Oral History of Hugh Williams and Burton Grad

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Hugh Williams and Burton Grad

Conducted by Luanne Johnson

Abstract: In this interview, Hugh Williams and Burton Grad, members of IBM's unbundling task force, describe IBM's changing view of unbundling from a legal necessity to a business opportunity. They discuss the criteria used to determine which programs would be priced separately and which would remain unbundled with the hardware cost and how IBM's business model changed as a result of unbundling. Williams was a senior technical advisor to a number of executives in IBM's System Development Division. Grad worked with applications software development in the Data Processing Division.

Unbundling as a Business Opportunity for IBM

Luanne Johnson: I'm interested in what was happening within IBM during the unbundling process. I've researched the reactions in the press at the time but I'd like to know how people within IBM perceived it.

Hugh Williams: Some of the unbundling happened one piece at a time. I think there was a date where everything was effectively priced. But for a period of time for every major new announcement, the direction was let's start pricing.

Johnson: So at this point it was definitely perceived that there was a business opportunity there.

Williams: This was a business opportunity. I'd say for a number of years after the original software unbundling announcement, there was an honest skepticism in the minds of a lot of people, as to was this really a business or not. And that may or may not have been true of the industry, but that was certainly true of IBM. Therefore, the motivation to write a package might have been as much in terms of helping to support selling hardware in a particular industry as in terms of making money on that package. From the beginning we had to make a profit on each

piece of software. That was a legal constraint. But whether this was really a business to invest in and grow and get bigger and bigger and bigger, or whether it was just something we needed to do as a complement to our hardware business was I think debated for a long time.

Johnson: Well, that substantiates one of the questions I had when I went back and researched all the press at that time. Burt had originally presented it to me that the unbundling decision was a defensive decision because of the legal constraints and that IBM would not have entered into that decision to price offerings separately except to ward off the antitrust suits.

Williams: That certainly was the original proposal, the motivation.

Burton Grad: I think it was publicly known at the time. I don't see that as anything private or confidential. Tom Watson said that when he announced the task force in December in 1968.

Johnson: What do you think changed the public perception so much that when the announcement was finally made, there was this uproar in the press about the way the pricing was done? And there was this recurring position that IBM actually used this as an excuse to go after this market very aggressively. Those were the kind of quotes that were in the press.

Williams: There was an uproar about the three percent [reduction in the price of hardware]. I'm sure that Marty Goetz and others in their particular business at that time who had suits against IBM were going to reflect a viewpoint like that. But I would suspect that a broad base of, let me say, objective observers... I could be wrong,but I don't remember that kind of press. I remember violent outcries about the three percent.

Johnson: It was there. I quoted one article to Burt because it just put it more succinctly than the others. I probably read 150 articles, in *Datamation, Infosystems, Barrons, The Economist, Business Week,* all of those. There was very little coverage in *Fortune* interestingly but some in *Forbes*. The article in *Barrons* which came out in September of 1969 was titled "Unbundle of Joy." And specifically the analysts pointed out that the company, seemingly acting under the duress of antitrust action, had deftly created several potentially lucrative submarkets which it could easily dominate. That was the theme that ran through all this press. And I'm just wondering what happened. Do you have any feeling for what in the announcement might have caused that perception? Was it just a reaction to the three percent?

Williams: Well, IBM has never fared well in the press. And it wasn't faring very well back at that time. I only wish that what those people had been saying had been true. Because we took baths in certain of those so-called business opportunities we were going to dominate. Other than the fact that everybody had to believe that if IBM did it they had several nefarious and

monopolistic objectives and that was just fair game, I have no basis for why that would occur. This was a response to the CDC antitrust suit, and the prospect of a government antitrust suit, and, to a minor extent, to some of these smaller software company suits. But it was primarily to avoid a Justice Department suit. We were doing what we concluded was inevitable. And if we could, we would have put it off another five years. I mean, I can't speak for the corporation, but I'm sure we would have. There was no positive motivation.

Grad: There was no market.

Williams: There was no positive motivation in that. Remember we were charging for all those things in a very nice pleasant way. We were charging for all those things in the price of the hardware.

