try to give people outside the company is very much reflected in this presentation, and it's exactly the one so I can give you a very formal description of what I would say. The presentation is done in kind of a layered way that it's sort of built, you know, builds down and so forth, so I think that the top level messages are fundamentally the messages that are contained in the first couple of transparencies of presentation, which is first that--let me just look at these ones(?) here, first that we actually are--we are very sensitive to customer needs, you know, potentially we don't understand customer needs, that's always a problem, but we do start out with a feeling that what we're trying to do is meet our customer needs. We have a model of what our customer needs are. We also have a model of how we think we fit into the information systems business, the role that we play, and that role has changed I think rather substantially over certainly over the past decade it's clearly changed in a very dramatic way, and I think that it's changed in ways that are fairly significant, even if you look over a period of just the last

couple of years. A decade ago we were a minicomputer vendor, and we sold generally very specialized hardware and software to generally people who were very smart and generally took it and did things with it that we didn't well understand. We were perfectly happy to sell the hardware and software and not worry too much about what happens after we sold it, and I would say right now we think we're in the information systems business, we basically want to be a complete information system supplier to enterprises or organizations--I don't know what the word is, just to put that anyway (?), and we feel a substantial responsibility for the total information system solution, so that it's no longer the matter of our selling a small computer to somebody who's technically smart and then forgetting about it, but rather we believe we are effectively a partner with an organization, supply them with their information system needs to make them successful as a business, and we don't think the job is done until that--those objectives are met. And then if you ask what's the next message, well, if we can then move into our particular philosophy about how information systems should be built and used, and then we can move into further detail about what are the architectural principles that we use in the systems and then we can get down and get further detail about some of the products in fact that are built in those architectures. Well, I hit the bottom now. Can I answer other questions? Or do you want to understand (expand) some of the levels?

_____: Feel free to ask questions if something pops to mind--we'll be very happy--

_____: I'll amplify one thing though, that--and I gave kind of two time periods, I gave the decade ago, and said well look at us a decade ago and look at us now. I mean it's dramatically different, and I think that even over the past several years, though, there's a significant enough difference, and that's--and having these change dramatically over a period of just a couple of years is a significant event, and I think the what happened over the past couple of years is that we realized that the work that we've been doing in some sense was maybe even more significant than we gave it credit for.

_____: How did you start to realize it--

_____: Yes, that's a very important point.

_____: That we had--obviously the basis of our success tend to rely on about two things, and that, you know, like anything, saying it's two things understates the case, but it's obviously the networking and the compatible systems I think are the two things that really we did. We did those things I think with an eye to the fact that they would enable us to do the kinds of things we're doing now but perhaps ten years ago we would not have been presumptuous enough to say we were going to take on IBM broadly, you know, which probably would have been very presumptuous at that point in time to assume that we could, because we were just a tiny fraction of their size at that point in time, but we thought there were some things that were important things to do when we were making computers, and the emphasis on networking

and the emphasis on compatibility were two things that we thought were important almost without reference to what we would be as a company ten years later, because they were just important things to do--they constituted the right way to build computers.

_____: Why did we figure that out?

_____: Why did we figure that out; I think you get different, you may get slightly different answers on the two of them. The first one--well, let's take the second one first, the compatibility. The reason for compatibility was that we realized even then that if we fragmented all of our internal efforts across multiple architectures we would not be able to compete, that it is going to be a tough business, and that Digital was not big enough to support lots of different efforts going in different directions. The only way that we could survive in the information systems business regardless of what it was going to be--whether the competition was Data General or the competition was IBM was to get our efforts very focused, so...in some sense, you might almost view it as a selfish interest on our own part, that we had to get our act together within engineering and within all the other parts of the organization that depend upon our products to get things simple enough so that we could do the job, we could get a complete set of capabilities. If we had three or four architectures like IBM and in fact what we did back in 1978, we /would have so fragmented our resources that we would never have been able to mount a credible effort against any

competition. So we -- that was one thing, and as it turned out, the things that make us productive inside, turned out also to be benefit to our customers. I think it's very important, the same thing that enabled Digital to get a very comprehensive information system solution by focusing also benefits our customers because they too don't want to fragment their efforts across multiple architectures, so therefore when people start to build vax based solutions they're very productive in doing so because they only have to do things once. So I think it was a win-win situation, but I believe the initial motivation was actually more in the direction of helping us than in fact perhaps fully understanding that what we would--what we did for ourselves was going to be equal or bigger benefit to our customers. It wasn't as well understood in 1977, that the benefits maybe our customer would get from a single architecture, but it was well understood the benefits we would get internally from having a--

_____: Running our business.

_____: Running our business--well, doing--just bringing out systems required enormous engineering investment to bring out complete systems. I mean you think the name of the game is the completeness and comprehensiveness of a solution you can bring; you can obviously bring out a complete comprehensive solution if you focus all your resources on only one architecture than having N architectures and getting only one end for the complete solution on each one of them. So that the thing that's very finite, and it's finite for us and it's

finite for our customers, is the amount of intellectual and financial resources you can apply to any given problem, and it was of enormous benefit to Digital to be able to apply all of its resources to one thing and this was of enormous benefit to our customers to have the same thing, so that was a situation which I think initially we probably thought of more in terms of our own internal things, but in fact rapidly became obvious to us that it was also of enormous benefit to our customers as well. So that was one part, the compatibility, why we felt that was so important. Now, this is almost parenthetical--I don't think you'd want to put this in the introduction, but it's also a piece of context, is that whenever you try to go from having a lot of architectures to one, there's an awful lot of internal opposition to doing that--not because anybody is opposed to the principle. Everybody thinks the principle of having one thing is great, but they don't think one thing is great if it isn't the one thing they're working on, so therefore they were to focus on one architecture meant that we had to not focus on the other three or four architectures we had, and that caused a lot of trouble. But it took awhile to get--pull that off.

_____: One of the things that occurred to me is the advantages of focusing on one solution, the disadvantage being that if you miss, you've put all your eggs in one basket.

_____: Right, right.

_____: Maybe getting at how Digital made sure vax was the right answer.

_____: Let me say two things there. You're absolutely right, in that -- and I can give you an example again, you would not want to put it in the book about the risks of the approach that we took, and that, I don't know if you're familiar with the problems we had at getting the product, which is called the 8600 out, but that product was several years later, and by virtue of it being several years late, it put the company in considerable jeopardy, because in fact it was the only high end vax processor being developed at the time, and if we didn't have that we didn't have any high end systems for awhile and that was a problem. It wasn't so much that we committed to one architecture, and that would almost be difficult to see how you could really foul that up too badly, but the fact that there was only one implementation of that architecture being done at that time did cause us some problems. So there are risks. There are risks of putting all your eggs in one basket so to speak. You tend to think if you put them all in one basket and watch the basket that's better than scattering them all over the place. The other thing, the second of the two things was the networking, and again, I think, see, why did we do the networking--I think we felt that there was some real customer advantage to networking. I mean, and again, maybe because we thought it was so neat ourselves internally but it just seemed to us that we were very much--let's even step back a little bit in terms of our whole philosophy of computing. We tended to think of bringing computing to the end user, as opposed to centralizing

it in glass rooms. And the obvious way to build --bring computing to the end user was to bring computers to the end user. Okay? And at the same time, you obviously wanted end users to be able to share information. You wanted those computers to be part of an information system. So networking was almost an obvious thing that had to be done. YOu had to bring, once you took the applications out of this glass room, for example, in order to bring things closer to the user, you brought the computers closer to the user, and then you wanted to tie the computers together and networking is what we mean by tying computers together. So that very much followed from a real philosophy about how you should do computing. That was very clear.

_____: It's a very systems oriented approach, by which I mean not computer systems but the whole looking at something as an ecosystem if you will, that--and the question is, this is a very good idea that comes out of the whole environment, the whole philosophy that was created at Digital. Did other companies do that? Did they have this as wholistic an approach as this seems to be?

_____: I don't think anyone or any large vendor, it's sort of hard to take any one, because you know, undoubtedly some of them have had some good ideas, but I don't sense that any other vendor had quite as strong a commitment to networking. IBM had very much a centralized approach; in some sense they didn't really have any need for networking, because their philosophy was you put everything in a glass

room, you know, that's it, end of discussion. There's no reason to put computers close to the users--we don't--like that's a bad idea, we want to keep them pretty far from the users, and put them in a glass room in a big programming staff between them, so they didn't have any need for it. The other significant trends clearly that took place over the last decade was the personal computer thing, and it tended to be standalone too--all the emphasis was on personal, but it was not personal as being part of some larger thing but it was personal in the sense of making you better in what you were doing, but it didn't have much orientation towards making an organization more production. So I think the combination of IBM, which was a one hold of the information systems business people which would have little interest in networking, and then the other pole was the personal computing which almost by the way it was concceived it was do your own thing kind of computing so that you didn't see networking coming out of that either, and at Digital it was sort of a significant company and kind of in the middle in the sense that we were interested in building large computing structures, and building larger computer systems that attempted to make initially departments and subsequently organizations more productive, and that required networking, so really I think that we tended to be more into networking than any other company.

_____: How much -- could you talk a little bit about the role of using our own products might have had on the development

of_____--?

_____: I think that's, I think that the role of using our own products is profound. And I think that the reason that the products are as good as they are is that we use them. Is the people who build the products use the products on a daily basis, and I think that that's very significant. Very significant.

_____: Different than other particular companies?

_____: Well, again, if you could take my very over simplified model of the world, and that is that you've got these two polar extremes, the people who build them--mainframes in glass rooms obviously don't use them in their day to day business. I mean they--the average engineer building one clearly doesn't use them. And if you look at the person computers they're not powerful enough to run any business on, so they -- people run personal computers probably don't try to really run organizations on them either. So, in both cases those kinds of computers don't--aren't adequate for doing the things that people who build computers need to do. The only company that was building computers and was able to use them in their daily business I think was Digital, so I think we had the engineers a lot closer to the use of the computers than perhaps in some other organization. Obviously I think you've got to be careful about over generalizing this because I don't think we don't want to set ourselves that far apart, but I think at least there has been a big advantage.

in Digital engineers using the computers that they build in their daily business.

_____: Can you think of exampls of things--?

_____: Oh absolutely. I think one of the--any--one of the obvious things is that, and I'm sure it's true now, that most engineers working in computers have either computer terminals or personal computers in their offices, but I believe that ten years ago you found that most engineers at Digital had computers or terminals in their office. So obviously those people were using computers, and the result of using them in their daily business rose out of the things that we subsequently brought out. Particularly -- and simple mail (?) systems are a very very common thing and electronic mail was in common use at Digital in the late 1970s. And I don't think that it's probably true in most cmpanies that electronic mail was in common use, and the reason that it could be in common use is that everybody had a terminal, and electronic mail system doesn't work if everybody doesn't have a terminal because you have to say invariably one of the persons you want to send mail to doesn't have a terminal so you can't send electronically so you send paper to everyone. If everybody has a terminal, then you can do it on an electronic mail system, and because every engineer at Digital had a terminal even in the late seventies, we could move very quickly to electronic mail and learn how to build mail systems and how to use them and how to run your company with mail, electronic mail as an aid to running your

company, and we did that very early. Earlier than other--many other companies building computers.

