Intel 386 Microprocessor Marketing Oral History Panel

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Rosemary Remacle: Dave, would you please give an executive summary of Intel's decision to sole source the 386, breaking with a long-standing semiconductor industry tradition?

Dave House: It's hard to imagine that the 386 and its prodigies, the 486 and Pentium and successive processors, weren't always the predominant architecture at Intel. In fact, in the early days they weren't even the primary architecture at Intel. Shortly after the 8080 was introduced, Justin Ratner, an Intel Fellow, came up with an architecture he called the 8800. It was an object-based architecture and he proposed it as the follow-on architecture for the 8080. Gordon Moore decided he needed a panel to advise him. So he appointed a committee to evaluate this new processor architecture made up of Terry Opdendyk from the software side, Ted Hoff, the original creator of the microprocessor, and me since I was from the minicomputer industry and one of the few senior people at Intel that wasn't a semiconductor person. Gordon scheduled an executive staff review and called the committee in to make a recommendation but the committee could not agree on anything. Terry Opdendyk said, "This 8800 is going to be God's gift to mankind, it's object-oriented, it's going to make programming so much simpler and less expensive." Ted Hoff said, "Well on one hand this; but on the other hand that. It has these advantages; it has these disadvantages." And I said, "This product is a dog. It's going to be slow. It goes to memory so many times before it ever pulls an operand out, it's just not going to solve the problems." Carver Mead had been invited by Gordon to that meeting to hear the presentations and review this proposal . At the end of the review Gordon turned to Carver and Carver said, "You know, I think we should do it. I think there's some value in this," and Gordon decided to fund it.

The 8800, became the 8816, which became the 432 and it was always positioned by its developers to be the next generation architecture. It turned out the 8800 was taking a little longer to get developed, so we needed a gap filler. We needed to do an 8085, which was basically a 5-volt-only 8080, answering Zilog, which was rapidly capturing the 8-bit marketplace with their 5-volt-only Z80 product. The 8800 next became the 8816 when there was a need for a 16-bit processor and it continued to evolve, but wasn't ready yet for release to the market. So we needed another gap-filler product called the 8086, a 16-bit version of the 8080 and 8085, and we developed that product. Of course that product and its 8-bit bus version, the 8088, became the product first used in the IBM PC and that architecture continued in future generations.

The market was next moving to 32 bit architectures so the 8816, which now became known as the 432, it changed its name again, was taking a little bit longer to develop so we needed another generation of gap-filler product behind the 8086. That became the 286.

About the time that the 286 was introduced in the marketplace, we defined what became of the 386, the 32 bit evolution of the 8086 and 286. There was a lot of controversy at Intel at that time as to what the next generation "gap filler" would be. There were three competing proposals. The P4 was a completly new architecture out of the Santa Clara group that had defined and developed the 286 and its predecessors, but broke it with binary compatibility to overcome some of the 286 architectural limitations. The P7 was a next-generation 432. There was this idea, kind of in the background, not really official, to do something completely binary compatible. That became the real 386.

I had been running the microprocessor group from '78 until '81 and in '81 I moved over and ran the development systems, and Phil Kaufman came in from Andy's staff and ran microprocessors for a year.

During that year, the P4 and the P7 really were defined and the architectural battle began. After a year I was asked to come back and manage microprocessors again in addition to development systems. There was a great pressure from the executives, from Andy Grove, and from Les Vadasz, to unify this activity. One idea was we'll put the P4 and P7 on the same IO bus and it will therefore, be able to use the same peripheral chips and that will minimize our development costs and we'll have two parallel developments, the P7 being the real future and the P4 as being sort of this backup or gap-filler or interim product. And that gave birth to the big bus war that you'll hear about in the tapes about the 386 and eventually that strategy of a common bus was abandoned. At the same time, the P4 wouldn't run the binary software available for the 386, and we'll hear more about that also.

Traditionally, semiconductor companies in the early days had second sources for their products because production wasn't that predictable and yields weren't predictable and quality wasn't that good. Buyers would insist, and particularly the Government would insist, on multiple manufacturers. When I arrived at Intel that was a common practice and we second sourced our successful products. I arrived out of the minicomputer business thinking, "This doesn't make any sense. We spend 15 percent or so of our revenue on R&D and our competitors do the same and we work to define products and develop products to beat the other guy and when that's all done and the marketplace has finally decided that we win and we've got the best product, we give it to our competitor! How does this make any sense? I don't understand the second-sourcing thing."

When the 386 came out, we had fairly well established ourselves with the previous generations. The PC was taking off and going crazy and we had developed the first 32-bit compatible version of this product line, a big major breakthrough. There were a number of us at the company who said, "Why do we want to give this to our competition? Isn't there a way that we can make this be a sole-source product?" So we came up with the strategy for not second sourcing the product while meeting our existing agreements with our existing second sources - who were not performing. Was there a way that we could make the need for a second source not required? We came up with the strategy that we'll manufacture this in multiple fabs, so if there's ever a fab problem, an earthquake or a fire, we'll always have the other fab to depend on. The 386 was very successful and had great acceptance in the marketplace with it’s 32-bit linear address space. This was the first time we had offered a 32 bit address space in a compatible way that ran the 16 bit software that was in the software stores, the binary shrink-wrapped packages that existed by this time. We run that older 16 bit software directly on the machine with the advantage of the 32-bit architecture. There was such a great, compelling demand from customers that we were able to actually introduce the product without a second source. From that point on, the whole industry was changed. Today, people don't second source their successful products. At one point before the 386, it was common practice; after the 386 it wasn't done anymore.

Remacle: All right, if everybody would introduce themselves, tell how you got to Intel, a little bit about your background, what your role was relative to the 386 launch, go-to-market strategy, and what happened to you afterwards.

Melissa Rey: Great way to start out. Hi. My name is Melissa Rey and I joined Intel in 1978. I participated on the 386 launch as the MarCom representative doing all of the advertising, public relations, trade shows, and interfacing with the advertising and PR agencies. I stayed at Intel in different capacities afterwards until 1988, after the birth of my third son, and then I decided I couldn't be an Intel employee and a full-time mom, doesn't work. <laughs>

Claude Leglise: My name is Claude Leglise. I joined Intel in July of 1982 straight from school. My first job was product marketing engineer for the 8086 and 8088 families working for George Alexy. In the winter of 1983, I took over the 386 Marketing Manager position when Jill Leukhardt moved to a different job, and I stayed in that job until 1986. In the process, I lead the taskforce that introduced the 386 to the marketplace. In 1987, when my boss, George Alexy, left Intel, I became Director of Marketing for all microprocessors and kept that position until 1989. By that time, the 386 was contributing about half of Intel's revenues, so it had grown from an idea to a major contributor. I stayed with Intel until the spring of 2005 in a variety of different positions.

George Alexy: Hi, I'm George Alexy. I joined Intel in '77. I came in as an Applications Engineer. I was there three months and they handed me this chip called an 8086, the first ones that came out of production, and told me to go show it to customers. I stayed with the applications and then into marketing for microprocessors and by the time we got to the 386 I was the Product Marketing Manager for the entire Microprocessor Division. The role I played primarily in the 386 was to hire a fabulous team of people and help orchestrate them to do an incredible job of defining and launching a world beating product. I stayed with Intel until '87 and then went off to do my first startup.

Dana Krelle: Hi, I'm Dana Krelle. I joined Intel in June of 1983 straight out of business school. Prior to that, I had worked as a software engineer with a computer science degree. So I was a little bit unusual for the new hires into Intel. I came into Claude's group after having been recruited by George, and worked on the 286 family initially and then Claude asked me to come over into the 386 group in, I think it was, early '84 and work on the positioning and pricing strategy of the product. So I was part of the launch team and did that. And then subsequent to the launch and the 386 go to market, as Claude and George moved on to other positions, I became, eventually, the Director of Marketing for the group through that time. And then I left the company in 1993 also to go to startups.

Jill Leukhardt: And I'm Jill Leukhardt. I came to Intel in 1980 as a Field Applications Engineer on the East Coast and I worked in support of the sales organization and working with customers teaching them about how to use and apply our microprocessors. I moved from that position to become a Regional Architectural Specialist and in that role I got exposure to the product planning process working with the factory in providing input into how our products should be planned. George recruited me in August of 1982 to take responsibility for the planning of the 386 and to do some of the initial marketing. After that I became the Strategic Business Segment Chairperson for microprocessors. After that I was Product Marketing Manager for high-integration microprocessors. I then left Intel and had marketing responsibility at several startup organizations and I have since retired.

Remacle: Claude, can you set the scene, what was going around Intel at the time that you started to talk about the 386?