Johnson: That's the position that Burt had presented. But I was just checking up on him.

Williams: Well, as I said, it was a very wise course of action. That would be the only case where his viewpoint is substantiated. I guess the law of averages was saying couldn't happen twice in one hour.

IBM's Systems Software Prior to 1969

Grad: I was trying to picture the pre-1969 situation inside of IBM in the systems area. Because I know what was going on in the DPD [Data Processing Division] area because I was there. But I was wondering whether you would be able to describe to her what other kinds of things were going on, how big the systems software operation was. Please give us some sense of the size and scope of what was happening in the systems area in the mid-1960s, and the late 1960s.

Williams: I'm not sure what you mean by systems area.

Grad: Was all of the software, except that which was done in DP, being done basically in Poughkeepsie and Endicott at that stage?

Williams: We had some international software development being done.

Grad: Where was the S/360 software? Was it predominantly in Poughkeepsie?

Williams: The OS/360 was at Poughkeepsie and San Jose was doing data management and some of the file management like ISAM and that sort of thing. Endicott had DOS/360. When did we announce the model 20? That was all done out of the Republic of Germany.

Grad: DPD was supporting the model 20 for the System/3.

Williams: That systems software support was done out of Germany. And Hursley played a major role in some of the S/360 hardware and software. But DOS became a dominant preferred operating system for smaller systems. TSS [Time Sharing System] was fighting a sort of rear-guard action. And CP67, later called VM, became significant by 1971, 1972.

Grad: Well, VM/370 was the saving grace in the time-sharing environment.

Williams: And then it continued. But it was always a second class operating system until about four or five years later.

Grad: That was a DPD product until much later.

Williams: Yes.

Grad: How about utilities, languages?

Williams: Languages were in [the] Time Life [building]. They got moved.

Grad: At the time of the announcement.

Williams: Yes, of course, they were then in Time Life.

Grad: Was Elaine Bond put in charge of that group reporting to Jim Hewitt at that time?

Williams: No, I think Carnella had that at that time.

Grad: They must have switched in fairly soon.

Williams: But in any case, languages were there. And there was Cobol, Fortran, RPG, and DL/1. RPG may have been subcontracted.

Grad: Hewitt got the languages given to him as part of the unbundling. They were moved out of the Systems Products Division. They weren't in DPD prior to that. They were moved over to DPD at that point in time because of the unbundling.

Priced and Bundled Software after Unbundling

Johnson: So languages were specifically moved to DP.

Williams: DPD got everything that was priced.

Johnson: So what did that leave that was not priced?

Williams: The operating systems.

Grad: And Sort?

Williams: Sort, I think, was moved over. Anybody can go back and find out very quickly.

Grad: Are there files on that stuff?

Williams: Sure, there are files of all of the IBM announcements in the public domain.

Johnson: Well, the reason I asked the question that way was because the announcement will tell me what was priced. But will the announcement tell me what wasn't priced?

Williams: Well, what wasn't priced were the operating systems including things like VM, TSO, data management packages, VSAM, ISAM, other systems support programs.

Johnson: So if it was priced it went to DP?

Grad: I'm not sure that's absolute. I know the languages were moved over. But if he's right that sorting was priced, sorting was not moved over.

Williams: Well, that's true. I think that may have been handled out of Europe.

Grad: I think there were significantly more product division programs that weren't originally priced.

Williams: And the assembly language was not priced. You always had to have a language in which you maintained the rest of it.

Grad: But RPG was priced for the smaller machines.

Williams: Yes, RPG was priced.

Grad: Well, one could argue that was the language on the small machines.

Williams: One tried to argue that. And one didn't succeed.

Grad: I remember that discussion. I think that the first product to make money was RPG II.

Williams: You really ought to get a copy of the internal announcement.

Grad: The external announcement was public domain that was sent to the customers.

Williams: Whatever was sent to customers, the press release, all that stuff is archived. There's no sense in being in error about this. My memory may fail. Your memory may fail.

Johnson: Sure, of course. But what you're helping me identify is what I need to go look for.

Grad: There were many more programmers, in my memory, in the product divisions at that point than there were in DP. We had 500 to 1,000 programmers in DP.