_____: We said that we focused for competitive reasons on these issues but also we said we knew the right things to do, we knew the right way to build computers, (INAUDIBLE) what are some of the fundamental principals that drove our approach in building computers; we heard closer to the user but...other driving forces.

_____: I think one of the things was a relatively strong commitment to the concept of architecture, that ... that.... not to get overly technical about the thing but in fact you should take a computer system and you should break it down into smaller pieces that you can specify the interfaces between those pieces, and the process of doing that is very important, and the process is almost as important as the end result. Whenever you try to do that you tend to drive for a kind of simplicity and elegance in things, whenever you look at things at that level. You tend to say well, if I really had to break it in pieces and specify the interfaces rigorously I nave to really understand what I'm doing. I have to be careful, I have to make good choices about what the pieces are and make good choices about the interfaces because I'm going to live with them. Youknow, I just can't sort of say well I'll worry about this some other time; you've got to really focus on them, and when you focus on that you tend to get good designs. And you have the ability with clean interfaces to get lots of people working on solving the same problems

_____: It just seems that a lot of people and a lot of companies they break into pieces and then the pieces don't come back together as a whole. How did Digital maintain the discipline or whatever that allowed them--?

_____: You're right--breaking pieces in itself isn't an adequate description. To give an example of breaking something into pieces which has some unfortunate results--for example you might have said what I want to do before we(?) break it into pieces, according to how big the system is. So I've got this big problem, I want to make information systems that span the company. Now how could I break it into pieces? Well, when we break into pieces say this group, you're going to make little systems, you'regoing to make big systems or you're going to make middle sized systems, and you're done with it at that point in time. Now what's probably going to happen, is that you're going to get three very different kinds of systems because you've essentially divided things up in a way that kind of ensures that when it's all put back together again things aren't going to fit very well. Another way you could do it is say I really--kind of division that I want to think about is not whether it's small, medium or large, but I want to think about the architecture, I want to think about how do I do communications, how do I do computation, how do I do storage, how do I do something like that, and sort of make that your first level split, and then of course you have to ask after you've done that who's going to make the little systems and the big

because everything's all divided up and you know who's doing what, and those things enabled us to have I think a good design, a really really well thought out design and get lots of people working on the same problem, just when I'm talking here I'm using a general definition of the problem of getting a complete information system. So I think that commitment to architecture was one of the aspects of the culture that was very important in getting a good system, and I think the other thing is we belabored the point excessively perhaps, is the use of the system by the people building it. There's no better way of getting a good system than to force people to use the system they've built--becauseif it's not good they're going to change it. So that's one of the best ways that I know of getting good systems is to have people who are building them actually use them.

_____: It's interesting in the architecture that again it seems like there's two extremes--breaking things down to pieces but then also understanding a whole and then how those pieces fit in. I mean you have to know ahead of time what you're doing but then again sometimes you have the freedom to change it as you go along.

_____: Exactly; well, the idea--the whole process of breaking something into a whole and into pieces implies that you have some idea of what the whole is. I mean describing it as a decomposition rather than a composition implies that you have some notion of what it is that you're doing before you start.

ones, and the middle sized ones, but thefirst level cut is not small, medium or large, but the first level cut is the architectural things--first level cut is the functional things you're trying to accomplish and then you split it after that into which group's going to do what--that's a much better approach than splitting into groups and then asking the groups to basically then address the functions, and it's a question of which--

_____: Disconnecting.

_____: Yeah, which plate(?) you do first is very important. And I think that we were successful in sort of making our first level split at more how do you want to decompose an information system into pieces, with a functional interfaces specified as opposed to how do I talk about which group is going to make which size computer first, and then by that point in time usually the groups have already decided how they're going to do things and you'll never put them back together again.

_____: You talk about definiing the interfaces between things. Who defines the interface between hardware and software--is it--how is it done?

_____: Well, hardware and software is easy. That's the most fundamental one. That interface broadly speaking is the vax architecture. And that's a specification of what the hardware side of the computer--of an information system does, and there's some very formal architectural specification that was agreed to as part ofthe original definition of

I'll call it--the trouble with vax is the vax could be used at two levels--both describe something specific and to describe something generic. Talking about the vax program, which included vax hardware, vms operating system and the networking and so on--that was all under the umbrella vax program--it was agreed up front when the program was put together how we were going to split things off and who's going to write the specifications and so forht, and that was done jointly by the technical people who were working on the program.

_____: So far you've said Digital over the past 8, 9, 10 years has been making a lot of right decisions, both technical decisions and business decisions, and I'm wondering if you could step back fromthat and think about what that was--is that because of our philosophy of computing, is that because we had a philosophy to begin with, is it because of the, is there something in the Digital environment---is there something that we can tell our customers --it's that point we talked about the other day. There is a re--Digital has done things right. People want to know why Digital has done things, and it's going to be the best argument for us for telling people why they should stick with us in the future, and I think it's going to be one of the themes that you may want to address in the volume, and I think these layers are going to fit in.

_____: Okay, I'm going to make one comment and move on, and that is, there's a certain danger in believing your own propaganda, and there's a certain element of luck in just

having made a series of right decisions that after all is said and done they look pretty good and then you can either attribute it to brilliance or what, and I don't think we ought to let it go to our heads that there was probably some element of we made a bunch of decisions and gee they worked out pretty well, a lot better than we perhaps--than they might have. And some of our success was due to the fact that other people may have made mistakes. I mean there's no reason why IBM couldn't have done a good job, much better job in networking than they did, and if they did we'd be in a lot weaker position than we are now, so don't(?) want to get totally enamored of our position right now and then just present us as being, we're just so smart, because I think that's probably not quite the right thing. You know, I don't want to come over as arrogant or presumptuous on our part--

_____: No, and I agree with you and I'm not trying to ask you to do that because I think that's really foolish. Some might say to write a book about yourselves is.

_____: Well, we have a message.

_____: That's what I'm trying to get at.

_____: And in some sense, there's a tiny bit of humility which is sort of in the direction that this is something that we did--we believed in it, we did it for several reasons, we believed in it and got our own business this way, and we think this is a good model for you to follow, in some sense it's this is what we've learned, this is how we do

things, it's worked out very well for us and we think it can help you too. And it's that kind of attitude rather than we were so damned smart back in 1977 and we knew everything and nobody else knew a thing and.....

_____: You're right--so what have we learned? And how did we learn it?

_____: How did we learn. You know, I feel like I'm not sure what to add--what more to add than what I said already unless you want to get looking for some new points or some--?

_____: What I'm looking for is for you to go through some of the stuff that you've just touched on--maybe you want to talk about what we learned as we were doing our business that we were able to communicate to our customers.

_____: The way you structured it was perfect when I heard it. At the end you said why we think it's a good model for you in your business.

_____: Right.

_____: I think that's the question I would like answered as a customer . Why would it be good for me.

_____: I guess a couple of things. Some of it has to do with things that are not intrinsically computers, and that is something about Digital as a company and kind of its internal cultures and values and so forth and that is I think that we tend to be an organization that tends to place a lot of emphasis on individuals and individual responsibility and trying to maximize the contribution of individuals with respect to what they can contribute as opposed to

where they sit in the organization, and that's very much is part of the way Digital works in the company, and if you then think of an information system that should aid and support this kind of value system that you've established, you tend to think of a very open structure--a structure which is not a hierarchical one but a very flat kind of structure. It's one that encourages the free flow of information between individuals and so forth, so that kind of thing I think has a big effect on the way we work as a company, the way we think about products and the way we use products, and I guess you tend to feel that a lot of other companies are tending to view this as maybe the way they'd like to work too, that the changing the competitive environment, the changes in expectations of employees about how they can control their lives and how they want to make contributions, seems to suggest the way Digital has run itself for some period of time is in fact the direction which a lot of companies which may have not run themselves that way in the past would like to run themselves in the future--so there's a coincidence between the way we run our company and the way we have run our company for some period of time and the way we think a lot of people would like to run their companies in the future.

_____: Could you elaborate a little bit on some of the competitive things you think are forcing or encouraging people to run their businesses more the way Digital has?

_____: Well, I can give the standard list of those things.

One is that the things seem to be a lot more competitive now. I think primarily as a consequence of the fact that knowledge is changing very rapidly and the fact that the world--the number of countries who are able to sort of compete on the world market has increased substantially. So rapidity of change and the presence of a lot more competitors means that things seem to be competitive in the aggregate. The life cycles of products are shorter, the ability to get a permanent competitive advantage by doing something and not have anybody be able to attack it, that seems to--it doesn't seem towork so well anymore. It's very hard to get permanent competitive advantage by doing one thing and then kind of forgetting about it. So any kind of structure which is key to the idea that if you do something once and then kind of forget about it tends not to work, so very rigid structures, very deep hierarchies where everybody knows exactly what they do and the assumption is they'll be doing the same thing 5 years from now that they did 5 years ago, tend not to be responsive to the competitive environment that we see. We've seen that. So that tends to suggest that you need to move to much flatter structures, you need to have the ability to restructure very quickly when some technological change occurs in the outside world or some new competitive threat occurs you need to be very responsive so you can't have rigidity in structure. And again I think the--that's how I think sociologically that people just have different expectations about how they'd like to work, and you have to be responsive to

that, so you need structures in which you give everybody the ability to feel like they can make whatever contribution they can make and not have the organization get in the way of them making those contributions.

_____: What has Digital learned about managing the organization that's nonhierarchical -- how do you manage it? A lot of people have the expectation that a good job will be defined _____work or once I've told you to do something and you've done it, kind of hierarchical -- especially ten years ago--

_____: That's a hierarchical crutch (?)--I mean explaining how Digital works is tough. I think it really is, and maybe that's almost a significant statement in its own right, in that you can--a hierarchy is a structure that you can look at and you can say gee I understand how it's organized and I can tell you how at least it ought to work based upon if you draw something amorphous it's very difficult to say how it works, and it probably works not because there are formal rules. With formal rules you go back to the hierarchy or whatever-- it's due to the fact that, like maybe what we believe is the free flow of information, what makes that kind of structure work. You have an amorphous structure, how does it work? Well, it works by communication. That's the main thing, and that's what we think we bring in our philosophy of information systems.

_____: Yeah, it goes back to something you said very early on. You talked about how do we think we fit in, our roles

changed, and we became a--we went from being a minicomputer manufacturer to delivering information systems. Can you talk about that? Does that address what you were just addressing to Linda about--how does that--how does an engineering company change its mindset from -- engineers, one thinks of engineers as people who work kind of linearly or concrete sequentially. That's, as they teach at ed services learning style(?). Information systems people have to think in terms of non-rigid structures have to have flexibility of thinking, going from a small finite way of looking at the world to a very large way at the world. How have we done that; how are we preparing for the future?