Leglise: In the early 1980s, the market for microprocessors was very broad. There were four segments of approximately equal size. One was industrial control and automation with customers such as Cincinnati Milacron, Fanuc, Brown Boveri, who were doing everything from elevator controllers to nuclear plant controllers, just a wide variety of very hardware and software intensive applications that were embedded. The second segment was in the communications space. AT&T was a big customer, Ericsson, NEC-Abiko, building telephone switches and the very beginning of networking gear. The third

segment was office automation with names like Wang, Burroughs, Honeywell, NCR, Control Data, basically building office automation systems of all types. And the fourth one was a relatively maybe smaller market but benefiting from a lot of PR and attractiveness and that was the whole area of minicomputers, UNIX machines, and engineering workstations. Digital Equipment was a big leader in there with VAX. Hewlett-Packard was a major player. And other folks like Tektronics were pushing very hard in the area of graphics. So there were these four, very distinct, a very different type of customers and as a marketing organization and an engineering organization we had to build products and market products across this breadth of demands and requirements. The PC business was just starting, but remember, the PC was introduced by IBM in August of '81. The first desktop from Compaq came out in June of '84. So in the early 80's, that market, while it's holding a lot of promise, is not very large. The second thing that's going on is we are in a battle, constant battle, over architecture with our competitors. The design decisions are very technical. They are often made by engineers who are looking at bits, bytes, pins, temperature spec, performance, and we are constantly arguing against Motorola, and National Semiconductor, Hitachi, Zilog, and the list goes on. So, you know, this is a permanent architectural discussion that the marketing organization and the engineer organization are dealing with all the time. When we start planning the 386, we are at a disadvantage because 32-bit has become the sort of rallying cry of the software community as well as the press and we're getting hit constantly by, "Where's your 32-bit? The 286 is not good. I can't write software for it." And so we are attempting as hard as we can to win designs for the 286, and quite frankly, delay the fundamental decisions until we are ready with our 32-bit product. So the 386 comes out in 1985, there are already six companies that are out there marketing their 32-bit processors, the most prominent being Motorola and National Semiconductor. So the atmosphere in the Marketing Department, and to some extent across Intel, is one of, you know, as Andy would say, paranoia, great fear, great permanent battle on a daily basis against the competition.

Remacle: What about what was going on in the larger business environment ? As I recall there was-- times were tough in terms of recessionary pressures on the company to really watch their pennies. How did that impact you?

Leglise: Well, what I recall is about two months after I joined, there was this thing called the-- was it 90 percent solution?

Leukhardt: The 120-- 125 percent…

Alexy: …10 percent. <laughs>

Leglise: When, you know, I was told welcome to Intel, now your paycheck is cut by 10 percent. So that's sort of to illustrate how bad it was. <laughs> Then in 1984, things were really, really, bad, I mean, we literally had to lay off some people. So the environment around us was definitely not very good. Keep in mind that in the background, Intel's core business which had been DRAM, was cratering, fundamentally. So the mood was not joyful every day.

Alexy: I'd say the mood was practically panic of what do we do to survive and maintain our market position, grow our market position in the face of all this.

Remacle: At a more focused level, Jill, what role did the 386 play in the overall Intel strategic thinking at that point, going back into the 1982 timeframe?

Leukhardt: Well, when we were defining the 386, there was this overhang that it was seen as another gap filler as we talked earlier. And it was seen as a 32-bit version of the 286, if you will, and there was a new architecture that was coming that was seen as the be-all and end-all. That P7 architecture was being defined out of Portland and the 386 was something of a stepchild in the early 80s, in 1982. So it wasn't seen as the king and the savior at that stage. So, you know, in some ways we were feeling under-resourced, under pressure with an incredible sense of urgency.

Remacle: You were all a pretty young team at that point. Did you have executive staff sponsorship or people looking over your shoulders? Or was it pretty much a “making it up as you go” kind of thing?

Alexy: I would say we had direct interaction with executive staff members, Dave House being the primary sponsor for the entire microprocessor product line within the X86 architecture, but we had a lot of latitude with this team to make decisions and move quickly. We couldn't afford a bureaucracy of decision making and I think we had good people and we had good management that understood that and allowed these people to really make significant contributions in the definition and then the execution of the product from early definition through launch.

Krelle: One of the things that struck me about Intel after I started was I was, I think, no more than about six or nine months into the company and I was in meetings where the direction of the company was being decided and I was making contributions and participating and I really couldn't believe it, but I was having the time of my life. It was a great place to be.

Leglise: There were two things. First of all, you know, fear is an excellent motivator and being late to market and fearing for our lives, you know, made decisions faster, didn't have to collect too much data really to pick the direction. The other one was we very rapidly, around '83, '84, ended up doing things that had never been done before. So there really was no oracle that we could go consult and get the proper answer. So, you know, the fact that we were inexperienced somehow was a shared feature among pretty much among all the employees including the executives.

Alexy: Possibly an advantage, they weren't encumbered by the past.

Krelle: Yes, exactly.

Rey: People thought outside of the box, outside of it and it was encouraged. It was a lot of fun participating on previous campaigns of this sort as well as the 386.

Leukhardt: Well, I think another thing is that our customers wouldn't let us take our time. I mean, they were pressing us for 386 information. They wanted more information than we wanted to disclose.

Remacle: Were they asking for a 32-bit processor or were they asking for the follow-on to the 286, or…?

Alexy: They were asking for a 32-bit follow-on to the 286 for a vast majority of the customers. I mean, there were two things going on here. As Claude outlined in the different market segments, fortunately, we were out very early with the 8086 and it set an architectural tone with about a two-year advantage before the competition started to show up with their next generation processors. And during that period of time, we were able to garner a significant number of design wins in the markets that Claude outlined. Those people had made significant commitments in software development around that architecture. And these were these days when that software was primarily assembly language or written in an Intel-provided language called PLM and it was very difficult for them, it was expensive for them, to move from an X86 architecture to another architecture. So they really didn't want to do that if they didn't have to, but they kept looking to us for, "What's the next step that allows me to preserve that investment I've got in software, and yet be able to move forward to have more competitive products and have products that will be competitive with my competitor who may choose to select an alternative architecture such as the Motorola or National architecture." So we had that going for us, but it put incredible pressure on us to keep that ball rolling in bringing out new generations of the product that allowed them to preserve that investment. As Claude highlighted, this was all before the PC and once the PC took off, that massive software base, even amplified that importance incredibly. But even in the early 80 timeframe, that was a major factor for us and something we could not ignore, and if we did ignore it, we would have lost massively. There would have been a mass migration away from Intel architecture to others, so we really needed to keep that lock on our customers and help them move that forward.

Remacle: How did you incorporate customer input and amalgamate it in a way that you could make decisions around it as opposed to having people just having anecdotal discussions?

Alexy: Well, Claude and Jill spent a lot of time going out to customers, so I'll let them speak to that.

Leukhardt: Well, we spent, during the fall and early winter of 1982, a lot of time on customer visits, getting feedback against the architecture of the 386 and getting customer input and reaction. And luckily it was largely favorable and then we were faced with the decision of how much of that information to disclose, which was tricky because we knew we weren't going to have a product for three years and what we really want was to be using the 386 to sell 286s because that was the physical product that we had. And so, I can remember, you know, customers coming saying they wanted to learn about the 386 and giving 286 presentations and then tacking on the end about 8 or 10 slides about the 386, and, you know, trying to use that to satisfy their curiosity. All the while I had a knot in my stomach, you know, thinking, "Well, they're not going to be satisfied with this, but, you know, that's the best I can do."

Alexy: Not only that but at that point in time, the definition itself was fluid enough it was difficult to get nailed down on some of the specifics.

Leglise: At the beginning of 1983, I was using the same 8 or 10 charts that Jill referred to and, you know, it would take me about 4 minutes to give the whole presentation. By the middle of 1985, it was still about the same 10 charts, but I could present that whole thing in about an hour. So, you know, we really were not disclosing too much to the customers. In two years, I visited over 400 customers worldwide and my team was doing the same thing, you know, at different accounts. And so, we were constantly talking

to customers, part to sell, part to listen. The marketing team and the engineering team were very small, all in the same building, all on the same floor and so being able to collate the information we were getting was really not very complicated. The other thing is we had a very strategic advantage inside Intel. We had this organization that was described earlier called Regional Architecture Specialist. Those were very technical, very senior field application engineers and we would bring them, we would bring a portion of them into the factory every quarter or so to have a really detailed interaction with them over features of the product, features of the solution, and say, you know, "If we do this, what does it do to the customers? What are you hearing from the customers? What kind of feature do they want most, et cetera, et cetera?" So we had this very interactive process, very regularly with the customers and with our technical sales organization.

Alexy: They not only integrated from the customers, what the customers were looking for, but by being out in the field with the customers, they got an incredible amount of information about the competition. And they provided that input into it so we could do the analysis of if we do this, how is that going to compare the competition or where we think the competition might be going. It's like a chess game, you know, we're going to make this move, well what moves can we anticipate the competition to do and why do we still win? That was an early premise I learned and part of my Intel training was to always try to anticipate and at the end of the game, why did you win? How did you win? So that you would, you know, kind of map those moves out and the field people were fabulous at providing that backdrop to us.

Remacle: Melissa, in that same time frame, you were out there talking to press people or taking executive members out to talk to the press. What was the press response while the company was in this phase of its life?

Rey: Well, they were fascinated. We had press tours going out and we were trying to line up exclusive articles with different publications. I think we did multiple exclusives with multiple publications. But the interest was in... <laughs>

Remacle: Excuse me you mean, you had the same exclusive with different publications?

Rey: Yes, different story lines, yes. It heightened their interest though.

Leglise: There was a period they were giving us for dead...

Leglise: ...1983, 1984, they were giving us for dead.