Williams: The number of people who were working on code that got priced and the number of people working on code that was free is a subject I don't think I'll respond to. Because I remember Ted Climis almost had a violent rage on that subject.

Grad: Was that right?

Williams: You gave him the wrong answer. Then I gave him the wrong answer. That amount of pain you probably want to blot out of your memory. He wanted the number to be different.

Grad: Unfortunately, we couldn't back it up. Well, I'm sure today's numbers are public. But fundamentally there was a lot of programming effort on systems programs at that time.

Williams: Well, remember I'd done a study of this before unbundling. I can't give you the numbers but I can characterize it. In fact, prior to the unbundling effort, it was package code, systems code, package application code. But the majority of programming that was going on was by systems engineers working with customers. Almost all the packages that eventually became DPD packages came out of customer/IBM relationships with significant manpower on both sides. And that was the major source of programming.

Grad: We always had a joke about this. I remember that on the smaller machines, like the 1620s, all they wanted was to have a nice catalogue. You almost didn't worry whether that particular program worked or didn't work.

Williams: That's right.

Grad: As long as the catalogue showed the variety of things that could be done then the view was that the client could do that kind of application on a computer. That was really the issue at that time.

Williams: That view still has some currency. Look at IBM's advertising for the PC.

Grad: Are you working on any government contracts?

Williams: Yes, and the funny thing is they want me to get a clearance. I had clearance many years ago. And I don't want to get a clearance. Because as soon as you get a clearance you are totally hamstrung in terms of free interaction. So I say I'm going to do this stuff and I'm going to do it without a clearance. Don't tell me anything that I shouldn't know. I mean, in my early days it was so exciting to get a clearance, blah, blah, blah. Now I wouldn't touch it with a ten foot pole. And I am presenting to a group of people who have clearances and the conversation is totally one way.

Grad: They can't say a thing.

Williams: They can't say a thing. So you're trying to see the expression on faces, to see if you're more or less on the target or not. And this is not a pleasant environment to work in.

Grad: But a lot of the companies get business with the government because they have all these people who have clearances.

Williams: Oh, yeah. Oh, yeah.

Government Business was Unbundled Separately

Grad: One of the things you might make a note of is that the government professional services business and the growth of that in the market has a totally different set of characteristics than the one we're talking about on the commercial side. That business was already unbundled, separately. All kinds of things were going on there independent of what was happening on the commercial side of the business. IBM already had professional services activities that they were charging for there. It was breaking prices apart in order to be competitive. Sperry still has, I think, a larger percentage of that business than IBM does.

Williams: That's a very large percentage of Sperry's business. If it wasn't for that...

Grad: I don't know if you've seen Kirk Douglas in his new ads saying 31 countries have agreed on one thing. Sperry. If they can agree about that, then…

Williams: Oh, yeah. I've seen that ad.

Johnson: Gee, that was nice of Kirk to say that.

Williams: Spontaneous.

Grad: Spontaneous. Lay a half million on my hand and I'll talk to you. Plus residuals.

Williams: Plus residuals.

Grad: You had asked about the characterization of what IBM looked like prior to the unbundling task force and what the rest of the world saw from outside. I think Hugh saw a different part of IBM prior to 1969 than I saw. Tom Glans and I saw the same part of it. Hugh saw a very different part of it. Internationally what was going on?

International Software Development at IBM

Williams: Well, it's sort of the same thing on a smaller scale. But there were really three classes of programs, systems, applications and the branch office customer activity. And I think the third was the largest.

Grad: In terms of the number of bodies you think there are. Because that's the part that got Dave Kearns in the penalty box. The people who did the surveys just literally were lied to.

Williams: That would be hard to prove. But all of your programs in DPD came out of that.

Grad: Not ALIS [Advanced Life Insurance System] and PALIS [Property and Liability Insurance System] in Insurance.

Williams: Well, that's a rare exception.

Grad: IMS. We did the bulk of programming on that but worked with Rockwell as the customer and for CICS with Commonwealth Edison as the client.

Type One, Two, Three and Four Program Classifications

Williams: I'm talking not only type one and type two programs, which was the term for systems programs, but the type three and type four programs.