_____: I was going to comment that preparing for the future probably isn't something that we tend to place a lot of emphasis on. That sounds like a very formal kind of process, and we sort of assume that you know what the future is going to be and therefore you can plan for it. The alternative is to sort of set a structure in that's very flexible and very adaptable, because I don't know what it's going to be but I know it's going to be different, and I'm prepared to respond to it very quickly. I think planning is a word which really tends to come out of older style organizations. It really has a presumption that there's enough stability in the environment that you can know where you're going to be five years from now and you can really take significant steps to get there. Now I'm not decrying the fact that--or implying that organizations ought not plan. But

maybe a higher level principle is that you probably don't know what it's going to be like five years from now and therefore what you ought to do is maximize the flexibility to be a good organization for whatever the environment is like five years from now.

_____: Which is your point about anticipating change, I think.

_____: Right. What you know is going to happen is going to change, but you're probably not very clear on how--what it's going to change to. Because I think once again you don't want to overstress the point that nobody ought to plan and that we just ought hang loose and we'll see what it's like type of thing. But you can put structures in place. Rigid structures require extreme accuracy in prediction about how things are going to be, because if they're rigid and they're slowly changing, you better be pretty right-on in terms of how things are going to be or you're going to find your structure doesn't match at all. So I think the--a good temporizing position is that one of the criteria in designing an organization or an information system is to try to make it very flexible because you have a very strong presumption you don't know what the right structure is going to be five years from now, and therefore one of your mental level criteria is I've got to make the structure flexible.

_____: But you can still invest in structures that result in this--

_____: Yes, absolutely.

_____: And therefore how does that design information system start in organizations, how that relates in some way to customer needs, because if we're designing--we've come up with a strategy for flexibility of information systems, and we're going to be able to sell information systems to lots of different kinds of organizations I would assume--

_____: Right, well, different kinds of organizations but also try to _____two dimensions that obviously you cover different kinds of organizations but also just sell the point to any organization that it ought to be flexible. I think that's one of the important things, is the flexibility. I was going to make one other comment which I didn't finish--you were sort of asking how come the engineers--I guess how did the engineers get to get away from their linear thinking into--

_____: Right.

_____: One of the things that happened, because we had one architecture or one--and talk about architectures, all of these things, we had only one kind of system we're making, namely vax systems. We grew to the point where not everybody could sit in the same building or work for the same boss, and in fact we ended up having lot of organizations that were geographically separated, but in fact they were building pieces of one system. Now you might contrast this -- you were sort of asking how do some other system--companies work, or maybe how IBM works, and I don't presume to know a whole lot about how IBM works, but if you assume that you're a

company that's this big, and you want to break the company up into pieces, one thing might be to have the small systems division that does everything for small systems, and the medium systems division that does everything for medium systems, and a large systems division, and they do everything. They do the hardware, they do the software, the do the communications and so forth. What you would probably get out of that is three systems that were probably relatively nice in their own domain but they wouldn't work together, which of course is a pretty accurate description of how IBM's product line looks. If you look at Digital we never did it that way. What we did is we broke the company up into this part does software, this part does networking, this part does CPUs, this part does disc. But the software group did the software for everone, the networking group did the networking for everyone, and so forth, so you had--we have a very functionally organized company as opposed to what you might call a divisional company for example, that slices off whole business segments and it gives top to bottom responsibility for that segment, and the result of that was that we had to have extremely high communication, because nobody was building--no one group was responsible for the whole system. They could not succeed by themselves. I mean the disc group could not succeed building discs by themselves--the discs had to work with somebody else's processors. So we had a built-in requirement that for very high communication between the various parts of the organization, there was just no way

that we'd get anything out if people didn't talk to one another, and that placed some very considerable stresses as you might imagine on our organization, and it undoubtedly induced some responses which were firstly a lot of formality around interfaces. The disc group had to know exactly what the interface was between what they were doing and what the vax processor people were doing or there was no hope that anything would plug together, and secondly there needed to be a lot of communication to deal with everything that couldn't be precisely specified through normal specs, you had to have a high band of communication between people to keep -- to make sure everything was working together, so the combination of the emphasis on architecture, and the fact that we had such a functional organization really tended to create within Digital the need for communications that I don't think would have a--we would not have seen quite as high a need if the organization had been put together differently.

_____: That's very interesting. Most people talk about the information business now as a communications business that's really gone beyond that and you _____period doing it.

_____: You talked about--this brings me back to a point you made earlier about in the engineering groups they had electronic mail in the seventies. Then bit by bit the rest of the company got it. Did you notice any impact as electronic mail moved to different parts of the company--that

it had on those parts of the business?

_____: Unfortunately the impact wasn't as large as it might have been, and for reasons that you probably are all too painfully aware, and that is the engineering community had its mail system and the rest of the company had a different one.

_____: Right.

_____: And now there's some rather torturous ways of going between them, but one might take that almost as a lesson to learn. I don't know whether you can present that kind of thing positively, but in fact that actually hurt the company in the sense that engineers were able to talk to engineers very nicely but engineers couldn't talk to the field nearly as conveniently because the mail systems weren't the same. And I don't know what effects that might have had--it's difficult to know, but they were--I assume they weren't good.

_____: Along the same kind of--from the negative point of view, do you see any ways that Digital fundamentally has to change?

_____: Yes, and I can answer more from an engineering perspective than I can from a whole organization perspective, because I tend to see the problems that occur. Remember I mentioned that we were very functionally organized, and making--and each of the functions tended to make components, and these components had to come together to make systems. Now we have done a remarkable job I think through architecture in communication of making it possible to build systems out of components, but still there's a lot of work required to

make systems out of components. And one of the things we're trying to do is to figure out how we can get more responsibility for systems. I mean right now we have the tendency to have much more component responsibility, and we are very fortunate that our architecture allows us in most cases to build systems out of those components, but there's some cases where there's been problems, and it's very difficult to figure out -who's responsible when all the components don't add up to a system, you can go back and push on the components, but that doesn't necessarily help, because there's something in the system that isn't there and it's not quite clear who's responsible for it, so that's one of the things that we need to get...need to get better way of dealing with it, and I suspect that can also be said to be true for some of the integration across those parts of the organization which are say not just engineering--I mean I think engineering talks well with engineering but they may not talk as well with marketing or the field as it ought to.

_____: Jim, how would you apply Digital's products to solving that?

_____: Well, an example of it would be--and in fact it is happening, because now at least the mail systems don't seem to be quite as separated as they used to be. I mean there was a time when it was a considerable pain. I mean there was--everybody was on electronic mail but not everybody talked to everybody else because the systems were discrete. Now we have gateways and bridges between them so in fact people

can talk to one another a lot more conveniently. I think things like that are very appropriate to getting much more communication in the organization.

_____: So there's all this organizational linking, pan(?) organizational linking devices--

_____: Right.

_____: Which sort of relates to that model, the VS model with the (?) three tiered model.

_____: Right.

_____: And what else at the lower levels? How do we address some of these problems, or at lower level might not be the right word--at more discrete levels.

_____: I'm not sure I have a different answer than_____. Was going to sort of comment on a couple of other things. Despite the fact that you have an organization that has a lot of communications and so forth, it still needs some kind of direction, and I think another aspect of Digital is the fact that we have been able to have a relatively simple strategy which I hope is well articulated and well understood, and if it isn't of course it's going to be a whole lot better when we get done with this type of thing (LAUGHTER). But one of the--I mean one of the things I think when you ask you do you make an organization work better is you make sure that people know what their mission is--which is not quite the same as a hierarchy where you tell everybody what to do, but it's one where you try to communicate so everybody learns

what the mission is and what division(?) is and so forth, and everybody hears about it.

(END OF SIDE)

_____: You talked about we should be more humble and that we were lucky in certain ways and forced to maybe make the right decisions at certain points, but also if you look back it does seem remarkable to me that there has been a consistent vision.

_____: Yeah, I think it's a very good point.

_____: I mean you can read things from 15 years ago and you can read them today and it sounds almost the same at a very macro level.

_____: I agree with you; I was really struck when I worked on the vax product announcement and I had never read any old stuff from can or really any history, and after being in this company at that point four and a half or five years I really understood--got a sense of the Digital vision and the networking and compatibility and I remember walking around and I'd start telling people about it--people outside the company, my husband, and saying this is really--it looks clear anyway, and it makes sense for today, so I think that that's something, without being over-boastful that we could talk a little bit about, that we were saying may be a closed chapter of the Digital vision. . Maybe--talking about the--

_____: That's an interesting point, that really--really stresses--and something if you ask--if you have say a very rigid hierarchical company now, you sort of ask how can it get to that new place; instead when you're trying to create a very flexible structure or flatter structure and so forth, and you try to put in communications and so forth so that organization can work wedll, but it's clear that you also

have to make sure you have the mission and the vision while you're at it, or else that wonderful structure may be anarchic rather than purposeful, so you need to have that vision floating around, and you need to have it internalized by everyone.

___(__: Does it come from the company leader, does it come from Ken Olsen? In this case? Does it come fromthe people that get hired...?

_____: Well, I think in some sense it clearly does come from Ken, hopefully the thing's a reinforcing process, that people who are part of the organization reinforce that, that message, and it gets reinforced further. So I'm not sure you can... that you can point to any one individual, but I think it's very clear that Ken Olsen has an extremely profound effect on the company, and he feels it's so important that there be a message, it's almost like _____here, some are(?) obssessed with the idea we've got to get our message out. Everybody has to understand what our message is, and he thinks that way. He thinks that's one of the--I believe he thinks that's a key element of the philosophy of how you manage an organization. Make sure that everybody understands what the mission of the organization is, which is quite a bit different than saying one person understands it and then we get _____ they'll take their piece of it and then they'll spike it out even more so that you don't hear what the mission is, you hear what the piece that you will do, and that's all you ought to know--that's a very different way of _____. Ken

believes everybody ought to know what the ~ mission is and then decide how they can make their best contribution to that.

_____: You said something earlier about the process being more important perhaps than the outcome.

_____: About this endeavor at least.

_____: But could it be that our vision has been more around the process? Than a fixed goal? More about how you go about doing things?

_____: Yeah, that introduces a whole other topic. That it's a part--and this is looking into the future. There are some people who believe that the most important product is process. And that maybe in the future our important process--product will be process, will be helping other companies to figure out how to--what are the proceses that they need in order to be successful, and not to use information systems more in the context of not a product, but a process.

_____: What do you think?

_____: What do I think...? I think that--I think that's a very powerful concept.

_____: It also it can get in the way of outcome.

_____: That's true. Yes, it can be, and also if you don't, if people aren't prepared for--it sounds terrible, it sounds simply terrible. It takes a long time before you realize that process is the most important product, as opposed to the process is the thing that gets in the way of doing products.

_____: Well, it's a very human notion of doing business, which is what I think is kind of interesting about what's

happening at least in the popular literature and with a lot of the research I've been doing which says--and even that people all of a sudden they tripped their hands with all this technology because they didn't know what to do with it anymore. They had all these boxes, these wonderful, expensive components they didn't know what to do with, because they hadn't figured out how to get people to work with systems, and so it reintroduces people into the process, which is--is that a message that ever gets talked about at the higher levels of Digital at all ? How do you think about that in terms of your work?