Rey: So we had to get a level of interest going and we did that by providing them just a little bit of information. This information was presented by key Intel executives on press tours. The media bit the carrot.

Remacle: Was there a written marketing plan? Did you work off of something that you could check off and say, "Done," or, "We didn't make progress on this." Or can you talk about how you managed the process in a management sense?

Alexy: Well, Claude had developed a pretty extensive marketing plan and so I'll let him...

Leglise: Intel's an engineering company, right, it was and probably still is. So marketing was managed like a project and we had a very extensive marketing plan, spent months with Dana Krelle, Clif Purkiser [ph?] and some other folks thinking through the positioning, the pricing, how we would launch the product, how the competition fit. So we had a very extensive marketing plan, a very extensive schedule, project schedule. I even heard, somebody reminded me, that we even had a budget, which we'll talk about later, was actually blown substantially. But, so all of these things did not happen by accident. They were definitely written down, followed, tracked, and adjusted as time went on.

Rey: The marketing communication plan was detailed and by week, month and quarter and we followed that detailed plan carefully.

Remacle: Starting when? At what point did you start doing that?

Alexy: Late 1984 was it?

Leglise: 1984, yes.

Rey: Yes, in the middle of 1984, July-- because July was the drop dead date.

Leglise: No this was 1985.

Rey: Oh, you're right.

Leglise: 1984 was when we had the plan started.

Remacle: So the serious go-to-market planning started in mid 1984 sometime?

Alexy: Yes, the other challenge I think we had with this was while we had a marketing plan within the microprocessor group, this really was a company-wide activity and I think Melissa was working with the SBC board group, the software group, the debug tools group, to really bring a company-wide program together and influence them in their marketing communications plans to line up all of the things we needed to support a very extensive and complete 386 launch. It was no longer the day of just running out there with a chip and everybody would come and use it. I mean, one of the key advantages Intel also had was the extensive support and breadth of the product line that they offered. So I think a lot of time

was spent working across business units to bring everybody along. And it was difficult sometimes because they had their own agendas and they had their own P&Ls that they were operating on and their own budget constraints, but, you know, we got the thing done.

Remacle: Well, let me back up, because, Jill you made the point that you were kind of the stepchildren, the gap filler, and it seems like at some point you moved from being a gap filler to a central activity inside the company. How did that happen?

Alexy: I think my recollection of it was the relatively poor acceptance of the 432 in the market and the schedules associated with the other programs left the company no option other than to really double and triple down the efforts on the 386. It had the best chance of getting to market in a time frame that would allow the company to move forward.

Leglise: The P7 program was developing three very large chips. Each one was larger than and more complex than the 386 alone. And so as happens often in these large engineering programs, the schedule started moving out in the future. And there came a time in late '83 where we had to make a decision. We had to go with the 386 to market. And so at some point, I think, if I recall correctly, we said, you know, "The P7 program is totally critical, it will happen just a little bit later. Meanwhile, kids, go ahead with the 386 and make this one happen as soon possible." So I think that's really-- it was mostly, in my recollection, driven by an engineering schedule more than some big strategic whoop-de-do.

Leukhardt: I think that's true. I think in addition to that the whole PC phenomenon was...

Leglise: ...just starting.

Leukhardt: ...was emerging at the same time and the value of the software base of PCs was starting to become more and more obvious and therefore the value of a compatible 386 was also becoming clearer.

Remacle: Okay, so following on the last question, what were the strategic liabilities that you had to build into your planning process? You were late to market, what else?

<laughter>

Remacle: Claude, you wrote the plan.

<laughter>

Leglise: I thought there was a statute of limitations.

<laughter>

Leglise: Certainly the biggest liability we had was timing, was the fact that the product, the 386 that the customers wanted, or thought they wanted, was two years behind what the competition was doing. The other thing is we came at the marketing problem from fundamentally a hardware background. And keep in mind that a lot of decisions prior to the 386 in the days of the 8080, 8085, Z80 were made by hardware engineers who selected the best possible chip and then decided to build a breadboard and then wrote some code around that. We were very much coming at it collectively as a team from that perspective. And what was happening in the time frame of the 386 is that more and more of the conversation was not about the physical hardware but more and more about the software, about the compilers, the existing code the operating system. UNIX became a huge conversation to which we didn't really have a credible answer. We were trying to peddle Xenix, which was sort of the Microsoft equivalent of UNIX, with a rather limited degree of success at least in the engineering space. So we had these two fundamental issues related to our position in time and our maybe less-than-optimal understanding of the considerations of the software people.

Alexy: I think we were also dealing with the fundamentals of the architecture of the 286. Even though we were doing a 32-bit machine, to be honest with you, the 286 was considered to have a lot of baggage that wasn't necessary or appropriate and so we were dealing, from a market standpoint, not just with the timing, but the whole perception of the architecture. And a lot of the work had to go into nullifying that and moving people beyond that and shifting the whole emphasis of the marketing and selling messages and targets. So I consider that another major hurdle that we had to get past.

Leukhardt: George, you're being very polite about it, but to be blunt, people thought the 286 was ugly in terms of its architecture and its limits in terms of 64 kilobyte segments and the 386 didn't have those limitations and that was a key selling message and a key difference in its architecture and a key part of the positioning at the low level that had to be built into the positioning, it seems to me.

Krelle: It was really the case as Claude was just saying that although Xenix was offered on the 286, which is a UNIX variant from Microsoft and SCO, it wasn't very successful because it was on the 286 and it had to have a lot of compromises due to the 16-bit architecture, but with the 386, those issues went away. And as we'll see as we talk about things moving forward, the 386 and the Intel architecture beyond that became extremely successful in the UNIX marketplace and in fact, is the volume leader today.

Leglise: There is an old joke that, you know, God was able to create the earth in seven days because he didn't have to deal with the installed base. Software compatibility is a two-edged sword. On the one hand, it's terrific because all of your existing investment, all of the time you spent developing software is preserved by going to a new product. The down side of that is when you're designing the product, the next generation, it must be compatible. And, you know, we even learned over time that it was beyond the notion of software compatibility to actually be bug for bug compatible. Because if there was a bug in the previous generation and the software engineers wrote their code to work around that bug, you'd better have the same feature in the next generation. So software compatibility is very much this double-edged thing. Terrific business proposition, but it makes the job of the architect and the engineers considerably more difficult because they must maintain the path with the past.

Krelle: And in the language of software it's basically what we learned mattered was binary compatibility which was, there was millions and millions of at that time, floppy discs with software that people had for

their PCs or whatever machines they were running, that identical floppy, the code on that floppy in object code format, had to run identically. You couldn't have to recompile or something like that. And that was something, actually, that we also learned from the 186 versus 286 experience in prior products where the 286 was, in fact, identically compatible with the 8086, but the 186 was not. It was subtly different so all the code out there wouldn't run, some of it would, but some of it wouldn't and because of the "some of it wouldn't" aspect, it was unsuccessful going into those markets where binary compatibility was required. And so one of the key learnings that was in the 386 definition and that we carried forward as one of the main elements of the-- one of the main messages was that it was identically binary compatible. All the software that was already out there would run identically, no repurchase, no recompile. That became a major, major success factor for the product.

Remacle: How did you keep the engineering team, the product development team, how did you keep the linkage between what you were doing and what they were doing, what you were telling customers, what they were doing, how did you keep that all clean and organized?

Leglise: Jill. It started with you.

Leukhardt: Well, I think it was very easy. They sat on the same floor. They were feet away. We saw them passing every day. They saw us passing every day, it was-- we would have had to intentionally ignore one another to avoid having conversations.

Leglise: I think Jill's being modest. Jill spent an incredible amount of time in her SBS role and the amount of time she spent with customers and her relationship with all of the other Architecture Specialists. You spent an incredible amount of time with the engineering people, one on one, working through what they were doing versus what we were learning from the marketplace and from the customers. I mean I distinctly remember you spending lots of time having lots of meetings with the engineering team to keep them connected to what we were seeing from the customers.

Leukhardt: Well, I think that's probably true, and I also had a favorite refrain because engineers also have a tendency to want to make things better. And I wouldn't let things get made better if they weren't already in the spec, in the architecture definition, in the PRD, that is the requirements document. I would basically say to them, "What's changed? If nothing has changed, we're not making a new decision, you know, because that decision got made last week, last month, six weeks ago. We've already made that decision. We're not revisiting that decision."

Remacle: And how old were you when you did this, Jill?

Leukhardt: 25 or 26. We were all young, though.

Alexy: Aren't we anymore?

<laughter>

Leglise: One of the ways we kept the engineering organization and marketing and sales very much synchronized is that we actually used the engineering management, in particular John Crawford, Gene Hill, in a lot of customer visits. As soon as we had to get technical-- remember the customers are people who are designing computers. So they are very technical. As soon as it got beyond what the marketing organization could do, at least in the early days, we would get the engineering management involved. And so we had this-- it's not like marketing was acting as a filter for the inputs to the engineers and visa versa, the engineers were not providing or drifting, if you will, from what we had agreed upon. So it was a very small team, but very cooperative kind of work.