Grad: Type three programs were developed by IBM branches for a customer and type four were developed by a customer who made it available.

Williams: And we were just acting as a clearing house and publisher.

Grad: That whole numbering idea. Did we create that during the task force?

Williams: No, that was created before. Types one, two, three, four was before the task force.

Johnson: Wait a minute. Let me clarify something here. Type four was a program written by...?

Williams: Customer written. Three was IBM written.

Johnson: And it was available to other customers.

Williams: As is.

Johnson: No charge?

Williams: No charge. One, two, three and four were all free prior to 1969. One was systems code. Two was application code. But in fact ASP, which was system code, was type two.

Grad: So was CICS.

Williams: So the other definition of type one was product division as the producer; type two was DPD produced. Three, IBM written for a customer. Four, customer written. All of them were free. All of them were available in the sales manual or catalog.

Johnson: Why would a customer put a program in the catalogue?

Williams: Back when it was free they loved it.

Grad: They all exchanged with each other. IBM just provided the library function.

Johnson: It's the equivalent of the bulletin boards now.

Williams: Sure.

Johnson: Everybody's got software out there.

Williams: Programmers want their day in the sun. But a lot of them regret it after they have people call them at home. The product doesn't work and they call them. But they provide personal variety. Back then it was all free stuff. So who cared?

Grad: Yeah, no one thought they were being cheated out of it. No one was charging and making any money off of it. But a number of people right after the unbundling took free programs, public domain programs, and put some kickers or some features on it and make it their products. Some of the major products in the industry, produced by third party software companies, came out of that kind of background. There were a lot of programs being delivered. The PID equivalent was there. They were delivering a lot of code.

Williams: What was PID?

Grad: Program Information Department. It was still the same name.

Williams: It's now the PID department.

Grad: What was it called then?

Williams: Software Delivery Services. I don't know.

Grad: SDS.

Williams: Something like that.

Criteria for Unbundling

Johnson: One thing we talked about earlier relates to which ones were not separately priced. Talk a little bit more about what the criteria were for which ones were. Could you clarify that again so I've got that down?

Grad: What were the public criteria we announced?

Williams: Well, System Control Program was the term we invented. I wasn't a party to who invented that term.

Johnson: You're not going to take the blame or the credit for that one?

Williams: It was deemed to be software that was essential to run the hardware. And hence, that's why you had to have one non-priced language, an assembly program.

Grad: Is this the analogy we drew to delivering the tires with the automobile? You have to deliver the car with a set of tires.

Williams: No.

Grad: That wasn't the analogy?

Williams: No. That was just a set of arguments.

Grad: After the fact.

Williams: After the fact or during the fact. Since today I can take the tires they deliver or get my own tires. But I can't run a car without tires. I can't run a car without gas. Because lawyers didn't understand programming they loved to use those analogies. But neither one of them applies to what we're talking about here. The most like the one with the software was the gas for the hardware because obviously therefore you have to price gas.

Johnson: But you don't exactly use it up the same way.

Williams: The view was that if you didn't have this you couldn't run the hardware, all right? There was sort of a corollary view that only the company which was going to put out the hardware would make the investment in the operating system. Which has probably been belied by the PC.

Johnson: Okay. But it also substantiates the position was that they were doing this in order to avoid the antitrust thing rather than to create a market. There was no need to create a market for the people in this area.

Williams: Well, the basic argument was it was essential to the operation of the hardware. You didn't have a product without it. You couldn't market hardware without it. And therefore if you establish a free market in that, it would be totally disastrous to the hardware sales, etcetera, etcetera.

Grad: Were they licensed to the users?

Williams: The System Control Programs? There was no license.

Grad: It was copyrighted?

Williams: No, the SCP code was not copyrighted.

Grad: Was that left in the public domain?

Williams: It was public domain. It was public. Only priced code was licensed.

Grad: So licensing really wasn't introduced to that systems code until late 1970s.

Williams: When it was priced. Licensing went with pricing. And there was a lot of debate about could you license something and not separately price it? And the answer was no.

Grad: What about the price of maintenance? We had Class A and Class B maintenance.

Williams: There was no separately priced service on the software.

Grad: It was built in?