_____: People and technology?

_____: Yeah, people and technology, and I think making -- people who might not have bought computers yet or Digital yet feel comfortable with our solution to solutions that would focus on the business, put focus on business insights, help their people do their work better.

_____: I'm not sure I know what the question is.

_____: Yeah, I'm feeling my way through the question--I think what I'm trying to say is, last April Business Week had an article which purported to explain why the computer industry was in a slump, and it said in opening that people had all this hardware and they didn't know what to do with it.

_____: Right, they didn't know what to do with it, exactly.

_____: And they described what the industry needed, and it sounded like our strategy--talked about compatibility of systems, all that stuff, networking--

_____: Right, yeah, I remember the article.

_____: And basically it was saying that some way there needed to be a way to bring people -- people were still in love with the technology, they threw technological solutions at a problem--

_____: Right.

_____: But didn't know how to bring the people into the solution along with it. Same thing in the whole environment of training. There's been a real problem with technological fixes, and people have--they throw hardware and complex software but people haven't been able to figure out what to do with it, and yet here's all this information age technology that they're supposed to be taking advantage of, and all of a sudden people are saying well we have to approach the technology in a new way, and we maybe don't need more technology right now. We need to find it. It's a little bit what you're talking about the process, and I'm just curious if that's ever been talking about in Digital, as you're now designing a new generation of systems, I presume, and looking at how we're going to stay competitive--are those considerations coming into the design of our products.

_____: At one level I_____answer no--that maybe isn't what you wanted to hear but--

_____: No, I sort of expected, actually, but--

_____: Oh--I don't know thatif you think of our traditional products whether that's fundamentally what's driving...I mean, clearly we want to make them easier to use, and clearly

we recognize there are a lot of things that maybe we haven't paid much attention to in the past that we've got to pay more attention to--we still have our heritage and assuming that people that use our computers are somewhat knowledgeable about them, we tend to like computers ourselves, and probably tend to assume other people like them as well, even though most enterprises probably don't like computers at all--they like getting their job done. Computers may play a big role in getting their job done, but they'd probably just as soon they didn't have any computers, if they could get their job done some other way. So I thinkthere may be--I think it's hard to answer that one, do we have a lot more emphasis specifically on trying to make compjuters more relevant and more useful. Probably not. I think we still tend to feel that the basic elements of our philosophy are still appropriate, still...still compatibilities, still the notion that cmoputers are for end users, not for things like sitting in glass rooms behind programming staffs, still networking. Those kinds of things are things that we tend to think are going to--they're still valid principles for making computers more useful to people.

_____: All right, how can we then help other organizations use other computers better, since maybe that isn't our role to do that but that is what's happening in the outside world?

_____: I think that--I don't say particularly in Europe, maybe a little less so than--a little more so than in the U.S., but they have spent some time with people doing some

strategy and planning and so forth in Europe, and they seem to be very sensitive to the fact that very often in order to sell computers to an organization you have to change the organization. And this is very often understood by some of the managers in the organization, that fundamentally say, we really have to change the way we do business, and that's tough, changing organizations is tough, and that may be something that we have to do a lot more of--we may have to actually come into an organization almost with the knowledge that they're not ready to buy a computer from us. I mean they will buy computers from us, eventually, but you almost have to work with that organization--how can we change fundamentally the way we do everything, and then once we've done that, yes, we'll need a lot of computers to reflect that but --

_____: Sounds like you're selling process again.

_____: Selling process, exactly.

_____: And you're answering my question, and I wish I'd have asked it better, but that's a very interesting--so what did you and the Europeans work out in terms of strategy and planning?

_____: Okay, they have some very formal programs which fundamentally I think create people who are prepared to go talk about this question of process. I mean when you go talk to a customer you don't talk about boxes. I mean it's almost like let's forget about boxes, we've got a couple of bases to talk about companies, how they work, and what do you need--how do you need to organize to get your job done,

and very often what you almost need to do is you almost have--you have to first understand what the mission of that company is. What is your mission. And very often people don't know what their mission is when you really get down to it, and until you understand what your mission is and what your vision is and what your company values are and what you want to preserve and what you don't like about it, /^till you get those questions answered and really thought about, you can't talk about what the relevance of information systems are for that business.

_____: You said something really important here--

_____: Automating the space.^mistakes

_____: Right, it's automating mistakes.

_____: But I'd like to pull out an idea that I think is important about what you're saying.....go ahead--

_____: Well, I have a point, which is really that's an incredibly difficult sell. I think.

_____: Or it may be the easiest kind.

_____: Or maybe we haven't seen it right I guess.

_____: It depends what you mean; at some point it's easier to sell boxes as long as the customer wants boxes, but at some point selling the next box is very difficult because the customer suddenly wakes up and says that next box isn't going to do a thing for me--I need something else, and now you have to go back to basics, which will get back to what's the mission of the organization, what do you think is important, what don't you think is important, and until you

get over that you won't sell the next box, because the customer has all the boxes he wants.

_____: Maybe now that Digital's been phenomenally successful at going in and trying to advise people that they have to change their organization versus coming in and proposing a solution that somehow that sort of fits in their hierarchical idea of how things work anyway--traditionally it's been a problem.

_____: Well you can get at that what is important and what isn't important discussion that's going to lead you to the flexibility required to be responsive. It's just going to lead you right into gee, we better_____--

_____: Right--

_____: And open system and open information.

_____: We have this mechanism which allows us to sort of defer the problem, sort of say -- and I think it's very important, and I think it's not only solves our problem to some degree but it also solves the customer's problem, and that is, once vou recognize that you really have to figure out what's your fundamental mission is and how you want to go about it, then you really can't solve the problem until you do that. But on the other hand not everybody's willing to say I'm not going--I'm going to stop the business, somebody will figure out what I'm all about, because by the time they get through to that they'll be out of business and they can't do that either. So one of the key things that we offer is flexibility. And that is we can begin to solve more local problems without neces-

sarily before you figure out the whole space. You can go in and solve some local problems and whatever you've done it's very likely that you can carry that over to the more global thing once you figured it out, and that's the advantages of the compatibility and the flexibility, because the investments you've made is not invalidated when you figure out you want to do it a little differently next time or later.

_____: Plus you can contain the experiments--

_____: Right--

_____: You can just attack part.

_____: Right--that I think as I said is a little bit of a kind of a convenient escape hatch, but we all like to be in business, you know, we want the customers to stay in business, while they figure out what they're doing and you'd like to sell things while they figure out what they're doing, so I think we can--we have to walk kind of a delicate line, and it sort of depends where the customer is. Some customers realize they really do have to rethink the thing, and other customers absolutely don't even want--they're worried about even thinking about that way, because the implications of rethinking are so threatening.

_____: Right, the resistance to change--

_____: Well resistance to change because it's more fear of the unknown.

_____: Right.

_____: I mean you particularly see that when you're talking to sort of the classic MIS director who's grown up on 20

years of IBM where basically the whole thing's control, control, control, keep it all here type of thing, and the idea that you're going to have people all over the organization determining how they're going to be using information systems is a terrifying thought, and even though probably the mine(?) or _____mine, they know exactly that's what's coming for sure, but boy, that's threatening, because that may change your job in a big way.

_____: But the ability to come at it from a piecemeal point of view and then still make it integrate I mean that is really depends on the architecture(?)

_____: Right, exactly.

_____: You're saying the modularity, the idea that you--

_____: So the customers don't have to buy all or nothing.

_____: Right--

_____: Right--you give them a chance to go a little bit at a time.

_____: Right, do it in an evolutionary way.

_____: So we've really given them tools for coping in the new information environment.

_____: That's right, it's back to the sort of the analog of what we talked about organizations, and the metalevel principle for organization design is make an organization that's flexible because you're not quite sure how things are really going to work out. The same thing's true of your information system, and that is you want to keep it flexible because probably you don't really know how you want to run your busi-

ness right now. And you don't want to make a big investment in a system that's not flexible enough that once you figure out how you really want to do things that you can use it that way without throwing away everything that you put there, so those principles parallel one another.

_____: Yeah, Marion had talked about things like investment protection, the growth, the reasonable evolutionary growth, contained growth, the fact that you don't have to take your whole organization down while you're adding your system.

_____: Right.

_____: Are those things that you want to talk about today or do you want to wait till we have a meeting with --

_____: _____.

_____: Those are the areas that authors are going to get into, more than we need to get into.

_____: Obviously (?) continue talking about it.

_____: Okay.

_____: You're doing the interview--I'm just asking -- answering questions.

_____: Well, I'm getting ahead of myself; I'm trying to keep this contained, but let's go there.

_____: I'll make a few comments about the--just parenthetical things to throw in. This idea / you don't have to take everything down, that's kind of an interesting point. Why is that an attribute of our product set? And that's because basically we ... well, the way we build our network is that when an engineer wants a computer in his office he goes and gets one

and plugs it in. I mean there's nobody--no central organization or somebody that's telling him whether he can do that or not--the assumption is this is a a democracy, you want a computer, you want to be on the network, just do it type of thing. Obviously if you have that as sort of kind of a cultural value in your organization you're not going to design a network architecture that requires you to take the network down every time you want to add a computer, because it would be utter anarchy, so it's just another piece of philosophy. On the other hand if you believe that it's a very--if you believe that -- you have this very hierarchic approach where somebody decides whether you can have that computer and they decide when you get on the network and so forth, you design a network that has everything all very centralized. Another thing is, relative to computers themselves, we tended to build computers that didn't require operators. Our motto is not that there's a big staff of people that run a computer room. You don't want to be an operator--you want to--what you want to do is compute, so you get a computer and plug it in and you start using it and we don't want an operator, so we designed computers that don't have operators. On the other hand if you believe there's a big central staff operator who's sort of --or(?) how the computers run, so I think a lot of the attributes of our systems tend to reflect that fact that we want--that end users really want to use our systems so they build the systems in a such a way so they can use them.

_____: And the end users are us.

_____: And the end users are the engineers; I mean they build the system so that they can do their job as opposed to worrying about managing a network or managing a system; they don't want to do it so they make that all automatic.

_____: It also helps other people do their jobs too--writers, and everybody else do their jobs really well, that's something that's nice about it. What are some other parenthetical things that you.

_____: Those are just two that popped into my mind when you were asking about _____.

_____: Okay. What about the VS.? --the (LAUGHTER)

_____: What would you like to know about the S? The S was invented last August, it was invented in August of '86.

_____: I think I was at a meeting where it was talked about where it was first introduced to you about the Lancaster, very early in the morning?

