

Les Cottrell [00:00:01] I think 37-80, I think 37-80.

Randy Melen [00:00:04] The 37-80 was remote batch machine for sending jobs to..

Cottrell [00:00:10] Like 3705? Excellent, yeah. So, anyhow, and so I came up here and interviewed with Chuck Dickens and Joe Wells.

Melen [00:00:23] Oh yeah.

Cottrell [00:00:23] And Chuck was very, very, very enthusiastic. and Joe didn't seem very enthusiastic. I think Joe was more the techie.

Melen [00:00:33] Yes.

Cottrell [00:00:34] You know, asking me [those] kind of questions... luckily, I'd done a course on SNA, the systems network architecture, IBM's things, so I knew all about how you it's just that we're talking about his ideas, about how you get things to assess things like that, but never had an experience with but never used it, never use you. I came here, but before I left, I had actually worked on a definite asynchronous tablet interface to get to mobile so we could have an LSI 11 talking in Aruba and download the data toolbar from a test last flight testing lab where we had these LSI elements of the also. And it was just pretending it was a total seven, seven years. And then I just had a choice, every one of them. So, you know, we just said that it was probably a to thing and it would pretend to give a password. You know, to ask you to do is put into it, you know, whatever it was, you know, then you'd just keep saying this is an issue that you feel should you can say, you know, stylization. And it was so it worked. And I think it great for testing purposes. You also can download software, those software, so we could keep our software in one place. And we had a lot of other things going into which came from John Stephanie, which is amazing to hear people say that. That's the that on the idea, very similar to program on the IBM makes it a lot of things. We even got to the stage of actually installing on the other side of the IBM mainframe, which is obviously, if that is to start up the go into hospital waiting for this to come up because of the evidence they destroyed. Actually cheering up, if you focus for that one second, modified the operating system because you didn't need it. Right. And so we were able to test our programs on the IBM mainframe, and that worked out very well. It's been a hotbed of innovation. And after that, we got another compiler that was written by a guy for university back east who prior to that had been set and people that came from him became viasat. And so it enabled you to write an intermediate language. I would say this high level is a lot easier than writing in, in a sense, because so have to do that. We had to be very efficient code because this is real time stuff to add hard, real time problems to solve. Otherwise, we had to do the hard, real time problem because the original challenge was designed to run at 360 pulses a second of was coming out. So you had, what, 360 to a second to read the data and they been exposed so that that stuff is incredibly hard to do that and then eventually dropped to four, which twice as much time and eventually dropped to 120. So you got a lot more time. But it was an interesting hardcoded the assembly process. So anyhow, so I came back and I joined the networking group through networking. There was a bit of a networking which I think had been here for a couple of years. I don't think Guy had been laid off or whether it was in the networking. John Helprin. Oh, yes. Gary Bauer and Charlie Vallerie. Charlie and Honorable. Yeah, yeah. My goodness. You were four and then I reported yesterday. And this one in place by Bill. Yes. As a temp who is acting head. So that actually became permanent head. So then there was a couple of guys who were there was somebody who