Williams: No, you either got service from FE [Field Engineering] and that was called Class A. Or you got it from the developer who was from DPD and that was called Class B. Or you didn't get any. And that was Class C.

Grad: That's right. It was actually customer service in DPD that delivered the Class B service. It wasn't the development group that delivered it. The development people provided backup if customer service couldn’t solve the problem.

Williams: FE did Class A. And it was on site service, from the branch office.

Grad: How did you get through that argument between the old Type 1, Type 2 programs?

Williams: Very poorly. There have always been a few people I've known who were totally irrational and would invent schemes upon schemes that were like how many angels could dance on the head of a pin. It was unintelligible to me. I had to assume it was totally unintelligible to our customers.

Grad: And certainly unintelligible to our managers.

Williams: This was fine because nobody knew what was really there. You could more or less do what you wanted to do.

Grad: I remember Ted Climis filling out these sheets and sheets and sheets of flip chart paper, and then seeing him present those at a meeting to Spike Beitzel and others. He would just drown you with words, absolutely drown you with words. He would just keep right on talking no matter what anybody asked him. He just would keep on going page after page after page. He would do thirty or forty sheets. Closely written charts and he would just keep going, just keep bull dozing. You'd ask him a question and he would get it out of the way. He'd get right back to the charts.

Johnson: He was the leader of the group of the three of you.

Grad: Yes. The three of us. Hugh represented the systems area and I represented the application area. Afterward Hugh went to the World Trade task force which lasted, what? Probably close to a year?

Williams: Yes, we did it in Europe by and large. They didn't do anything on services or system software until a year later. They had to do the priced software right away because if you're going to license something you have to license it worldwide. But in all the other services they didn't do the licensing. Canada did them.

Johnson: Why did they do them at all? Was it still in response to the antitrust thing?

Williams: No, no. It was just in response to being consistent internationally. Certain things you have to do. Software licensing we did on day one, worldwide. You can't sell something in one country and give it away in another.

Grad: Systems Engineering though was I think the key one that they held off on for quite a while.

Williams: Yes. They held back. And they had the advantage of seeing what worked. They did a lot of things very differently. They had the advantage of seeing what went wrong, what went sour. So their investment strategies and everything else was based on a year's worth of experience, some good, some bad in the U.S. And they directed their plans accordingly.

Transition Arrangements after Unbundling

Grad: I want to mention the transition arrangements which agreed to ongoing support and special licenses, royalty free perpetual licenses, for those who participated in the construction of the programs.

Johnson: Let's go over that again so we get that.

Grad: As a practical matter those were transitions.

Williams: Mutually agreed support concerned management. That's public domain. And that was for commitments either made prior to the announcement or in the works to the customer.

Grad: It had to be something either in writing or orally. But there had to be a commitment. And these commitments had to get those verified.

Williams: And it was always controlled. And you had to go get the region to sign off. And there was a window on how long it was available. The other items like paid up licenses or royalty free licenses, etc. were not part of the package. Those were separate individual deals.

Grad: That was important. I think we stated that mutually agreed to support is fine for what we need to do here. That was a purely transitional thing. In the long run it had no effect. All that was just a bridging mechanism to get you from where you'd been to the other in some reasonable fashion, without anybody being pissed off at you.

Johnson: Okay.

Status Five Years after Unbundling

Grad: Picture now three to five years later in IBM. The systems side of the business was still bundled. The SCP line had not broken at all. I remember that we didn't think it would last even three to five years. But IBM had not been sued. The view was that if you've got a strong suit you'd probably break the line. Because there really was no fundamental justification, other than we said it's going to be that way. There was no underlying theoretic argument that would back up the position. As it turned out, nobody sued. If there were problems, you resolved them. And for whatever reason no competitors ever came after IBM operating systems. People did offer some operating systems programs in the mid-1970s. There was an outfit in Reston, Virginia that tried to build a DOS replacement program to compete. And Marty Goetz at ADR had a TSO competitor called Roscoe. But they never came after IBM during that period.

Williams: I worked on a task force to deal with the Roscoe suit.

Grad: Oh, is that right?

Williams: I can't go any further than that.