_____: I'm not sure what--

_____: Or maybe--you heard about it before that--

_____: I'm not sure; I know when it was invented, and I even know some of the genesis. I don't know who drew VS first, whether it was me or someone else or maybe several people at the same time, but we were trying to come up with this--as I said, a sort of graphic representation of the concept, which had to have several attributes associated with it. Number one, it was in some sense replacing the previous representation which was NE. And the other sort of previous representation it was replacing was if you like just a single horizon-

tal line, which you might view as sort of a two kind of extreme points of view you might have on this thing. One is you've got this ... I said it's almost maybe a little bit of perverseness in the sense the E is kind of hierarchical, when you actually think about it--you might have said gee, that's peculiar, why did Digital draw on an E when it was a... really almost thinking about things in not that way at all. I'm not quite--I know who initially introduced the E--it was Gordon Bell, which of course you haven't mentioned that name in this book (LAUGHTER), type of thing(?) and I think really the origin of it was, and it really served a very good purpose, at the time was sort of focusing on this concept called departmental computing, which you might use maybe at the first stages of kind of the current thinking around computers, and that is that most computing was done in the glass room by the big staff, and that was not responsive enough to the needs of organizations, so what happened was the next level of organizations began to get computing of their own, that was departmental computing if you like, andthat was kind of the origin of it, and the purpose of the E was--and this is rewriting history but (LAUGHTER)--

_____: That's what books are all about--

_____: _____rewriting of history is that in some sense the purpose of the E or the purpose it ultimately served was really legitimizing departmental computing, okay? Because the world had used(?) only this top level organization and this bottom level terminals wherever -- not all the organizations

really even had terminals associated with it, but it tended to be sort of saying this is a way of thinking about computing. And I believe that never, even though we--even though we probably invest an awful lot of effort talking this way, I don't believe we ever really believed that fundamentally there were three levels of computing that were that separate and distinct. We just drew it that way, because we had to explain what we did in the context of how the world thought about computing, and they thought about the organizations and they knew about terminals, and we said okay, we've got those two things--there is something else, it's called departmental computing which are the first stages in pulling computing away from the organizational level. And so we drew this E graphic and we said our strategy is this E. But it turns out that really wasn't our strategy at all. Our strategy was not that there are three distinct tiers of computing--that was almost diametrically opposed to what we really wanted to do. So but we had to get from there to a more linear approach, and the S was sort of a transitional kind of thing. It said remember all those levels were were talking about and IBM still talks about those? The world still conceptualizes computing but rather as an E we're going to show it more as all things at the same level--the S enables you to both have levels and not have levels, depending on how you look at the picture. And so this is a transitional thing that says remember the E we talked about and everybody else talks about it too? But it's really an S because both levels are there to be sure but

they're not separate and distinct and hierarchically arranged as far as the information flow is concerned. You've got, certainly have levels if you think of an organization. I mean there are organizations, there are departments, there are work groups, there are individuals and so forth and those are really valid concepts in talking about an organization but the information flow should not be that hierarchically arranged--it should be in a straight line, as--or it should be here to here in some sense, as needed. So that's the purpose of that graphic.

_____: Your putting the E in a separate context really helped me a lot on seeing what the S is, and you call the S a transitional symbol. What--?

_____: Well we could have jumped immediately just putting everything in a straight line.

_____: So that's what you see the next--?

_____: Well--maybe.

_____: Could possibly be.

_____: It sort of depends on how--who you think you're getting this message to and where you think they're coming from. If they're coming from the perspective of the organization as an entity, and you see these things all work groups, you see these things with all individuals and so forth, and I suspect they're going to be valid terms that describe the pieces that make up an organization for quite awhile. So from that standpoint, those are concepts that anybody who's thinking about an organization wide information system are going to

continue to think about; they're going to say I do have departments, I do have work groups, I do have the individual, and people will probably, maybe not forever, but they'll probably tend to depict them in some kind of layered fashion and say the departments sit above the work groups that sit above the individuals, so when you're drawing kind of an organization chart, or a picture of your company or your enterprise, you will tend to draw it that way. But what you want is the information system overlay on top of that which is really those things are not hierarchically arranged as far as the information flow, so think of it as a linear information flow overlay, on top of a traditional organizational chart type of drawing method which I think will continue to remain in vogue for, I don't know what people will be drawing(?). Maybe 10 years from now people won't draw organization charts quite the way they do now.

_____: Yeah.

_____: And there's--Michael Porter from Harvard is starting to do it horizontally.

_____: Yeah--value added change, which is--that's great. That's a much better way of looking at an organization than the old hierarchy.

_____: Sounds like a straight line(?)

_____: That sounds like a straight line--

_____: Yeah, or the semantic level(?) whether, you know, I'm succeeding with all that flow (?) so we may be heading that way, but I certainly for DEC world it was news (LAUGHTER)--

_____: _____we write organizational theory while we're at it, you know (LAUGHTER).

_____: Well, in a way it sounds like that's what we have

_____: We do, that is--

_____: I mean coming back to that--

_____: That is very much our--what we have to do.

_____: That's what we're finding out, that's what computers are doing.

_____: And it also--what I'm hearing is that is the unique thing about Digital, that what's different about Digital as a company that needs(?) other companies--that allowed us to learn things and--

_____: Well, again, I'm just a tiny bit pained to say it was all kind of laid out methodically in advance. I think it's something that was learned.

_____: Right.

_____: And the combination of the culture and the learning and decisions we made around how we wanted to build information systems--all kind of worked out well and evolved together. I think some of the discussion we're having now about the fact that we--one of the things--values that we might have in the future in a much more systematic way, is understanding that information systems change the organization a lot, and in order to effectively exploit/lore information systems we have to think a whole lot about helping organizations understand how they should structure themselves to be effective, and that's a kind of product that we'll be delivering in the future. And

there's a good reason for why we should think about that. It's because a lot of the stuff that we made in the past, like boxes and so forth, are becomming commodities themselves, and therefore as we look to the kind of value we can add in the future, we're going to be less able to add value with the boxes, and we have to think ourselves, like every other enterprise has to think how you're going to add value in the future, and I think somebody who thinks that in the information systems business, one of the key ways you can add value is making sure you can help your customers apply information systems to software problems. So that's going to be--that's a product of your services / depending how you look at it, that we're going to have to do, we're going to have to allot a value to that, we're going to have to derive revenue from that.

_____: And that's what a lot of people are trying to struggle with right now in a lot of different products in the company.

_____: Right.

_____: So that seems to me that evolution that we talked about beginning going well from main computing to the small systems information sized communications business. That's the new mission then. It becomes almost the next level of messages that have to get out. Are these messages that we want to get out in the book that--coming from you?

_____: I would say yes. I don't--I guess I'm a little concerned that we don't want to get too far ahead of things.

_____: That's a very good point.

_____: Some of the things we're talking about I think are very important for future considerations, I mean that Digital itself and what it's doing in the future and how it relates--I would never mention that boxes are becoming commodities or that type of thing and therefore maybe the biggest contribution we have is process, not boxes. I mean I worry about getting too far ahead in the game on that but (INAUDIBLE TALKING AT ONCE) -- turns out what we happen to have to sell today are 8800s.

_____: I wanted to ask you when you discovered you're a revolutionary (INAUDIBLE)

_____: I think it was a very story which--around the capabilities we have now. I think we ought to work some piece of our you know, philosophy and our values and so forth and how we think we can help people, but let's--I don't want to get saying processes are our most important product.

_____: No, but we can say it in a way how you just said it, that information systems change organizations' lives. The very simple unadorned language to say that, and let people read between the lines, for this version of the book.

_____: Well I was just going to go back and ask him questions directly about the book--I mean what we heard is that it's supposed to--it wasn't_____sort of _____Digital's strategy--

_____: Well, part of it I thought was--

_____: That's what I thought--

_____: --sort of setting down a context--you're going to

see first our products then our applications, then our solutions as we march through this thing, what was the basic philosophy that we brought to bear on this whole question of how do we--how did we come up for an architecture for our products and applications and solutions and how do we think about it, and that's basically what we're trying to motivate. We're not necessarily trying in this book to pick what Digital's going to be like in the future, so much, although some of it's -- maybe some of it's implied in this conversation once you start thinking about it, but that's maybe a bigger--that's too ambitious an activity for the ten pages or so unless you people are very accomplished writers and we can revolutionize the world in ten pages.

_____: Sure, didn't Thomas Paine do it in a paragraph?

_____: That's right, Thomas Paine--I was thinking of the declaration of information independence, you know,_____ 200 years from now people will recognize this (inaudible talking at once) breakthrough.

_____: This is really great stuff--you have the right audience, Bill.

_____: I can tell.

_____: And we should definitely--I think that we can keep some of that, or we'll see how it goes or Linda really, because I'm--you know, it's in the final drafts, but just have this context for us or subtext is really good, but I think we need to get back to what we were talking about--

_____: Yeah, well I think some discussion around the book,

versus just the content that's going into it, so from what you understand we're trying to get down what Digital strategy is today, what Digital's message is. You said earlier that should be simple. So could it be in a sentence--?

_____: Probably, but I'm not sure which one right now. Could it be in a sentence.... It's really anything that fits nicely in a sentence certainly assumes there's a great deal of context around that particular sentence but I'm not sure what context we would assume. I'm sure if we had some context we could put it in a sentence. I mean we started out this conversation what were the sort of the two key things around our product. Well, it seems to be compatibility and networking those were kind of the two things. Well, that's a sentence but boy we've heard an awful lot of context around it--so that means anything to anybody, and maybe it's another level that's meaningless to anyone, so I'm not quite sure which is--where you're heading.

_____: We spent a lot of time trying to do communjications for Digital in many ways, and so if this is the basic problem how do we simply get across our advantages without, you know, dragging things through a whole lot of context. Again at this--in a way that's what we're trying to do again with this book, is to put it in a way that--

_____: I think we're also trying to be readable. It's coming out at DEC World, it's a trade show, it's going to be the biggest party in (inaudible talking at once)

_____: It's a classy something-or-other.

_____: It's a classic--well, my grandmother called up and

she said I heard Digital's having a big party in September, are you going, and I said well-- but I mean the word is out .... you know, in that kind of environment, people coming from all over the world--

_____: That's another good way of looking at it--maybe that's an easier way of looking at it. There's an expectation if you're a customer at DEC world you'd get a book about Digital and it's got some title on it--what do you expect to find out in that book?

_____: It's hard to generalize, isn't it, because everybody's supposed to read this book.... So nearly everybody has something different that they would want to get out of the book I guess. I guess I don't have a simple answer for that other than trying to make--we want to try to make what we do exciting. I mean more than anything else we want--I guess after you've read the first chapter we hope everybody would be excited about number one, boy, that's a really neat way of thinking about an information system, and boy Digital really has some-neat products that will address problem. So people will be excited after they read the first chapter--this is really neat stuff. It's relevant to me, it's going to help me. Help me get to a better place. That type of thing. I hope it conveys a lot of passion, a lot of enthusiasm on what we're doing, people feel that gee these people really are excited about this stuff, and it's really relevant to me as well.

_____: So did we cover that? Have you answered that? You know, we asked the question about the Digital computing model, what is it, what story are we telling, why does it

benefit our customers, what are the implementations that they could walk away with. You said--we've talked a little bit about it. Maybe now an hour and a half into this interview you can --

_____: You're going to have to ask more specific question. These general questions after an hour and a half, I don't know what more to say.

_____: Do you want to take a break or are you doing okay?

_____: I'm fine.

_____: Do you want me to take a break?

_____: No, I'm doing fine--if I could put my feet up on the table or something.... Okay, let's ask some specific questions around that....