was in charge of the corporate operations and he got. And then a guy called Beemans came in and ran operations for a couple of years, and then I think his first name was off of left and left. And so Chuck asked me to take over operations as well. So I took over operations. We come in for the morning meetings, in the afternoon meetings with the union. Folks learned about personnel issues because up until that, it had been much new personal issues about the operations operations and about 20 people on three shifts. We two shifts, maybe typically two to three people per shipyard to have at least two people shift in place. One fell down or needed help. And these were people they were mounting to carrying on paper and paper bags, you know, and giving them. And somebody seemed to be in conflict with some of it. That's right. So the main concern was on the second floor. Yes. And the tapes and printers were on the first floor down here. Yeah. At that time. Soon enough. So there was this big group who run 24 hours a day, seven days a week, all the allowances rather than he was in operations. Bob Kelly, some other guy, East Asian looking guy to try to break his name was I think it will probably still be in contact and he'll still be in contact with you and a couple other sorts of joint action within the group. That's right. Yeah. And any any Dennis was actually was the supervisor. He was one of the people we hired as an operator. I kind of, but I don't think there's any because there was an operator who's a supervisor one time he was operating at one time he was heavily involved in the union. And so I got out of that. And I think one difference was not only here, but he also was director computer. And I can see that he had computers across all three separate operations, that he would spend half his time on campus and the of his time up here and eventually management. It's like I said, make your mind up. This is really good enough. It's a full time job. And he decided to stay here, not go to campus. I think there was one seventy nine. I think you're right there. I could be Stanford University, OK? There was still one organization within six months split apart yet because I don't know, when I came on board, all the things I had to worry about was it just finished building. One of the problems they had was the wiring was all part of what was handled through the computers and the campus computers. The campus was set on wiring. We'll be trying to get this kind of thing and be done to these blocks wide folded down. And because they wanted to use ID, punch down know blocks and the campus couldn't do that because the database couldn't handle it. So one of the first things I did was get involved with George Curry, who to build a database using spires, which was it was to handle this other type of cabling. So we had this big database, which is George to tell us about that. And it really was very successful. And it is George's idea because I was going to write something, you know, probably in Fortran or something like this. And, you know, to trace it, you know, what you need to do is come up with a concept of virtual circuit attached to this very short circuit with all the wires. Then you don't have to kind of say, OK, I'll take this wire it to this block now when it goes to that block and it will be a nightmare. And he came up with this thing and implemented it in an inspired and then I wrote another aspires to actually provide the user front end, which frejus in four years. We still have records in that we never really replaced it, you know, so I'm not sure I still wish we could ask for about that. I suspect it is because it was really useful, because at that time, as I came on board, [00:09:50] Joe had just issued an RFP for [2.5s] a data switch, which was basically a switch, which enables you to take ASCII terminals to it and to connect computer ports to it, and so you are able to say, I want such and such a service and magically you would get a, basically a hard-wired connection, so to speak, it wasn't hard-wired, but a connection which dedicated this computer port to you. And so this thing involved some wires, twisted pairs going all around the site, so with the database you keep track of all that. That [---?] putting a hundred pair, two hundred pair twisted cables, and then in the last of the last part...until an enormous amount of wiring went on.

Melen [00:10:29] What switch was this with?

Cottrell [00:10:29] It was a MyComm eventually.

Melen [00:10:34] MyComm --It wasn't Gandalf or something.

Cottrell [00:10:36] We looked at Gandalf, we looked at Intercom and we looked at, ah, MyComm. And Gandalf was the oldest, the most mature; Intercom was the most sexy and advanced; and MyComm was in the middle. And we went the middle part and I think was a good decision. Intercom was chosen by, ah, Gandalf was chosen by Stanford. Intercom was chosen by the people at Berkeley. They had a lot of problems at Berkeley. We had and especially it turned out to be mainly grounding problems, it took them months to get it sorted out. We had some grounding problems, but our system really came up and ran very well and we used it for a long, long time until Ethernet came along in about 1985. And then slowly we started migrating to Ethernet tele[?]. But at first, the hard-wired twisted-pair cables were much better because you weren't doing anything to it, and so you were guaranteed a response time. Whereas, if you were in a [?] server, it would queue and add extra stuff to it, and if the teles[?] server failed, of course, you'd lost your connectivity. So for many years it continued to stay in place. So the MyComm was something that Fred was heavily involved in doing the cabling for and we hired a guy called Tim Streeter from CERN, who -- I started out writing the code to actually manage the MyComm, in other words monitor it and, you know, enable you to easily change the stuff, the configuration of the MyComm without having to log into the Micomm by having this front end which was very easily used, and then Tim Streeter, I hired Tim Streeter and he took it over and he made a very nice job of it. It was used by, I think, UC Santa Cruz, and just ourselves, you know, and we gave lots of talks on cause it is actually a very nice system. So, okay, back to where we were, so on the operations, I took over operations and then eventually got someone to run a review of operations on how it should be done and hired her to become the head of operations. She was a Mormon and eventually went back to Salt Lake City.

Melen [00:12:52] What is her name?

Cottrell [00:12:52] I've forgotten her name. I have to dig back to find out. And so then we hired Teri Church to be head of operations, and she hired Sandra whatever her name was, I can't remember her name, to be head of operations and those days we still had the operators. So when I was in operations, I was also trying to make, write lots of scripts to make this much easier to do so that when you wanted to see how things were going, you could enter a command which would take a lot of hard [----?] internal commands to the IBM and put them together to make much more useful for operations and then Ted worked on ...

Melen [00:13:31] Ted Johnson.

Cottrell [00:13:31] Ted Johnson.

Deken [00:13:31] Ted Johnson, okay.