Grad: Oh, I didn't think they actually ever sued. But it would be a matter of public record if they actually sued. I know that Marty was teed off. I was working with Marty. I was in ADAPSO by then as IBM's representative.

Williams: Why don't you talk to Marty about that? He probably knows that.

Grad: So picture IBM five years later. By that point there's still no real systems programming that's priced. So the world hasn't changed that you recall.

Williams: My view is that after the world began to understand it was a business, it took on new characteristics. Five years was at mid-1970s, ten years is late 1970s. People said let's make a business out of all of it.

Grad: In DPD you end up with Archie McGill and then Jim Hewitt and others saying we've got to show that we make money on each program or that we're planning to. This is essential to the whole pricing mechanism. Everything you're going to put out is going to get priced. That's the view. Everything you're going to produce you're going to price to get rid of this business problem. I did CICS. I had to show that I had a reasonable market to justify the five, six people I had working under me. So we had to go out and do the regular pricing like you

would for hardware. So DPD was deeply effected by that. I don't think the product divisions had really been seriously affected until the late 1970s.

Williams: I have a very good recollection of facts. I have a poor recollection of dates when things occurred in time. Unless I have some reference point I don't know what happened in the seventies.

Grad: The 370 announcements take place, in the early 1970s.

Williams: Yes.

Grad: And essentially that becomes the basic architecture and structure that we're still working under.

Williams: Well, you know, funny things happen. Like TSS became a priced program long before either DOS or MVS.

Grad: But TSS was also turned over to DPD at some point.

Williams: That's independent of the pricing issue.

Grad: Well, I thought those two were related. Once you decided to make it a priced item, it got turned over to DPD.

Williams: But after the fact. Turning it over is after the decision.

Grad: My boss for a period of about a year had the TSS group reporting to him and he had the PARS [Programmed Airline Reservations System] group. But PARS was still not priced. PARS was still free at that point. And there was a big group of customers using PARS. TSS was used by a very small group of customers. It had about seven, eight, nine customers whatever the hell it was.

Williams: It must have happened even though they were very large and prestigious customers.

Grad: I guess the only time you start to see a difference in the product divisions is after they start to price all the system software.

Williams: Well, I would submit to you that IBM priced DOS, priced VM, and nobody's really competing in those areas.

Grad: That's true. They're totally locked areas.

Williams: Okay. So those, to be somewhat crude, are marvelous moneymaking machines for somebody. They are not an open market place.

Grad: What happened in DPD, and what happened in the product divisions is dramatically different in terms of they never created the opportunity because they didn't unbundle with the others. And by this accident of fate, CICS and IMS were unbundled, yet competition didn't happen to work against CICS. Either CICS was good enough or the competitive products were poor enough or something. But it never worked. No competitor ever really got established. And CICS has a very, very large percentage of the IBM communications market. But that isn't what happened in IMS. You get IDMS. You get the Software AG products. You get Cincom. All of the others come in there and become very successful.

Williams: CICS and IMS/DC.

Grad: Well, IMS/DC. Yes, you're right.

Williams: You're talking data base. And you're talking transaction processing.

Grad: If you were an IMS user, you used IMS/DC. Now if you can use DL/1 with CICS. But if you were not an IMS user, you still ended up using CICS. Nobody else has really gotten any significant inroads. Now, why? God knows why. Technically I can't think of any good reason why.

Johnson: So you're saying that that's the one exception. That generally for everything else that was priced there are significant competitors.

Grad: Substantial competition. I can't think of another area. Well, in languages there's never been a lot of effective competition. They're starting to do more now.

Williams: There have been some.

Grad: But not to the same degree. But fourth generation languages were a different ballgame entirely.

Johnson: Yes, yes.

Grad: And there, as a matter of fact, IBM was very much at a loss, right?

Johnson: And, of course, with microcomputer software.

Different Business Models for Minicomputers and Microcomputers

Grad: Micro software seems to be a whole new world. Think about what Hugh has said; you had a very different set of dynamics working in the microcomputer field. And the way the PC evolved in IBM, it wasn't a directly influenced thing. If it was indirectly influenced it was pretty remotely indirect. It wasn't a cause-effect relationship.