_____: I thought we were going to get into passion.

_____: Oh you want to get into passion, Friday afternoon?

_____: I like that answer (inaudible talking at once) that's a good goal for us because we've been looking at this--we've had a hard time (INAUDIBLE)

_____: Well, see, I guess the question is about whether the answer is universally applicable to everybody would be...I think is very very exciting, or the interesting challenge is to try to pull something like this off. In my personal thing was, probably less focused on question of where customers were coming from, but much more from the question of engineering this whole thing, and I don't do much engineering work now but I did a few years ago, and the exciting part was doing it, was designing the architecture specifying all the pieces and seeing whether we could put together an engineering structure

that would actually pull this off, because it is a tough job to pull this off. The particular choices that we made, saying we're only going to have one architecture, we're going to have this very functioned(?) organization where each piece is assigned--each part is assigned to a different group and trying to figure out how are you going to get all this stuff to work together. That was kind of the exciting part about the thing.

_____: That was the result or--?

_____: Well, both the process and the result. If I --you asked me a couple of years ago I would have been much--I would probably have been more excited about the result, because I was interested in the products. It's always nice for me--everytime I walk past a vax I say gee that's neat--I remember having something to to with that, and that's kind of exciting. Since I've gotten much more into management in the last couple of years I'm very excited about the process, because that's what managers do, which is to set up a structure so you can accomplish something. So those are the kind of things that excite me about the place(?)

_____: It's very typical of Digital, when I think of what gets Digital people passionate, they don't just think of building products, they do think of changing organizations and changing the world, and there is that undercurrent of sort of the revolutionary.

_____: Well, I think it's a good voice, because we are in fact going to be talking to managers and the people who pick

up this volume I think are going to want to--are thinking about their business, ought to(?) be more effective. There is a fear in America about are we competitive or are we going to make it.

_____: That's interesting, that particular comment I think Digital, speaking for the organization as a whole, probably hasn't had as many second thoughts on that topic, so it doesn't spend so much time worrying about whether we're going to be competitive or not--we just sort of assume we are. And I don't mean that in a complacent way, but kind of the assumption that we will continue to do well because we will be competitive.

_____: We're also in an industry that's also growing up.

_____: Although it has some tough parts to it, it hasn't been necessarily all up up, even for us, but even for the industry in the last couple of years. We also live in an environment which by traditional criteria should have extraordinary uncertainty associated with it. Here's this company which is many times bigger than we are, that we're trying to take on, I mean you know, that'd be positively frightening. IBM not this year but until last year was viewed as the most formidable enterprise in the world. I mean this was absolutely the best run, most efficient, most admired corporation in the entire world, and here's teeney little Digital Equipment Corporation taking on the world's most admired corporation, and now in one year off the presses that we're the most wonderful corporation in the world and IBM is

much less confident competent(?). That's kind of interesting. That's kind of heady stuff I guess if you really think about it.

_____: (INAUDIBLE)

_____: When I came to this company it was just at the hiring freeze in 1982. There were articles in every single major business publication, on Ken Olsen _____all this company _____and now we're seeing it.

_____: That's right, that was my original comment. I think good to apply a smoothing(?) function. You're never as good as you think you are when things are going well and you're probably never as bad as you think you are when things are going badly. I don't personally think the organization is excessively complacent but I worry a little bit that we don't get too complacent. There's too many good things being said about us, and I don't think that--that's why I said I think we should be more modest--even though we should convey a passion and a belief that we really think the stuff is neat, there's an element of humility I think we should... because perhaps several points--I don't want to come off as arrogant, and secondly I don't think we know everything.

_____: Here's a thought too that humility when you apply that to sensitivity to the customer need, continue to focus there as opposed to--

_____: Right right--

_____: (inaudible)--

_____: --right, right, exactly. Exactly, and I would not mention any competitors, any kind of competitors at all in

them into excellent solutions for whatever they want to do, but there's not enough customers in the world to buy ten billion dollars worth of components and make them into things, and increasingly our responsibility goes a lot farther than component excellence because it extends into the fact that we have to do much more of the engineering around the solving the customers' problems than we did in the past, so we see the emphasis on application which is a value added section if you like in the industry in which is yet another value added section. That's really in a sense saying Digital is more formally recognized and that we have to add value at more levels than just the boxes that we like.

_____: What are some of the trends that are causing that--systems____--

_____: Well I thought the trend was--the principal one I think is just the realization there's not enough customers to buy boxes anymore; if what you walk into the door is peddling boxes, you can sell some boxes but you can't sell ten million worth of boxes.

__'___: 1979 Ken Olson said computers had really become commodities like oil. Seems like they did in between(?)

_____: That's what he says, huh?

_____: _____commodities like yeah that.

_____: Yeah, I don't know where but anyway it's the spaces in between that you're talking about.

_____: That's right, to some degree they have--I mean you can buy computation as a commodity now. Turns out if you

what we're doing, or even say that we're better than anybody else. I mean I would stress--try to focus entirely on how we think we do things that meet customers' needs.

_____: Speaking of customer needs, I've seen a division in the company and I see it in the book of sort of between the engineering and ideas behind it and then now you sell those, in here there seems to be a trend to say well let's think of the most functionality, the most options, the most_____and in the marketing and selling end it's like a nightmare saying well you can do this but then you can't do that, the trend towards packaging things that have been limiting what we'll offer people. I guess how does Digital integrate those two--I think we're getting much more successful in having an integrated company. But--

_____: Well, I think part of it we covered sort of obliquely with what we were a number of years ago which wemade a lot of interesting pieces but we fundamentally we didn't really assume a lot of responsibility for threading them together, and really trying to solve the problem. We assumed the customers would take our pieces which were very well engineered and very nice pieces of technology and they would figure out what to do with them. I think what we've come to understand which is in fact a byproduct of our success is /there's not enough customers like that anymore. I mean it's all right when you're a several hundred million dollar company to make excellent components, andthere's probably enough customers in the world who have the expertise to take excellent components and mkae

want a system they're not quite commodities because, you know, chips are wonderful, but whe you wouldn't try to take all these things and plug them together, that's not a commodity yet, and I am actually hoping that we will always find a level of that integration that isn't a commodity so we can continue to add a lot of value as a company.

_____: Seems like that most of the growth in the industry is going to be in software communications--

_____: Traditionally because that's--I think what you're doing is that's the integration part. Most of the value adding is done in software because that's --the hardware is becoming increasingly commodities so the _____out of the software.

_____: Is Digital going to become more of a software communications manager?

_____: It is--yeah, it is.

_____: Is it?

_____: Yes, very much so. Once again, from a parenthetical point of view it turns out you probably--if you--certain metrics would not lead you to believe that, and if you look at the actual engineering investment it's still much more in hardware than it is in software. But that's a misleading indicator. Turns out that we had decided to vertically integrate some

(END OF SIDE)

_____: _____ get an outside vendor or I make it myself. I mean a disk is a disk and that's sort of a primitive _____ that you build the system. The fact that we have chosen the manufactured disks is really because we think we can make money manufacturing disks, not because we believe that -- you can say _____ not because we believe fundamentally that we can do this a whole lot better than anybody else in the _____. We think there happens to be money to be made and we can do a good job making disks but it's not because we believe the systems are fundamentally better or -- it's a money making opportunity. It's a good place to add value -- as far as Digital is concerned, not as far as the customer is concerned.

_____: (inaudible)

_____: So getting back to the _____ customer, the whole idea of -- you -- this is neat what they're doing, what's relevant to me, want to look at the basic outline, structure, let's see if we've got information _____ audience is going to be ._ We're going to talk about the impact of information on business and customer. Linda and I have been talking a lot about the impact of information on business. It's sort of an old story in a lot of ways but it's here because - do customers ask about this, do they -- do they want to hear about how Digital feels about this, or do they feel it's sort of an old story?

_____: Exciting --

_____: What's exciting about it?

_____: This particular segment, we've talked about a number of

things -- if I were writing the phrase I'm not sure I would necessarily use that the impact of information on business, but more following the whole conversation we had that fundamentally the way information systemws and information is integral to surviving as a business, that type of thing --

_____: I think_____

_____: Right, surviving, growing, thriving, all those types of things, that information is so critical, the flow of information is so critical to making a business viable, flow and access to and those types of things --

_____: The subtle things, compared to these kinds of _____ that relationship of organizations, information flow and information _____ and the effect.

_____: The thing that's a little bit different -- you sent me something which I have not read yet, about, maybe there was a first cut at that section, and I don't know what's in it, so what I'm going to say is that, not relevant to what you wrote, because --

_____: Maybe erease it.

_____: But -- cuts at it to sort of say "look at this information that's flowing, this information is coming from all over the place and we don't know what to do with it, that sorts of present -- gee , this is awful -- as opposed to saying that the flow of information in your business is what makes your business successful and doing it well is what means -- what will make your business viable and will thrive or do poorly or something -- that will

cause you considerable problems so you sort of present it as here's something that's well-managed, that would appeal to a manager or something, that will make you successful. So you kind of present it, not as -- you know, you're not the victim of information falling on top of you. Information is something that you have to manage to make your enterprise suceessful and that sorts of presents it in a somewhat different way.

_____: _____

_____: I mean, just think of it, managers hopefully are jinteresting in managing and maybe twenty years ago you had to manage labor relations or something, but what you've got to manage now is information, that's what is going to make you successful and by the way if you manage it well you're going t be successful and people are going to feel better about their jobs and all the rest of that kind of stuff if it's done right.

_____: And the role of the manager is changing.

_____: The roleof the manager is changing, exactly.

_____: And there's a lot of things that are subtle, that really can relate to this idea in a way that _____, you know if you're talking to the audience _____ to talk to. What about customer needs? _____ statement in this _____ here?

_____: This type of stuff here in terms of customer needs and. I even have a -- everytime I give a customer free transportation(?) I can't resist the temptation of _____ a few lines of a type of thing. _____ The only one to change is probably this last

point which was to change it subtly from cost effective information systems to sort of explainting what you mean by that and it uses motherhood(?) word like life cycle but actually it turns out the customer I gave this presentation to was extremely responsive to that, he says don't look at the hardware and figure out how many nips(?) you get per dollar, the real costs to the system are going to involve the application development, system operation, the system maintenance and the upgrading and evolution because you're going to be upgrading and involving your system, thinking how it's going to look twenty years from now, you don't have the slightest idea, so you want to invest in the architecture and approach allows you to focus on these costs as being the significant ones, not the cost of the box when you buy it on day one.

_____: Now, you've exactly matched(?) what was the advantage to Digital in _____

_____: Do you know there's a whole match to _____

_____: _____ service.

_____: Now, see, that's the kind of message too, that's a really good one to get into the book , that kind of --

_____: Well, this type of thing, you can use the product, the way the products are done and the composition of theproducts to illustrate how we address these types of things, for example, all of the stuff that we have in -- in the operating system or in the application environment, for example that facilitates operation and development, that stuff makes it cheaper and faster to deploy an application tothe customer and that's far moreimportant

than the cost of the computer, the computer cost is typically very small compared to the cost of developing the applications and therefore since Digital provides, makes it easy to develop applications, you save the money there and also you can get the application deployed quickly, time to market or in the case of an internal system, time to deploy that system is the critical thing, you can use a Digital system and get your application running after 6 months, it takes you 12 months on an IBM system. Everything else is irrelevant, the fact that you're gaining business advantage 6 months sooner is the bottom line, the information system costs are irrelevant compared tothe business advantage that you get by having an application developed sooner.