Remacle: Let's talk about the positioning of the product. That's always a huge activity when you're getting ready to launch a new product. What were the key challenges when you were thinking about how to get this product positioned? You had to position it against external competition as well as some internal competition. You had to position it for the current status and for the future. So how did you approach those challenges? Who was the driver of the positioning strategy?

Krelle: Well at that point in time, that was my job, so I can comment first I suppose. So the main elements were actually made up of the same things we've been talking about in terms of the environment where the main elements that we wanted to bring to bear were the software advantage of the product. That the key advantage of the product was it brought forward not only the binary compatible software base from all the different markets that we had already been successful in the past, but because the 386 now was a full 32-bit architecture, it had all the same architectural underpinnings that were present in IBM 370 series mainframes and digital VAX series minicomputers so that the entirety of software from all those machines were available and could be, with time, brought on to the platform. Many of those came with the UNIX operating system and that was available to us to be part of the advantages of the product as well as the binary compatibility of the software base. The other things that we brought to bear were the raw performance of the product was quite good. The engineering team had done a wonderful job of making the operation of the product be faster than the fastest product that Motorola had at the time, which was our main competition. If you remember back in those days, in 1984, the 68000 series had their most significant design win outside of machine control which was the McIntosh computer from Apple. The Macintosh was already shipping out in the marketplace and was generally viewed as the market leading personal computer.. [Our challenge was to take over that leadership position from the 68000 and the Macintosh computer. DK 11/09[

Leglise: The positioning of the 386 really started on a white board and we started with a long list of potential features and then started drawing these two dimensional charts that had one feature versus the next and plotting the 386, other Intel products and all the competition. And what we were looking for was, you know, where are we meaningfully different that we can build a marketing story around? Because at the end of the day, on all the basic stuff like 32-bit and software, you know, we were the same. We were offering the same capability as Motorola and National had for some time. What we ended up focusing on was performance, of course, where the 386 was clearly better, software compatibility with the largest install base which also was clearly better. But we also were looking for, what we used to call the blue granule, and this goes back to marketing of detergent where if the detergent has a blue granule it washes better. We were looking for the 386 blue granule and we found it in this thing called the virtual mode which allowed, theoretically, the operation of an existing 8086 piece of software within the protected environment, 32-bit, of the 386. That eventually resulted in a positioning that said we could run a legacy operating system, MS DOS, and a modern future operating system, UNIX, at the same time. And the day of the introduction, the cover of Electronic Design, which was the engineering bible at the time, has a die

shot and two pictures of records (this is long before CDs) one has an MS DOS record and the other one is a UNIX record and shows the 386 playing those two thing simultaneously. So the positioning was a combination of 32-bit, we are the same as the other guy. Software, we have more than they do, but then this little sizzle, or blue granule, that was radically different and made the product in the engineering community something that they had to look at.

Remacle: At what point did you bring in the outside folks, the Regis McKenna team and Chiat/Day, and what contribution did they make to the overall strategy or did they just execute against what you guys had created internally?

Rey: When? We brought them in…

Leglise: McKenna for PR probably 1984.

Krelle: Pretty early in the process.

Rey: A Regis McKenna team was brought in very early and they were really good contributors from a strategic messaging position. Chiat/Day came in later and they executed to our plans.

Remacle: Okay.

Alexy: Did you have Page Alloo work with you on the positioning? Because what you talk about was the classic Regis McKenna positioning process where you say, "What are the one or two things that differentiate us and make us clearly better than the other guy?" And those are the things you absolutely focus on and drive because the other guy can't react to it. It's your checkmate chess move.

Leglise: I don't remember that the PR agency was involved in the positioning exercise. I remember that they performed a pretty extensive audit of the feelings of the press at the time and the analyst community and gave us some feedback on, you know, how were we perceived. And from there we were able to create a meaningful message that would position us differently and not just be-- remember we were the seventh 32-bit processor to go to market so we had to do something that was radical. Otherwise we were just going to be, "Me too." You know, we could see the headline, "Intel Announces 32-Bit Chip Three Years After Motorola." And that just was not what we had in mind.

Remacle: Did the emerging RISC architectures play any role in your positioning thinking.

Krelle: I think that came later. I think that was a few years down the road.

Remacle: Okay, it was not in that time frame. And you mentioned earlier, I can't remember whether it was George or Claude, one of the two of you mentioned either the whole product or the total product

strategy to announce more than just the chip. Can you talk about how you got to that? Was that a conscious decision? Or, did you just wade into it slowly?

Alexy: It was absolutely a conscious decision. We effectively-- since I'd been at Intel in '77, it had always been a solution sell. When we came out with a processor, we had the bus controllers and the clock chips to go with it. We did an extensive amount of work to make sure that the bus timing was compatible with the EPROMs and the peripheral devices and worked with SBC group to make sure they had board level products, worked with the development system people to have PLM compilers and assemblers. It was always a broad, total solution approach. And I think that carried on right in through the 386 and even beyond that after I left I assume the same process continued to be taken.

Krelle: It got even more complete [in subsequent generations] because then the company in order to guarantee go-to-market strategies entered the chipset business and then the mother board business beyond that just to make sure that the complete solution was there to be able to hit the go-to-market schedules.

Remacle: And how did you orchestrate across all the divisions or business units to make sure everybody's product hit the market at the same time? I imagine you had to hold some people up, I mean how did you get that to happen in a company of strong-willed people?

Rey: I know that, looking back at some of the documents, just the people that were involved from a marketing communication perspective, I had the account managers from all the affected business organizations in meetings with us, so they worked with us.

Leglise: But we have to explain something. While we did announce the whole product family on the same day, chip, software, mother boards, all kinds of things, not everything was available. The chip was ready, it was working well enough, but the compilers were not ready, and the boards were not ready, so we co-- the way this whole thing came together, at the executive level, Andy Grove, Dave House, aligned all of the operations behind the 386 and the management was all committed to having products that would support the architecture over time. At the marketing level, we started a weekly or twice-a-week taskforce to get all of the marketing management, all the marketing communication management, on the same page and all focused on this date of introduction with collateral press releases and, you know, at least the semblance that the products were real and were coming if we could not deliver all of them simultaneously. So it was really at two different levels, management agreeing that this was the right thing to do and putting the strategy in place, and then at the tactical level, just the grind to make sure everything is ready.

Remacle: Once the strategy had been made public, what was Motorola's, National's, reaction to it? Could you see any visible change or response from your key competitors?

Alexy: That was-- I think they were confused and I think they were put on alert. I don't recall seeing anything significant coming out of them in response to it, so I think they were struggling with what to do.

Remacle: What about your customers and can you talk a little bit about how you built on the idea that you fed them bit by bit, what you, George, were quoted as calling the strip tease strategy?

Alexy: Well it was all about maintaining their interest and I think somebody made the comment earlier and delaying the customer's decision to commit to an alternative 32 bit architecture while we were getting the 386 ready to sample. And it was all about how do you continue to entice them and feed them bits of information over that two year-- two to three year period, to you know, keep them focused on committing to the 286 in the earlier days with the eye toward getting to the 386. But there was a very specific and-- amount of energy and time that went into "Okay, what is it we can disclose at these points in time?" And it was well thought out and orchestrated and planned. You know, this-- I don't know, was it quarterly we had-- We had regular intervals by which we were going to release additional information, and decisions made on what additional information was going to be released at each of those points.

Krelle: Although there was a point in time where we did come to-- in terms of the lead time for our customers to be able to actually get to market with a product using our product, there was a point in time where it was like "Okay, now the door comes open, and the full amount of information is shown," so that in fact they could be ready. Because one of the other things that we wanted to make sure and do to, if you will, we were coming from behind and we wanted to make the perception after launch all of a sudden come from being behind to being equal. And to being in fact probably being the most advantageous product and a leadership product, versus before coming from behind. Part of that was to get as many customers, and as many highly visible customers, to come with us and launch at the same time. And in order for them to get there at the same time, or at least be willing to say their name out loud at the same time, they needed a full disclosure at some point ahead of that so that they could get comfortable with it, and get their designs under way, and so on. And that was part of the orchestration process as well.

Remacle: Who led that effort?

Leglise: I guess we all did. The striptease strategy was a-- Yes, the implementation of the striptease strategy was a very orchestrated process. George described how we had mapped out by quarter what feature we would release to the marketplace, to the customer base; we also had a plan for collateral. We started with the eight foils that Jill talked about earlier, then it went to 12 foils, and then we had the four-page datasheet, and then the 12 page datasheet. Eventually we ended up with a book. We also were tracking by account, by customer, who had received what, so if we had a meeting 90 days later we would give them the next installment of the meal, so to speak. So this was all very, very managed and very controlled. My sense is it worked by, you know, we-- It's hard to say that we lost any existing customer to the competition, whether they were-- Certainly no 286 customers, and I don't believe we lost a lot of 8086 customers. The proof is in July or August of 1985, so just a few weeks before we launched our 386, we celebrated shipping the millionth 286, which at the time was just an astronomical number. So, you know, we were able to hold the market through some proactive and sometimes clever marketing and sales strategies so that we could be ready for this product we loved.

Remacle: It sounds to me like the press was implicitly involved. In other words you were "strip teasing" the press and the analyst community at the same time?