This is mainframe picture [IBM has the standard platform and all systems and applications run in that environment]. Can you draw the same kind of market dominance picture in the midrange and minicomputers?

RPG II became an immediate success as soon as it was priced. Everybody got one when they bought a System/3.

Johnson: Do you mean that they got it even though they had to pay for it?

Williams: Well, they more or less needed it when they bought the hardware.

Grad: And it was really the standard language. And therefore everybody wanted to own RPG II.

Williams: I think I could characterize the System/32 or 34 or 36. A good deal of that market goes as follows. Salesmen will go out and sell the hardware and sell the basic systems code. And he'll say why don't you go down the street and see what the X, Y, Z VAR (Value-Added Reseller) has. That, of course, makes IBM management unhappy. But that VAR may have a

package that works on that computer, but what he also has in addition to that package is installation skills, teaching skills, customization skills, and hand-holding skills. So, depending on which application area it is, it's a very attractive deal both from the IBM hardware salesman's viewpoint and from the customer's viewpoint. So, in that case you see a couple things operating. One, at the point of the sale of the piece of hardware, certain software gets sold. One of the reasons that IMS and CICS, even though they had mixed successes, they're typically a part of the base proposal and the base sale that's made.

Grad: Absolutely.

Williams: IDMS usually comes in as an add-on, because once the customer has lots of CPUs and has become reasonably independent, he will look at migrating to another system. But the first few systems any large customer would install and he got a piece of hardware and a CICS, IMS and a language and a few others, in a standard proposal. Once that deal was made then you have what I call the follow-on market where everybody's free to try and get the guy's attention to sell him something. That's mostly where the applications stuff operates. Sometimes it operated up front. But usually that's what I call the follow-on market.

But there's a different history for PCs. You don't get a PC without an operating system. Because Basic is built in as part of the system (which I think is probably a terrible mistake) a lot of people really don't think through what they want in the way of a language. Because you got one for free. I have to fork out another $100 for PASCAL or what have you. But Basic's part of the deal. And then there's a whole other world out there. That whole other world of applications out there is where people were competing. And so that really in a sense is where the line was drawn.

Grad: And the results can reach so far. It may change eventually in the future. But as of now, as you get closer to the operating systems area, even though they're all priced and let's assume essentially fairly priced now, there's really no significant competition, no major firm competing with IBM's mainframe operating systems. Each of the firms that have been very successful in the mainframe software area has a "rock" as a base, someplace they started from. They built their business upon that rock whether it was utility programs or fourth generation languages or data base systems. They all have a rock. No one has made a rock of the mainframe operating system.

Williams: Except in the microcomputer field.

Grad: But in the IBM mainframe area, IBM continues to get those sales.

Johnson: It sounds like what you're saying is that the critical factor is the way IBM markets.

Williams: There's consistency on one hand where let's say this is stuff I have to have to run a system with that being part of the initial deliverable.. There's another point where CICS and IMS usually are part of the modern-day proposal. And that violates that principle. I can run the hardware without CICS or IMS. But it's quite a different characteristic selling those things rather than selling something which I consider to be a follow-on.

Grad: The fact is it has to be application driven. Whatever you're going to put on the system drives your selection of the data base management system and the data communication system. You're usually buying a lot of the hardware today as a replacement because of better performance or better price. But in a lot of cases the decision is application driven.

Williams: Well, prior to 1969, proposals for applications were for batch programs. After 1969 proposals for applications were for online interactive programs. And that absolutely requires something new to handle it.

Grad: It's accidental. I don't think there's any correlation. But the unbundling is sort of the time warp between the batch system that was the dominant thing being sold and now the online system.

Williams: Totally coincidental.

Grad: There's no relation between those two. But it did mean you had to clear the decks to some extent. You had a whole bunch of new applications to build, all of which are DB/DC oriented. So it's not a matter of the old applications disappearing because the old batch programs were still around. But you suddenly had an environment which needed a whole bunch of online stuff. There was some interactive application earlier, before online transaction processing, and then there was practically nothing.

Johnson: Well, that's a fascinating observation and I think that's a good place to conclude this interview. Thanks so much to both of you for your time and insights.