_____: Great ...

_____: All of the stuff around the training and evolution(?), we assume -- you assume the system will change, you assume -- you don't understand the requirements, you're going to need, -- you're going to need to deploy it, it's going to haveto be deployed in some other location rather than this location, it will be deployed on a bigger machine because _____ is going to be deployed on the smaller machine because ____ some branch office somewhere, you don't want to recode and redesign your application because you want to go to a smaller or bigger machine so compatibility addresses that. If you have a particular installation, the business doubles, you plug two more components in, so the upgrading -- disrupting and _____ always fit into this notion of the costs of the system.

_____: I was going to say, is it possible for us to come up with a cost model that shows the applications development versus different aspects of the cost

_____: We probably - we could, although -- sound like I'm in marketing, the main thing -- I use the word "cost" in there although sometimes that's the wrong -- The main thing that you want to leave with the customer is that you don't want to focus on the costs of the information, you simply want to focus on the benefits, costs is incidental, in fact you're almost in the position that the _____ benefits so outweigh the costs that in fact you don't focus on the costs, you focus on the benefits, so therefore you don't _____, you don't _____ on whether I can develop this application for one million dollars or two you focus on when can I deploy the application, if I can deploy the application three months earlier or six months earlier, it's more important than the cost of the application and if I have to changethe application later how quickly can I change it, it's all these kinds of things and if I want to deploy an application that I developed over in this part of the company in a different size problem over in this part of the company, how quickly can I do that, that's probably the most important thing, so it really focuses on the benefits, rather than the costs. _____ probably have cost-effective but I ...

_____: _____

_____: The next time I write it will be benefit rather than cost _____

_____: _____ the real benefit of it, I mean to me as a _____ as a customer is that you're getting _____ thinking about, evaluating circumstances _____.

_____: You're beyond costs because costs can be such a limited, limiting or stop-sign kind of word and you can address the issue, just _____ cost, but then take it one step beyond so that you're increasing the framework by which the customer -- you're giving the customer a whole language for _____ our approach

_____: That's what I'm wondering is if we can develop _____

_____: I know _____ question.

_____: Here's a reason to read this book so that I can be smart about evaluating computers and then -- it also ties into that;s a reason why I'd like to know now what Digital's application, _____ strategy, I think we could do that --

_____: I think we could do that, and no need to even introduce the questions.

_____: I'm not worried about the format _____. Content -- the kind that we can develop, then we can work out --

_____: A model -- picture in a page --

_____: Are these all of them, are there more?

_____: Just the ones that occurred to me, that's all.

_____: Those are excellent criteria in that --

_____: There are four life cycles --

_____: It's like planning, start-up and ongoing _____ so it's a _____.

_____: If there was a way of integrating customer services,

functionally.

_____: This one has enterprise, you have an enterprise one,

_____: This is March 9.

_____: You're still using Enterprise.

_____: Well, certainly as it gets into the outline, even more ideas will --

_____: Depending on the audience, many people are sensitive to this, I mean most anybody that installs information systems has a very good notion of what the life cycles are. Now, one thing -- one thing, the benefits though is a different matter. Sometimes there's not as much _____ to benefit, for example if you can show that two systems have similar life cycles, but in one system you can deploy the application sooner than the other, you pick the one that you can deploy sooner and jn fact even if they had dissimilar life cycle costs, you might even select the higher one that you can deploy sooner, so the benefit side of the equation is very important -- the life cycle cost model is good, but also the benefit side is good and I think that one of the things that we stress, I think that we generally have lower life cycle costs than much of the competition is the benefit which has -- being able to generally deploy things sooner, because of the architecture and the compatibility and _____.

_____: _____, that kind of message to somebody _____ doesn't deploy information systems, doesn't install them, to a manager -- this is not -- it really is a smaller -- really

is a strong message, I can get my inforamtion to my people faster, I can get my products to my people faster --

_____: The customer real -- it really is the product time to market, to an insurance company it's how quickly you can get some new policy on the market, for example, how do you get the policy on the market, the policy _____ is an information system -- is able to _____ out the benefits and deposit the checks, the insurance policy -- so -- an insurance company's product is how quickly they can deploy the information system application(?), it's the manifestation of that policy and that's -- and for many things, the financial service is the system and in manufacturing it's usually the system that controls the manufacturing process, more than direction. But invariably any application deployed by an enterprise is eitherthe product itself or usually the immediate precursor to the product, so that's why time to market something _____, and time to market being important to the product, then you step back and how do you get time to market normally, is if you get the information system application deployed sooner, so that's why the deployment time is so important.

_____: I just thought of ____ specific questions which is how Digital's product strategy _____ architecture -- what's the case we can make for it supporting us, supporting non-traditional areas for Digital, transaction processing, database managing, how -- can we present it as a strength?

_____: Do you want my marketing/engineering pitch?

_____: _____

_____: You want to hear the engineering pitch, that's the _____ people over the heads with two by fours.

_____: I guess my first question was -- is -- are you going to be Digital's.....?

_____: Absolutely committed to being -- Digital is absolutely committed to being first class wired(?) database and management systems, transaction system. We're not the best today according to some metrics _____. I don't mean -- defining as metrics being ones that are relevant(?), they are very relevant _____ at least some metrics (?), _____, we do not have systems that are -- that are as good as say those offered by IBM or Tandy(?) or whatever, that's not fatal, it turns out those metrics(?) aren't the only metrics ____ that would apply to the system(?). Ease of development and so forth again gets poor performance(?), per dollar but their systems are very hard to write programs for and transport(?), so yes, it's cheaper once the thing gets done but if you're going tohave to take a lot longer to get the application written and deployed, then that -- as I said that would be an example of focussing on the life cycle cost but not on the benefits, the benefits may be how quickly you can get the application deployed, so even in areas that are heavily data-management or transaction oriented, _____ a very good story because we can help the applications be deployed a lot more quickly. And what we're doing

in engineering is trying to get the performance up so that in fact we don't have to apologize for it, so it's a matter of _____ a scenario(?) we didn't focus on, and _____ that IBM and _____ -- over the last decade and now we've decided that's an area where we think we ought to be as good as they are.

_____: How _____ does it take to _____, to make up that gap?

_____: I hope it's only a couple of years, it's hard. This is something they do well and . IBM didn't get to where they are right now by doing nothing well. They did somethings very well, this is one that they probably focus on -- it that area, in as much passion as we have focussed on networking and departmental(?) kinds of things, so

_____: I think that's what my question is -- is are we going to have to abandon some of the Digital ways of doing things to get the performance(?) or are we going to have to do it all our way.

_____: We're going to do it our way.

_____: Are you going to talk about how we're going to do that?

_____: Doing it our way means that -- that it fits in the architecture, that fundamentally it's well architected and it fits well with everything else we're doing, I mean that's just the way we do things and first, there's no liability to doing it that way, there's only assets as far as I can tell. In doing it that way, but it simply requires development, we have work to do and -- can get lots of engineers doing lots of work, design and

_____: There are ____ benefits _____ distributed data base _____

_____: Sure, absolutely. All of the things that we do well now, how we're going to go about -- we're not going to throw anything out that we have now, we're not going to throw out our philosophy of integration(?), we're going to go along with what we have.

_____: I want to ask a question a little bit -- I don't have a lot of background knowledge, so it's a bsic question, you know, I've read that Digital is stuck with VAX, architecture, _____ architecture of the 70s is a common thing(?), I don't know if customers ask you that -- I'd say that _____ in America _____ cars

_____: Sure.

_____: What do you tell them?

_____: I'll tell you exactly what I tell them. Well, in the first place it's not old by most standards, the IBM strategic architecture, was designed 10 to 12 years before VAX, I mean the IBM 360, 340, 3000, 9300 architecture was designed in 1960 -- in the early 1960s, approximately 1964, VAX was designed more than a decade later so it's a much younger architecture than the -- sort of the second most prevalent architecture in the world and that's true of many of the other architectures as well. In fact if you looked at the installed base, computing architecture, invariably their roots are older in general than most VAX, the other thing, _____ in my marketing mode and that is there were

series of decisions made around VAX that turned out to be the ones that people are tending to be making right now and -- this particular slide for example. VAX has 32 bit ~~virtual~~ digital(?) address, well that's considered to be neat stuff now and now everybody has a 32-bit-digital address but the fact that IBM discovered in 1983, for example doesn't mean the fact that VAX discovered the very same thing 8 years earlier means that VAX is dated, it's not a crazy thing, the concepts that people think are important, just happen to be the ones that we picked up earlier, so having a contemporary idea but having thought of it a lot earlier is not a liability, it's an asset and the big asset that we have, for example, is that all software supports it, whereas, ____ references from the book but in IBM's case, that they didn't have 30 -- actually they had 31-bit addresses until more recently means they had a lot of old software flowing around(?) that actually wasn't written with that in mind, it doesn't work properly with 31-bit addresses so they had this problem that customers have -- the software they've written for their 360s and 370s and so forth that cannot fully take advantageof the new machines, the other thing is that we haven't changed it yet, this is an argument of some subtlety but most architectures we do throught several levels of change before they are retired, we haven't changed it yet. So, sort of would leave the kind of implication that it may be changed. I -- as it turns out I don't think it will bechanged, it will probably -- either what we're going to do will either be viewed as a change or replacement or

it will occur at a point in time and done in a way that the customer won't see it in any significant degree so, yes ____ certainly ____ we've designed it in 75, we think the things we put in it are the things that people think areimportant today, even though we did do it in '75 and everything else _____ anyway, so I mean IBM gets a lot of credit, they've renamed their 360 to 9370, but it turns out if you look inside it's the same old thing it was before. and so, there's lots of ways to address that question, age or _____

_____: _____ like the marketing issue

_____: That's all it is, because the only reason anybody would even raise that question is that -- should have some kind of ulterior motive, _____ the customer doesn't care when it was designed, if it was designed in 1903 and it solves the problems, that's perfectly fine, there's nothing wrong with having something designed ten years ago if it works better than something newer.

_____: I wanted to comment. I want to go back just to _____ transaction _____, _____ saw a lot of connection(?) with _____ and I think it had to do with _____ about data management _____ later.

_____: You can tell I'm excited about data management, maybe in a different way than you think but --

_____: From what I've heard and the b_____ that I _____ before was that +_____ and after _____ you'd think that _____ were the principles that _____

information systems(?) -- I got from _____ and _____ give us a challenge and we identify _____ to acquire(?) principles and _____.

_____: Right, exactly.

_____: And that was powerful. That gives me the confidence that you have underneath when you were _____ on principles(?) that you can now employ _____ give me a couple of examples(?) _____ and data management and I can say _____ that leads you to that confidence.