Rey: We were out about a year, year and a half early talking to the press, and giving them, feeding them the bits and pieces we wanted them to hear also. We had to get them buying in and believing that the 386 was going to be the most revolutionary 32 bit processor.

Alexy: I don't recall if they actually were publishing anything.

Rey: No.

Alexy: But I mean we were out there talking to them.

Rey: We were talking to them. Yes, we were talking to them.

Krelle: But we didn't give them enough so that they could...

Rey: They could write anything.

Krelle: ...write any real detailed comparison article and trash us.

Remacle: That you could be held accountable for?

Rey: Yes.

Krelle: The worst thing that could ever happen is that somehow we got trashed before we were ready. And so it was part of the careful disclosure of information.

Rey: And we really cultivated the editors. We cultivated them. I mean, it was 'take an editor to lunch', and just we really built a relationship with them.

Leglise: In the press it sort of went in three phases. One was "Is Intel real? Are they really going to have a follow on to this 286 and 186 that they're selling today?" this is in the '82/'83 timeframe. Then it was a phase of "Well they're talking about this 386, but is it really going to be any good?" And then as we got into '85 towards the introduction, it turned into massive speculation. And of course the speculation that everybody was happy about was "Is IBM going to use this?" IBM had announced the 8088 PC in '81, the 286 based PC in '84, and so the question was "Will there be a 386 PC from IBM?" Of course you know we were all doing the 'nod-nod, wink-wink' routine, like "We can't tell you about this." But every time there was an article, and I remember one in Japan saying "IBM is building a 386 PC," we'd say "Sorry, we can't talk about that." And so we actually-- while we were not releasing any information about where the chip really was, and what the features were, we were certainly encouraging speculation of the right kind.

Rey: There was even documentation that if leaks occurred, that was all right.

Remacle: Just certain kinds of leaks perhaps?

Rey: Yes. Well if information got out a little bit early, we weren't going to take any action.

Remacle: What were the options that were discussed for the launch strategy? And I'm thinking things about timing of the launch. At what point in time did the launch date get cast in concrete? How big was the budget? How did you do a geographic rollout before the internet? What a thought. What was the pricing strategy? All of those kinds of things.

Rey: I just reread again that the drop dead date was in July, the mid part of July, for the announcement.

Leglise: But remember, as early as late 1984 we already were targeting October 1985.

Rey: October, right.

Leglise: For the public release.

Rey: Right.

Leglise: So that timeframe was set about a year in advance. But then the actual date, yes, there was a drop dead.

Rey: It was in July, before October, and it was based on product.

Leglise: I think that we ended up picking the exact day based on the cover date of Electronic Design, right? 'Cause they had so many weeks of lead time, and they could give us the October cover, which we coveted, and so that ended up being how we picked the exact day, is that was the day the magazine would come out on the stands, or to the subscribers.

Krelle: And the other part of it was that we wanted to have a date late enough in time that we could show the physical existence of the product. In other words this wasn't just speculation. And in those days there was a-- in the microprocessor market a lot of times things were announced years before they actually came into the marketplace, and that was common. But because we were already thought of as behind we had basically one opportunity to change the perception, to change the perceptual game. To do that we had to have a physical existence of the product, so we wanted to make sure it was late enough in time that we could in fact show that the product physically existed, worked, and we were in the game now.

Leglise: But if you recall, truth be told you know, if it had not worked, we were prepared to announce with a die photograph.

Krelle: Probably. <laughter> That would have been internal decision made...

Leglise: It had been done before.

Krelle: Yes.

Remacle: So how did you set the geographic, or plan the geographic rollout? Was it based upon customers? Was it based upon communication modes? What?

Leglise: The three major markets were still US, Europe, and Japan. Taiwan, China, was not that big of a market yet, Korea was not that big of a market yet. And so in order to get maximum impact with the press in each of those geographies we did a multi-geographic rollout. And I think we did the US and Japan literally the same day, we didn't want to do Japan earlier. And then we did Europe I think the next week.

Rey: It was actually, at least on the schedule, a day later. But I'm not sure if it transpired. But yes, it was well orchestrated. We wanted to get the largest bang we could, we wanted to make a lot of noise.

Krelle: So that the local papers in each place could carry the story and not be upstaged by somebody. You know, some wire or service somewhere else in the world, and so on, right?

Alexy: Right.

Leglise: The thing that was different about the launch of the 386 is that we went beyond the technical press, which had been the staple of media communication for processors in the past. We did get the cover of the major electronic magazines, but we went after the Wall Street Journal, Asahi Shimbun, Les Echos, Financial Times, worldwide. And so we didn't have, or we were faced with this notion that these are press organizations that react a lot faster than the trades. The electronic trades. And so that led to the notion that we had to announce in Japan, in the US, and in Europe pretty much at the same time. Because if we waited several days or a month, as was the norm in the past, then the news would be stale for this particular set of publications, and this set of audiences.

Remacle: Sounds to me like this was a pretty big budget relative to what semiconductor companies spent for launches at that time. Can you talk a little bit about that?

Rey: The marketing communication budget was in excess of two million [dollars], which was substantially larger than any individual product launch in the history of Intel. By three X?

Alexy: Almost ten. But we spent quite a bit on the 286 and...

Rey: Yes.

Alexy: ...Crush programs. If you put that all into one...

Leglise: Put it together.

Rey: We probably did $500,000 on that.

Remacle: How was this launch different from prior launches? Maybe ask the question that way.

Leglise: To go back to the budget question, to illustrate the budget difference, the typical advertising campaign prior to the 386 I remember vividly was a $125,000. That included the development of the ad by Chiat Day, and then six insertions in the trades. When we proposed to spend $70,000 one day, one insertion in the Wall Street Journal, I had to go see Andy Grove in his office, the first time I was kicked out. This was an outrageous number. Andy being Andy, after some data and some thinking, we ended up doing it. But my point is, with the overall budget, we were way beyond what had been the norm before.

Remacle: And was that norm just for Intel, or was that norm for semiconductor companies in general, or can you even respond to that?

Alexy: If you just look at the-- for example typical Motorola processor launch, it was much along the lines of what Claude had articulated. They came out announced it, put out press releases, there was an ad, maybe a series of ads that would run, and that was about it. That was the standard for doing a launch.

Rey: Another thing that we did with the 386 when we did start coverage, and we did go into Wall Street Journal for the first time, we went dark across all other product lines, which we had never done before. We had never shut down advertising on all of the products as we did when the 386 was launched, so that all focus, all attention was 100% squarely on the 386.

Remacle: Where did that decision get made?

Leglise: Dave or Andy. <laughter>

Rey: I don't remember. <laughs> It's 25 years ago.

Leglise: That was way above our pay grade at the time.

Rey: Yes. <laughter>

Remacle: What were the key marketing objectives for the 1984-- in the 1985 timeframe? You know, I'm thinking back to the old MBO process where you had three or four things that you were trying to accomplish.

Krelle: I think it was basically make sure that the 286 business stays strong and is unaffected, and then get-- put the 386-- get the 386 launched with the effect that you're now completely in the game, and in fact you're perceived as the advantage product in the market.

Remacle: What about customers? You talked about that you'd given them, Dana, you'd given them some advance notice so they could start planning their product so that they'd be ready to stand up with you.

Remacle: Which customers did you work with by segment? And what about the whole issue of high end, and maybe both you and Jill can talk about that a little bit.

Krelle: Well I can start with just the one I know the most about, which is the PC segment. And the interesting story about that is that IBM, as Claude had said, introduced the 8088 PC in 1981, the 286 in 1984. They really weren't ready to go to do another one in, certainly in 1985. I don't know if it's 'cause we weren't going to be in production until 1986, but they weren't ready to-- they didn't think they would be ready in 1986 either. They gave us a nice comment for the announcement, but they really weren't ready to commit to going to market at that time, they wanted to stay on their every three-year cycle and go to market in 1987. So we needed to find the companies that would carry the banner and go into production when we were ready, which we projected would be about mid 1986. So we talked to a lot of customers and at that point in time there was a customer willing to be extremely aggressive in going to market with us, after a lot of talking, consideration, full disclosure of the product and so on. And that was at the time very small company that was just a start-up from a few years ago called Compaq. And they had the same idea as us, to make a-- this was something that could change the perception of their company, could put them into a whole different league in terms of how their company is perceived, and the stars were aligned and both companies were interested in the same thing. And Compaq became our probably flagship standard-bearer for that launch. And then things went so well that continued then thereafter. But I think there were some other PC customers that also went to market at that same time, although Compaq is the one that changed the per-- got the greatest perception, benefit, coming both ways. Other segments, there were several other customers too. Do you remember exactly who Claude?

Alexy: You had a list of them.

Leglise: We talked about how in 1984 the marketing objective was to hold the market for the 286 and get the design wins. Sometime in late 1984 or early 1985, I don't recall precisely when, we switched to trying to get design wins for the 386. At the end of the day we ended up with 30 companies ready to go the day of the announcement in October of 1985. But the marketing plan specifically called for winning IBM and AT&T. Those were the two flagship customers that we really, really wanted to win. It turns out that the wins we had there were soft, and history proved later that other companies went to market earlier than

those two. But by the day of the announcement AT&T was prepared to support-- in fact announce their support of the 386 with Unix System V. But the rest of the design wins were a broad cross section of customers. Fanuc, Cincinnati-Milacron come to mind. Wang was a design win. IBM, as we said before, was working on some project of one sort or another. So again, they are the launch 30. So the switch in the marketing goals happened about nine months before the launch.