Cottrell [00:13:31] ...worked on, you know, making many more tools. Bill Johnson did not Bill Johnson, Bill Weeks. They were heavily involved in improving the VM operating system. VM, was that when VM came in? Probably it came in came in with. ...

Melen [00:13:49] Well, my recollection was in '79 when I... I went to a meeting in February of '79 between campus and SLAC talking about their future, and at that time, SLAC had

decided that they were moving off OSNBT[?] to VM and campus was moving off OSNBT to NBF [?] .

Cottrell [00:14:07] Yeah, I know we had...

Melen [00:14:10] The technology split for the groups, and so I would say you were probably running VM in test in '78.

Cottrell [00:14:18] Could be. That sounds right. Yeah, that's right, because, yeah, I yes, because I was very lucky, the other good thing I gained, when I went back to work for IBM, it was a VM shop.

Melen [00:14:26] Perfect.

Cottrell [00:14:26] So I came back fully trained after one year of training on VM. That's right: yes. Because we, at that time, we were in the process of moving to VM, into production.

Melen [00:14:37] Now, was John Ehrman working for you at that time as head of User Services or what were you doing... ?

Cottrell [00:14:41] No, John Ehrman was a separate group, he was User Services, User Services was a separate group from our group.

Melen [00:14:49] See here, see John reported to Chuck Dickens.

Cottrell [00:14:51] Chuck Dickens, that's right.

Melen [00:14:52] Ehrman is another person we should try to get.

Cottrell [00:14:52] Yeah.

Deken [00:14:52] Yeah: I've got records from him for the Archives, yeah, we should talk to him.

Cottrell [00:15:02] So let's see, so then we hired Teri, and then later on we went to "lights out," but that required the silos (which are currently being demolished)...

Deken [00:15:12] You went to "lights out" did you say?

Cottrell [00:15:12] Lights out -- no operators. So the operators were laid off, some were hired, you know, I don't know whether Neal had been hired before that, but some got hired, I mean, like.

Melen [00:15:25] You mean like Neal [Adams] and George Maclin.

Cottrell [00:15:29] Neal and George Maclin...Ron [Barrett], people like that, got hired into other roles. I knew Dennis was another one, and then others got laid off and we ran without any operators, and that was quite amazing, you know, 'cause the, you know, no longer was there a console on the second floor. At that time, oh but the, the paper still had to be dispatched. When did we get the 30/81? That must have been the early '80s because I imagine '81 was when we got it. Yeah, I think it must have been about then, and

then we got the 3800 printer, but that was, that required a lot of dispatching, so we must have kept one operator for some time on it, or at least some operators. But it wasn't like, you know, you have to mount the tape within a set amount of time 'cause...Oh, at this time we also must have got this.. yeah, that's right, so we got the silos, which we got mounted tape from but the paper printing was still a problem that most people by this time were beginning to get burst [first?] Tech printers all round the lab.

Deken [00:16:30] So, when did you get the silos, the silos being taken out right now?

Cottrell [00:16:36] '88?

Melen [00:16:38] '88 was the first silo that disappeared earlier this week was installed in '88.

Cottrell [00:16:44] '88, that's right. So that was to come about that time...

Melen [00:16:46] When the silos were installed with the... Was the 3800 printer also in the same area?

Cottrell [00:16:54] The 3800 printer was on this side.

Melen [00:16:57] Of the glass?

Cottrell [00:16:58] On the other side of the glass...

Melen [00:17:00] Yeah...

Cottrell [00:17:01] Just... Just over here, maybe two feet away from the glass wall and about running along parallel to the glass wall.

Melen [00:17:09] So it was there with the silos?

Cottrell [00:17:11] That's right, the silo in this corner.

Deken [00:17:14] So for the benefit of the tape: we are in Conference Room C, and Les is just gesturing at the glass wall that is behind him.

Cottrell [00:17:22] Yeah, that's right. Okay, so this remote type of operations, I guess the other thing that happened, it was in the.. along about 1983-1984, the Internet was beginning to get big, and Digital, Intel, and Xerox, they got together and there was now going to be a standard, originally it was just Digital, Intel, Xerox only, and then it became an IEEE standard and then it began to take off. And John Baron's group, which was the Data Division, which was at that time was not part of Chuck's [scanner line??]

Melen [00:18:02] They did digitizing of the data?