_____. But also sounds like _____

_____: _____

_____: The result, the result -- Digital looks at something _____.

_____: Well --

_____: But _____ I think as a caution(?) _____ how you express that -- is -- there's a cartoon that we change the way the world think and there's a carton with horses facing the cart! and I think that people -- it's the tone that --

_____: Confidence -- and humility -- something

_____: _____ has to be in there.

_____: From the standpoint of presenting our strategy and our visiion, I don't think we should apologize for the data management area at all and _____, _____ number one it's not a good approach(?) to make, secondly there's a lot of good stuff there already -- it turns out we didn't when the stuff was originally designed, we didn't design it to replace stuff that

runs(?) in glass rooms, now it turns out we had such neat products that are customers are coming to us and saying I'd like to install your products in a glass room and we say okay and they say, I want the same kind of data management that IBM has and we say, well, we don't have that now but if you want it, we'll do it, we'll do it in our way but we probably can't give you everything that you want -- what IBM offers, you want it now, we can't use it exactly the way IBM gives it to you, but we'll giveyou something like that shortly and we think it will be better ____ so it's not so much a matter that I think we should apologize, we never tried to do it, but we are going to try to do it and _____ get ourselves organized. If I had any more two by fours _____.

_____: So much for that enlightened organization.

_____: Yeah right. Yes, but I think we should focus on the parts that we do well and there's some things we do very well in data management, we really do and we have leadership capabilities there, there are some things that we never try to do, and IBM does them better than we do and that sort of thing, _____ expect to be different, so I would present the parts -- I would emphasize all the stuff that we do well and interactive dialogue when the customer says I want to do X and we can't do it, and then you go into the other mode which says we're going to do it in the future and we're going to do it our way -- going to do it in a way that we think will bring greater benefits and now ____ if you want to do it the way you're doing it now, you're going to

continue to use IBM and they're going to continue to use IBM there's no question about it. That's okay, and we're talking better IBM gateway and how we _____ better than IBM does, it's great.

_____: How much do you think we haveto worry about IBM, _____ Digital strengths --

_____: _____ worry a lot(?).

_____: _____ and stuff.

_____: They have.

_____: Right.

_____: I fyou opned up one of their ads, they basically say the same thing that we say, they talk about compatibility, they talk about integration, they talk about networking, _____ network _____, all that stuff, all the stuff that we were talking about three years ago and they didn't mention. They now -- build their whole advertising, whole marketing message around _____

_____: _____ Charlie Chaplin _____

_____: I think it's interesting. The old ads for Charlie Chaplin, the rugged individual who is doing his own thing, and _____ thing is this team, this working together, you -- that's a vastly different message, isn't it.

_____: _____ if you're looking for consisentency --

_____: But yet --

_____: But it's almost like -- you have to -- we have to stay in our track, we have to know who we are, what our initiative is,

that confidence though, communicated, people who are -- a lot of people are going to _____ point of view, that's doesn't hurt to tell the other side _____ to express that confidence about who we are and _____ but which leads me back again to the Digital strategy philosophy the _____ , are we going to -- in your section you were going to address or least the original outline of _____ Digital's computing model as organization of _____ competitive _____ to _____ improving productivity(?), or computing effectiveness(?). Now, is there anything _____ to us today about that, or do you think -- is that

_____: I have ____ another way of putting it --

_____: _____ go ahead.

_____: I was thinking of another question where you were talking about -- given the IBM can produce the same _____ that we can and kinds of things that sound the same(?), it seems that often the only way to express the Digital difference is through the results, like well, can you send a mail message from _____, maybe I don't know whether _____ you want to ____ in a work group level, a department level or _____

_____: Work on a scenario(?) of the kind of things that Digital computer allow you to do(?), or _____ that would put a block(?) -- IBM says oh, we have integration

_____: I think it's tought that the _____ at the word(?) level because the currency has kind of been debased, I mean network is network is network type of thing and everybody can use it, can mean different things. I think that -- I don't know exactly

how it's all going to turn out, but at least from a temporary point of view IBM is using the same words we're using. Now if you ask, how does your message differ, I don't know how it differs, _____ exactly.

_____: What I was trying to __ towards is developing a concrete example that says

_____: We have -- yeah obvious examples, I mean we've been running, I think for example, the advertising thing has now which sort of says I've been using the same words we are now but even now you can't buy(?) what the words are so we stess, WE HAVE IT NOW. Now presumably at some point in time they will have what they are saying they are going to have, although _____ about what _____ how that's going to be accomplishable(?) If they actually get to that point where they have what they say they are going to have, and we don't have anything different than that, then I suspect we have a problem.

_____: We offer _____ a _____ environment(?)

_____: Well, they are tryingto get there and they've said they are going to make it seamless(?) by putting some layers on top of all their other systems so they are all going to look alike and I think that's publicly what they've said they're going to do,

_____: That's _____.

_____: Yeah, they are SAA(?) and in principle you can do that -- in practice it's fairly hard, so I don't know how it's all going to turn out.

_____: Well, one thing I was thinking and again I'm sort of

thinking and again, I'm sort of thinking about the book and ____ the question, we talked -- the last thing about using the generic electronic mail as another _____ of example, there's something concrete, to understand sort of what happens _____ _____. What I'm wondering is that there is somebody who could illustrate the elements, the simplicity as to the way Digital accomplishes that result that we've set up some ofthe criteria.

_____: All I know, we're always searching for that one all powerful example that to understand this suddenly the light comes on and you say, gee I understand, I believe.

_____: Ask the hard question.

_____: I wish I knew exactly what it was because at the words level it's easy to say just about anything you want and you're not really crisp -- I mean if you haven't really figured out exactly what the words mean and exactly what the levels of either refinement or integration or sophistication that go behind it, I mean everybody has electronic mail, everybody has networking, everybody has productivity, everybody has integration I mean --

_____: Do you think it's possible for this book to come up as some kind of concrete example or illustrate in some way that gets across the -- is that too

_____: _____ whole other parts of the book -- 100% -- there's many different examples of _____ as possible(?).

_____: The thing that I'm confused about personally(?) whole other parts of the book I believe were 100 percent as many different examples as possible, business needs--conceptual_____--

_____: What I'm trying to show is yes, you have this architecture. If we could tie it to it--

_____: To _____ization.

_____: A generic--

_____: No--

_____: --organization one example, and if we could somehow show why Digital's approach is elegant, simple and it allows us to have corporate wide electronic mail that doesn't involve a lot of SAA kind of approaches and stuff.

_____: There's got to be a reason that this is in the outline, Digital's computing model and then (a) organization, (b) department, (c) work group--

_____: But everyone can say that.

_____: Right, well, I know so I agree with you and that's why I've been trying to get at this point because these--but these words have meaning to somebody and when I worked with Marion they talked about that and I had tried to write some stuff for her but it's really amorphous and didn't really have any--didn't say anything, was like--

_____: Words.

_____: Words, and didn't have any strength to it.

_____: That's one of the things that we're struggling

with is if you're trying to show that you're better you have to figure out what it is you think you're better than, and try to explain the difference, and as I say it's kind of hard to explain how you're better than something that's amorphous and not well defined, because anybody can claim they have mail system, electronic mail, and just about everybody does. Now once you poke under the surface you'll find out the capabilities tend to be somewhat different. I don't know where IBM is now--they may have it, but for awhile they had a single node mail system which I mean you've got electronic mail but everybody had to be attached to the same computer, and if you wanted to have network computers and have the mail in the network, that was either awkward or impossible. And you might contrast that to having a network mail system but if you talk about electronic mail as a concept and try to explain how you're better, you have to have some subtlety underneath it, and even a bigger problem is if you believe in highly centralized computing the fact that there's this computer sitting here everybody's attached to isn't even very alien. I mean what's that mean, that's okay(?), because that's the way I'm a customer thinking about my computing. Now the fact that very rarely in an enterprise would every user be connected to one centralized system, maybe they(?) immediately made that connection, and people don't maybe make the connection that in fact for electronic mail to be effective you've got to have basically everybody on it. Otherwise it would be like a post office where you couldn't send letters

to some people. In which case you'd probably try to--if you'd probably try to find some other way to distribute information if in fact some significant segment of the population couldn't be mailed to. So it just requires layers and layers of understanding in order to try to make differentiations. I think the best we can do is to try to generate this vision, that sort of turns people onto the idea that Digital does have a vision, that vision is very effective in--as the vision you need to have in order to make your organization more productive. We have the products, we have the solutions, we can go solve your problem. Now there's a limit to how much you can do at the abstract level. Sooner or later somebody says okay, I believe, it could be neat if I had a mail system. At that point maybe Digital's in good shape, because at that point hopefully we've convinced them that mail systems are important, Digital has one and now at the very least you ought to ask Digital about its capabilities. Maybe you'll also ask IBM what theirs are, and we hope that at that level we're going to win a lot of business because we--we're better, but it's very difficult I think to try to make the sale any harder than that. Because until somebody internalizes the fact that they really want this, it really begins that they ask the full questions about well, you have electronic mail but is it the enterprise wide mail or is it just mail on one computer or is it--until you get to that level, it's very difficult to make a differentiation. The distinction between us and IBM is subtle in any event,

not probably by philosophy but in products, maybe then in the products the differences are going to often require very detailed understanding of what you're trying to do. How you motivate the fact that our systems are easy to use. I don't know how you tell anybody something's easy -- easier than what? And if the person reading the book has never used a computer system before which is likely half of the people never--they don't use computers. They may buy them, they may have people that work for them buy them but never use them. How can you explain what ease of use is to somebody who doesn't use a computer? How do you explain that it's very-- we can develop applications more quickly than IBM or someone who doesn't develop application. Now maybe you can motivate but applications development seems to take an awful long time and is very slow and everybody knows that, and mentioning the fact that we place awful lot of emphasis on getting applications developed quickly, I think that's about all you can say but you can't prove that we're easier, but you can light the--light a light in somebody's mind saying well gee, Digital actually seems to think about that as being a real issue, and I know it's an issue for my organization so maybe I ought to take the time to understand what Digital does better and that requires getting the next level of people in this organization to actually go look at Digital's solutions, so I think that's really the best we can do.

_____: So in a way we're almost setting issues in there

_____--

_____: Right, we're trying to...right, in many cases create the feeling that Digital has something to contribute, and what you've got to do, you've got to either read more of the book or you've got to go to some of your people, got to talk to Digital people. That's what you like to leave people with. I don't think in any 10 or 20 pages we're going to prove to the CEO that our systems are easier to use than IBMs--we can't do that. They don't even have a frame of reference to ask a meaningful question. But telling people that our vision is that things are very easy to use, that may be something that they walk away with. Maybe they didn't hear that from some other vendor. The use was the principal thing that was guiding the development of our systems.

_____: Do you think that talking about the organization of the department or work group is relevant....?

_____: I think it's inevitable we're going to talk about it.

_____: I think it's a great story because it's_____. (inaudible)

_____: This is fun.

_____: Well, good.

_____: That's good--that's the most important thing.

_____: Absolutely--let's do it again.

(END OF SIDE)