Remacle: Okay, Claude was making the point that AT&T and IBM were the must have design wins. What happened with IBM?

Krelle: Well IBM gave us a very nice release for the press kit that basically said "We congratulate Intel on this wonderful product, and although there is no immediately forthcoming product from us we continue to look forward to evaluating and eventually putting it into a product." And at the time, you know, they basically had their ways of doing things. Their 286 product was still pretty recent. Additionally, IBM had a second sourcing arrangement with Intel for the 286, so they wanted to actually spend more time innovating on the 286, taking it to higher clock rates by putting it in with the CMOS [manufacturing process], and get a lot more marketability and business out of that product family before they moved onto the 386. So they eventually did come to market in 1987 with the 386 product, and it became very, very successful for them and for us. But we needed people who could go to market on the front end of our product schedule, which was to go to production in 1986, and also to be able to launch with us then in October of 1985.

Remacle: And you say Compaq was the key...

Krelle: Compaq turned out to be the most willing to be aggressive company, which was probably no surprise in hindsight because they were in this-- they wanted to also get put on the map. It's hard to, you know, imagine back to that time, but at that time they were not the major power that they became later. They were still only a few years old start-up, right, at that time and were still looking to make a name for themselves, and to get considered in the same league as companies like IBM, AT&T, Digital Equipment, and so on.

Leglise: Inside IBM it was counterintuitive that office automation desktops needed 32 bit architectures. Many computers did not have 32 bit architectures. IBM had a different architecture called 801 or RT, for the engineering workstation space. And so the notion that we're going to buy a chip from Intel to build the PC with 32 bit was just not sort of socially acceptable. And they were not aggressive in using the technology. In addition to having their own internal plan to take the 286 forward for many, many generations.

Krelle: And as I mentioned earlier one of the advantages of the product was that IBM mainframes were 32 bit architectures, and now the 386 had obtained that same capability with all the other aspects like demand paging, and so on, to manager virtual address spaces for applications. And so, yes, IBM saw difficulties in inserting a 386-based product within their overall product line.

Alexy: Well they were struggling with their own product position.

Krelle: Yes, exactly.

Alexy: And the PC was becoming a major factor. As you said, they had this 801 product that was a more of a midrange office automation, workstation type product. So they were trying to rationalize their own product families of where they were going to invest. And you know, I think they wound up making some decisions to take some of those products off the screen and really focus on the PC and their mainframe business.

Leglise: And keep in mind that in those days a PC AT sold for about $6,500, and then an 801 base workstation was $15,000 a knock. So the notion that you're going to have a $6,000 box with essentially the same capability as the $15,000 box was not palatable to a number of executives.

Alexy: Yes.

Remacle: As you were coming down to the wire, marching from May, June, July, etcetera, towards the launch date, were there any key hiccups or challenges either on the product, or with the press, or with any of your planning that kept you up all night worrying about it? Or did it just go smoothly?

Alexy: The chip scheduling wasn't going to work when it came back. <laughter>

Krelle: It was all about "Is it going to work on first silicon?"

Leglise: Keep in mind in those days getting a chip of that complexity, I believe it was 275,000 transistors, which was the biggest Intel had ever designed in the logic group. Getting a chip of that complexity to work on the first stepping was rare. And so the introduction and the degree of hoopla we could create for the introduction was deeply a function of 'does it work or not?' And, you know, if anything kept us worried until the last minute, it was "Will in fact the silicon work, and will-- out of the three lots in the fab [ph? This is correct] in Livermore, will one of them yield at least two or three chips that we can actually show?"

Remacle: And what was the result of that contest of the three lots?

Leglise: I personally don't recall the result of the three lot contest, but I do recall that we had chips that worked, and that was good enough.

Krelle: We had one that worked, that's all we needed. <laughs>

Leglise: For the launch, for the day of the launch when Dave House presented the product at the De Young Museum in San Francisco, he actually had a demo. Some engineer had kluged up a little card that would take a 386, and then the whole card with the 386 would then get plugged into a PC80286 socket, and Dave was able to demonstrate software that was running on the big screen. So it was way

beyond, you know, our nightmare of having to introduce with a die picture. it was in fact a demonstratably functional microprocessor that we showed to the world.

Remacle: Melissa, can you talk about any concerns you had? When you were laying down an ad strategy, you've got a long timeline that you're working with. How did the ad strategy come together, and how was it impacted by product release, or not?

Rey: It wasn't. I mean, besides that we had already bought all of the space. I think some of the interesting things with the 386 ad strategy is we decided in the headline to defuse any issue about being late to market, and we just brought it up as the topic. So the headline was-- I'm trying to think. Did we have the actual date on it?

Leglise: Yes. Yes.

Rey: "On October 17th 30 companies committed $75 million to a product that did not exist." And then you open it and there's a picture. "It was worth the wait", and then you go into the copy. So right away we leap-frogged to a leadership position. And another unique thing is the follow-on ads, all of these ads were at least three to six pages long, concurrent pages. And that was very unusual, and kind of changed the way marketing communications was done at Intel also.

Remacle: What was the reaction to the 386 launch? Field first? The customers? The launch itself I'm talking about, not just the product.

Alexy: Can you talk to the field? You were probably closer to them than...

Leukhardt: Oh, the field was wildly enthusiastic. Just beside themselves with enthusiasm. My-- I was not associated with the launch at that time, and my phone rang all day. Just...

Leglise: Frank Gill was the VP of Sales at the time of the launch, and we received multiple kudos from him and his organization for the level of visibility that we had been able to achieve. Again, in the technical media, but also in the business media, and how with-- You know, Melissa has explained how we-- with the advertising we turned this notion that we were late completely on its head. And effectively the sales organization never had to answer that question again, as to, you know "Why are you so late?" And the field was absolutely ecstatic. This was finally a product that they could sell without apologizing. And they had apologized for two years, or three years.

Remacle: How did you bring them on board prior to the launch, with training and so forth?

Alexy: I don't remember the timing <inaudible>.

Rey: We had field training.

Alexy: Definitely. But was it before the launch, or was it after?

Krelle: Yes, it was before. Oh, it had to be before because we wanted them to be able to be active on the day after the launch to go reap the harvest now, of all the additional design wins. And finally all the information was out on the table. You know, no more, you know "Can't tell you about this, can't tell you about that." Now they can go full bore on getting design wins now for the product. So my recollection is we did it-- We didn't want to be too early because we didn't want things to be kind of leaking out and spoiling the impact. So I think it was pretty close to the vest in terms of only about four weeks maybe, something like that is in my-- something pretty close to the entry date.

Leglise: I don't remember how we did that.

Remacle: And what about the press and analyst community, what was their response?

Rey: Overwhelmingly positive. I mean it was-- we got tons of articles out of it, the coverage was extensive, the ads won Cleo Awards.

Krelle: As Claude had mentioned about the cover that we received on Electronic Design, they understood the message of the software capability of the machine, and how unique that was in terms of being able to bring together all these different software bases.

Alexy: And one comment I would make is that in terms of the selling of the 386 to the customers, even prior to the launch, there was a major shift in strategy of going after upper management, not just the engineers making the decisions. Or the engineers actually weren't making the decisions, they were involved, but we pushed the level of decision making up into upper management, because it was a business decision as much as a technical decision of where they were going to make their investments. And that was a significantly different approach, I believe, that really-- We did some of it back in the 286 when we did the crush campaign, but it was much more a part of the focus of the 386. And I really realized the impact this was having when we did the launch in Japan, because we had a dinner afterwards, you know, we made our presentation, and then we had a receiving line of the people that had come to the announcement in Japan. And they were all upper management people. There weren't engineers-- there were probably some engineers there, but I was really impressed with the number of upper management people that had come to that announcement, and that launch event.

Remacle: And you had not given instructions to the field organization to make sure that those are the people that showed up? Those are the people that showed up out of their own interest?

Alexy: I think the field sales organization was onboard with that part of the strategy, and they wanted the senior management people there rather than the engineering people.

Leglise: As much as we had worked really hard to get Electronic Design, and Digital Design, and Electronics to cover the announcement on their cover, the one that was probably the most satisfying, if

you will, was to be included in the Wall Street Journal on their front page. I believe that had never happened for an Intel product before. So we actually were able to hit that business media that we wanted, that was followed by coverage in a number of business newspapers and magazines, as well as special report from Securities Analysts, which at the time was quite rare. Securities Analysts covering the 386 as a chip, its implication for the future of Intel as well as its implication for the future of Motorola and National in the computer business. So this was really very, very new for us. It was deliberate, but it was very new.

Remacle: What about internal recognition? You mentioned the field sales organization…. were you guys given awards? Cheered as you walked down the halls?

Alexy: Well we got to keep our jobs. <laughter>

Leglise: Traditional Intel culture. It was probably a minute and a quarter of kudos followed by a list of 20 ARs.

Remacle: Here's your new job. <laughter>

Leglise: Things we hadn't done.

Alexy: One thing that the company did do that I thought was nice is to the core members of the team, an actual plaque was given and a picture of the chip, and then the person's name engraved on a little-- on a plate, with a chip mounted next to it. And I think those were given to almost all the members of the team, and that was a nice thank you.

Remacle: And how would you define "the team"?

Alexy: Engineering, marketing.

Remacle: And somebody said there was stock also?

Rey: There was stock associated with the individual achievement award.

Leglise: I have a much more personal recollection of rewards, in the summer of '85 for some reason I forget, we were as a company closed for several days and the entire marketing team worked through that week on the launch because the launch was coming in a few weeks. So that year I had not taken vacation and I worked with the entire team through that particular week. After this, I don't know if you remember, George, my first born was born on Christmas Day 1985, so right after the 386 and George agreed to give me six weeks off to stay home with my new son and so that sort of, as I said, a very personal memory of a reward that Intel was willing to give me and presumably other people.

Remacle: You talked just a little bit about the 386 being a bigger marketing splash. George, can we talk about (maybe not explicit or intentional) foundations that got laid during the 386 that led to more branding, a bigger marketing push by Intel for the microprocessors can you paint from 386 forward to where we got to Intel Inside?

Alexy: I think that's probably Claude and Dana were there, I had left in the 1987 time frame and a lot of that was taking place at that point in time so why don't you speak to some of these first steps that you took along that path.

Leglise: In some ways the 386 laid the path for what eventually turned into branding of chips and I think there are two seminal events. One we described earlier about targeting the business press which raised the awareness beyond the engineering community of what a microprocessor was and why this was relevant. The next thing that was in my mind, very important is in 1986 Compaq asked Intel's permission to use 386 in the name of their upcoming product and Compaq launched a desktop called "Desk Pro 386" in August or September of 1986. That then started an entire wave of customers from AST to NEC to Dell [ph?], AT&T and eventually IBM that used 386 as part of the name of their product. So what that did was push into the computer buyer's consciousness the notion that inside that box is this chip called the 386. In my mind those are the two things that really started it; by 1988 we were running advertising that showed photographs of six of our customers' products, six PC's and each had the 386 name in there and from then came the idea of, "Gee this is terrific, you know, they're using our product name, how do we get the Intel name in there, how do we associated with this, you know, all this awareness that we're getting?" We started designing the logos that had Intel and 386 that ended up being silk screened on the parts for a while and that eventually, through a much more complicated process that's not the topic of today's discussion, turned eventually into the computer inside and ultimately Intel Inside which again changed the completely the way processors are marketed.

Remacle: How much internal static did you get as you began to take a more aggressive branding approach or did everybody go "Yes, that makes sense"?

Krelle: The first time around when we proposed it and I'll let Claude speak to the details of this because he presented it and got the shot in the head the first time, but the first time we presented it was about 1988, something like that. Well we basically presented something that was very similar to what actually came to pass with Intel Inside, of marketing the ingredient of the Intel processor directly to end users so that you had to actually pull the product through the computer companies, if the end user base wants this in the product then they'll pull it through and the design wins become a much more straightforward process .

Leglise: The notion of letting the customers use 386 in the name of their product was maybe a little bit controversial but eventually was accepted and it was really a judgment call. The notion of branding and in particular spending large amounts of money on branding was much more controversial. The meeting Dana is alluding to is one I remember vividly in July of 1988 in the Santa Clara 9 Auditorium where I started the presentation with simply a logo of NutraSweet and asked people "Do you know what this is?" and on the second foil was a logo of Dolby and do you know what this is and interestingly enough pretty much everybody did know and so the whole theme was, you know, we should create a campaign like this with some sort of visual aid that will get consumers to associate our product with the computer and

recognize who we are. And we had an Intel 386 logo design. And I think the conversation went sort of okay until I explained the big part of the plan which was to buy television advertising time during the Seoul Olympics at which point Dr. Grove threatened in front of the assembled masses to throw me out of the company that very day if I didn't shut up. So the notion of branding was somewhat controversial at the beginning.

Remacle: Before we do a wrap up, in retrospective is there anything about the 386 launch that we've not covered today or the planning for the launch or anything that you think we should throw into the mix here or have we gotten everything you think ought to be there?

Alexy: Did we get enough on the geography of the simultaneous launch and the impact?

Rey: I'm not sure about that but even just launching the 386 at the DeYoung Museum, we had never done an event like this before. We even had musicians and catered food-- this announcement was so different than anything we'd ever done before.

Alexy: Usually you went into a Marriott Hotel and took a room and people came in, you gave 'em a pitch, gave 'em a cheese sandwich on their way out the door.

Krelle: And we usually did that, some time after the first ad hit and you were doing a seminar for design engineers to hear what the product's about and come use it and so on, this [386] was a whole different strategy on a whole different scale--

Remacle: Were the events in Japan and Madrid equally as sumptuous?

Alexy: Yes the one in Japan was and Madrid was just a big three day party.

Remacle: What better city to have one of those in. Okay let's go to the,"if you had to do it all over again is there anything you would do differently" question.

Alexy: I think the results speak for themselves, I think it was a fabulous team of people that just made something incredible happen with a lot of new ideas and total new approaches to how to plan, define and market and launch a major technology product.

Remacle: You alluded to this earlier, but the impact going forward on Intel launches was…?

Krelle: Well for processors, sometimes we launched with events still into the future and sometimes we didn't. It depended upon the product and so on. But one thing that did become the standard process as we went forward was a complete alignment of all aspects of what a customer would need to bring a product to market to align that all at the same point in time and then launch it at that time. And in fact once the business became as large as it did become, we didn't want to launch until not only the chip

physically existed but until it was actually in production and had already shipped many thousands of units into our customer base so that on launch day they would have machines in the stores to sell. Because the business became so big both for Intel and our customers that as soon as you launched the next big thing, the demand for the old big thing would go down and so you didn't want that demand going down until you had the product to replace it all the way out into the channel in the stores. We did the first example of that with the 386, learned from that and took it to the next logical next steps in succeeding generations.

Alexy: The only other really big marketing program that I was exposed to during my time at Intel of course was the Crush Campaign and that was not a specific process or product. it was a family of products to provide some call it air cover to the sales organization and increase the awareness of the products, to keep the momentum behind the 8086 generation of products. I think from a processor standpoint and I can't speak to the 486 or others because I was no longer with the company when they got to the launch of those, but I think the 386 may have been just a very unique point in time where as I said, it was crisis mode and it was all hands on deck to get this done and make it the most important thing that was in the processor world at the point it was launched and I'm not sure if the other products had that level of pressure on them, but I'd have to look to others to comment on that.

Leglise: George mentioned Crush and the 386 launch and to me those two speak to exactly the same point: which is a strength of the Intel culture at the time which was focus. And putting all of the corporate resources, all of the corporate messages behind a single program. This was the core business long before the expression core business was invented, and instead of doing twenty different things simultaneously, Melissa explained how we stopped advertising other products. So this was a critical strength of the culture and how things were done is once the target was picked, and my god it was hard to agree on what the target was. But once it was picked, then the entire company marched in the same direction, and lo and behold, you know, it worked.

Remacle: Were there other Intel Culture elements that helped you along or were there any that got in your way?

Alexy: I think there was a lot of good culture in how processors were managed for just an example there was this get your act together meeting called GYAT meetings and that's just a one little nugget of many different types of cultures and that was used as a coordination point in the tracking the schedules of products and transferring into product. It was those types of processes that I think allowed the company to manage the level of complexity that was going on in so many simultaneous events to carry off one of these programs, whether it was sales training or whether it was how marketing programs were put together or how products were developed or how products were transferred into production. There were a lot of good processes in place that helped facilitate those activities.

Leukhardt: I would say during the planning process the good old Intel constructive confrontation model certainly reared it's ugly head with great regularity but it was definitely of value, we definitely needed it rather than having people go away and gossip and connive and lobby one another individually and off in corners, you know, just dealing directly with whatever the issues were was the way to try and get things done.

Remacle:: On a personal level, we all have moments in our career where we go "Whoa, that's something I want to carry forward, I really learned something this time around." Individually, what was the key thing you took away from the 386 experience and Melissa I'll start down on this end with you.

Leglise: Good spontaneous remarks are well rehearsed and I did not rehearse this one. From a personal standpoint, from a lesson perspective, what I took forward in my career were the notion of focus, the notion of trying things that were different and something we haven't talked about. A lot of people noticed the hoopla, they noticed the advertising, they noticed the press coverage, they noticed the customers. Very few people understood the amount of thinking and planning that went into marketing this product. And so one of the things I took forward in my career as a marketer and later on in other positions was the execution is incredibly important but you can't just execute, you have to think about what you're going to do first with great degree of flexibility but it's got to be very well thought out up front. If it's not, the odds are you're spending your time and your money on the wrong things.

Alexy: I guess one take away I would have from it was it's all about the people, it's all about the team and the focus of us, there'd be a lot of focus and energy put into putting the right people in the right place with the right skill sets. I mean bringing Jill back in from the field with the background that she had, the relationship she had with the field was an immense help I think to the overall program. These gentlemen with their own backgrounds from a software OS writer to a fellow who had been a semi conductor guy and then gone back and got an MBA and was obviously very bright and very aggressive and very capable. Putting those types of teams together, bringing Bill Rash out from AT&T Bell Labs where he was one of the engineers on the ESS5 switch, putting the right team together to absolutely have-- and then empowering those people to let them do what they do and kinda get out of the way when you don't need to be there.

Krelle: For myself, I think it was very similar to what Claude was saying and that I took forward into the future positions. It was basically the notion of, and in the process of, picking the strategic affect you want to have with the launch or with the activity, whatever it may be and then making sure all the pieces that are necessary for your targeted customer and targeted audience to realize that vision. Making sure all the pieces are lined up with the appropriate planning and especially the appropriate lead times to make sure it all comes together. And then make sure you checkpoint it often enough so that nothing goes awry, that things can be kept on track and so on, I think I learned that from that [386] experience and I've used that ever since.

Leukhardt: The 386 taught me that I could just plunge in and do it, I came in out of the field, I hadn't planned a product and in particular I'd never written a forecast, I didn't have an MBA, I had engineering background and one of the parts of the product requirements document was a product forecast and I had to pull these numbers out of thin air and so I did, you know, it just had to be done and there were so many things about the 386 that were just like that and it taught me that I could do that and it's that lesson has stood me in good stead no matter what I've done in my life.

Rey: I would like to concur with a lot of the people here, it was the people, the building of a team that is so cohesive, the ability to execute and to do a plan and just go do it. The passion, everybody was passionate, I mean in my ten years at Intel and I was lucky enough to work on Crush and I was lucky

enough to work on Checkmate, but this introduction by far was something that I couldn't wait to get up and go to work, to work on, the focus.

Remacle: One last question and then we're done. Since this is a video tape that's going to go down in history at the Computer History Museum, what was the impact of the 386 going forward on the history of computing?

Leglise: In hindsight I think the 386 either did or participated in three important things, one is IBM lost the leadership, it's fair to say that Intel was prepared to do just about anything short of possibly exclusivity to get IBM to launch a 386 based PC and they didn't. Compaq saw the opportunity, made a run for it and the world of PC's was changed forever, to me that was incredibly important.

Alexy: I think from the standpoint of the Computer History Museum I think had we not done the 386 or had we screwed up or failed on getting the 386 out, there'd be a different architecture would be considered-- it wouldn't be the Intel architecture, I don't believe it would be the Intel architecture that would be the architecture of choice throughout the microprocessor world. We were at a critical juncture where had we screwed it up or done an architecture that was not software compatible that software base would have been. We would have forced our customers to retarget that software base to another architecture and it's highly unlikely they would have chosen an Intel architecture. Because when you cut 'em off like that they remember that. I remember when I first came to Intel, an Intel salesperson was not allowed in the lobby of HP from historical reasons and eventually that was overcome when the PC market to play in it they had to do business with Intel again. Even Apple ultimately did business with Intel, Sun ultimately did business with Intel and I think the 386 was a defining moment in establishing the X86 architecture as the architecture.

Krelle: That's exactly right, though for me it's basically as what George was saying . It was basically the coming together of all the elements now in a microprocessor because the transistor budget finally allowed it not only 32 bits but also compatiblity and bringing all the features and capabilities into the architecture that were present in the upper end machines in the marketplace all the way up to mainframes. Now what we've seen based upon the launch of the 386 and then what happened after it is that with time and with the march of costs down the technology curve was: succeeding generations of silicon and the advancement of the product itself for greater and greater performance starting from the PC all the levels of the computers above it, which at the time were all different architectures, all kinds of proprietary things hav, by this point in time now in 2008, been replaced, The X86 architecture is top to bottom in the market place, multi processor versions are in the mainframe world. There's really no more mini computers, there's just this span of server farms of a wide range of size. And it's even now migrating downwards into handheld devices and so on. It's really the start of the coming together of all these architectural underpinnings in the 386 and then the impactful way I think it was put into the market place, the rest has come about.

Leglise: I'll add two more thoughts, one is the way we marketed it to a broader community than the engineering community in large part because we had to. The most surprising thing is that our competition did not react to this very quickly. Motorola, National in particular just did not expand their thinking in light of what we had done and that was quite a surprise that we were able to change the name of the game, while the competition really did not truly understand what had happened for quite a while.

Alexy: I think to pick up on that, if you look at the characteristic of those companies, National, Motorola and Intel the processor became the heart of Intel and everything aligned behind it. I don't think National and clearly Motorola just because of the size of the company had the ability to do that.

Leglise: And the last point about the 386 is that we literally stumbled over a period of five or six years into this idea of customer branding, it started with the business press, it evolved into Compaq choosing to put 386 in their product name and the industry following. It evolved into logos and computer inside and eventually the Intel Inside program and Pentium and what Andy Grove described as giving microprocessors a first name. I don't think anybody sitting here today had any idea in 1985 that this would turn into this sort of a program. We really did not know that we were headed in that direction but all of these blocks over time ended up building this case.

Rey: One of the ads that we ran two months prior to the actual introduction was to tease and to set up all of our key messages to the market place and the title was "Choosing a microprocessor architecture seems to be a religious Issue" and then the headlines walk you right through, "You want your software to live forever" "You want to find complete fulfillment" "You want assurance of the hereafter" and we actually reference the 486 before we even introduced the 386. The actual ad that we used when we announced is the ad that diffused the issue of why we were late. So the headline "By September 30th, 1985 30 major corporations had already committed 75 million dollars to a 32 bit microprocessor that didn't exist." "It was worth the wait" and then the copy on the back, so it diffused the issue of why we were late and leapfrogged us into a leadership position because of the thirty major corporations who are willing to wait for this product.

Leglise: And the first ad you showed, "The choosing microprocessor architecture seems to be a religious issue" ran primarily in the electronics trade. This one, the "It was worth the wait" broke in a journal.

Rey: It broke in the journal and a week later a technical version broke in the trades, yes with the same headline though.

Leglise: So this is the famous one that cost $70K for one day.

Rey: One insertion.

Leglise: Nationwide.

Rey: One insertion yes.

Leglise: It took some convincing.

Rey: Yes a lot of convincing.

Leglise: So that's the ads. The marketing team worked for a long time to get the trade press to cover the 386 and target the engineering community and the one that ended up driving the actual selection of the date of the introduction, October 16 is Electronic Design dated October 17 which shows a picture of the chip with the ability to run two operating systems simultaneously. This was what ended up deciding when we were going to launch the product. We also were fortunate enough to get Electronics to give us the cover and this is, you know, trying to get, to promise exclusives to multiple different audiences and ultimately Digital Design which covered not just the 386 but in fact the family of chips and the software. Possibly the one that was the newest and the most unusual for a chip at the time was that we got coverage on the front page of the Wall Street Journal in one of the front two columns right here. This was Monday, October 14th, so two days before we actually physically unveiled the product but again the first time probably that an Intel piece of semi conductor was covered by such an important business publication. Okay the third bit has to do with how the name became a household name. The first thing that happened that set Intel on the path to consumer branding is Compaq in September of 1986 announced the Desk Pro 386 and they had actually asked for our permission to use the 386 name in their own product then plastered this all over the press in the form of advertising and PR. Compaq Desk Pro 386, this is a trend that was followed by pretty much everyone in the PC business to the point where in 1988 we were running ads showing photographs of six of our customers PC's each one having incorporated the 386 name in their actual product name. Ultimately or the next step after that was to create a logo and I have here an old example of the very first logo for consumer use that was ever created at Intel, you can see it includes the word Intel and the original dropped e logo as well as the 386, it was an identical design for the 486, those were silk screened on top of the chips for a while. Eventually once the courts decided that 386 was not a name that could be trademarked, Intel evolved into a different name that could be trademarked namely Pentium but again this was the very, very first attempt at creating a visual identity that could be recognized by consumers.

Alexy: What I want to briefly go over is a snapshot of the scope, depth and breadth of materials that was prepared as part of the 386 launch. The first document I have is I think the first piece that was actually published out of the set that I have here was a 386 Field Sales Training Manual, it's 114 pages of selling strategies based on target markets, based on the audience whether it's upper management, engineering management, software programmers and has a complete breakdown of competitive analysis, it was what was used to initially get the sales organization aware of the product, the capabilities of the product, the competitive advantages of the product and get them prepared for the launch and then to actively and aggressively engage customers. That was followed at the launch by a launch kit and I won't go through all of this but you can see it's thick package of materials which includes things like an introduction to the 386, an overview of the 386 and this was given to the customers that were there at the event. Complete sets of presentations, a photograph of a die photograph that people always like to have these, they just give them a sense of reality of the part and this was all part of the preparation just for the launch itself. Then after the launch Intel was always famous for it's seminar series and we of course did a major seminar series in early 1986 around the 386 and it had a rich look and feel to it in terms of the colors and the design and it started with an invitation to the customers that we wanted to attend the seminars and at the seminar they got an introduction to the 386 including the data sheet, the slide notebook and a complete set of article reprints that had come out since the launch in the late 1985 time frame. So this is just an example of the amount of material and the effort that would go into preparing for a launch in terms of training the sales organization, having the materials at the launch and then the follow up poster launch to continue to drive the product into the market.

END OF INTERVIEW