Cottrell [00:18:02] Originally they were going to do ... They did bubble chamber, bubble chamber experiments. And they would look, they would build devices to read bubble chamber stuff and they would manage the scanning tables and they would provide computing. They got big into VNS. So they were the VAX people at SLAC, they were the Digital Equipment people. So they were helping experiments running at that time to get the VAXes up. About the same time we had a microwave dish on top of the A&E building. It

had a link to LBL: there is actually a line of sight from the top of that building to LBL. You wouldn't believe that: it did eventually get blocked by trees, but there was definitely a link, and that was a micro-dish, and so we began to have the first inter-lab DECnet running.

Melen [00:18:58] That was the first one?

Cottrell [00:18:59] That was the first one.

Melen [00:19:00] I don't know if anybody knows that! I've never heard that before.

Deken [00:19:01] It was the first inter-lab DECnet?

Cottrell [00:19:05] DECnet connection. I'm pretty sure it was, it was certainly for high energy physics.

Melen [00:19:09] And maybe even the first inter-lab network?

Deken [00:19:14] So when was that?

Cottrell [00:19:16] That's a good question: that must have been, I'm guessing 1982, 83 or something like that. I'd have to dig back to see if I have any record of that one. So that was in place and that was... We managed that, and John Baron was managing the VAXes and VNS and they were looking heavily at going to Ethernet. So we got a team set up which included John Baron's people, Mike [Huffer?] was one of them, Tim Streeter from our side, myself, Charlie Granieri, I'm not sure who else was on it... To look into Ethernet and things were very new at the time: you could buy.... You couldn't buy switches at the time, they didn't exist, so we were actually thinking of building a... A primitive, an early version of a switch. We actually brought some hardware to do it, Motorola hardware. We never did build it. By the time we kind of got down to figuring out how to do it, there were beginning to be available on the market, so we got right out of the business. Sun actually went ahead and built one, and for a while they had their own switches. What we did do, though, was we recognized that... that VNS had DECnet and Ethernet interfaces, but the IBM mainframe didn't, and then IBM came out with something... with the Zaku, which was a direct-to-text channel unit, which enabled you to connect other things to it. You could connect a PC to it, which has an Ethernet interface on it, so now -- normally you have a connection between the Ethernet cable and the IBM mainframe channel. So then, of course, we need software to handle it. And so we looked at various ways of doing it. And we started out, I started out writing a program to try and do this using Pascal and what with managing all the other things, it didn't really make as much progress as it should have, but I learned a lot from doing that. And eventually we said, 'well, can we not get something from somebody?' Well, there was a guy, I forget, somewhere back east and (just note check name afterwards).

Deken [00:21:41] Okay.

Cottrell [00:21:41] And I may be able to find it, who was developing TCP-IP, which is which had been announced about this time for IBM as a project supported by IBM. So we looked at that, and we also talked to a company locally one that started in 98 who was developing XNS for VNS. We talked and he said, 'would you be interested in working with us to... to extend it to run on a IBM mainframe?' It was all written in C, and so we worked with them. Owen Saxton was a big part of this, and he helped a lot to actually work with the people from this company InterLan, I think it was called.

Deken [00:22:28] InterLan?

Cottrell [00:22:29] I-n-t-e-r capital L-a-n. And they developed the software. And so we worked with them and we developed XNS for the IBM mainframe. I think it was the only, the only XNS that ever ran on the IBM mainframe. We gave talks on it at SHARE and things like that. It was remarkably good, but unfortunately, it wasn't following the general line. Well, everybody gave up on XNS eventually because XNS wasn't open source. Whereas, TCP-IP became, was very much open source. TCP-IP was then integrated into UNIX, XNS was integrated a few years later...

Melen [00:23:08] X standing for Xerox...

Cottrell [00:23:08] There were a lot of companies dealing with XNS, there was Bridge Communications... That's why we really got involved, because Bridge was what were running for our terminal XNS, for our TCP terminal servers. There was Inter-Lan, there was various companies. And there wasn't much interest in the commercial market at the time, but LBL integrated into Unix, and then with the delays in getting XNS, you know, made public, et cetera...

Melen [00:23:41] And wouldn't LBL have integrated with, actually, with the Berkeley campus, right?

Cottrell [00:23:44] I think you're right. Yes, you're right. It was yes, it was sort of.

Deken [00:23:47] With Cal?

Melen [00:23:50] Cal, yes.

Cottrell [00:23:51] And so, eventually, that, you know, not for many years, but eventually we you know, obviously IBM then came back and supported it. And so, and actually, I think we ran it until the end of the IBM mainframes. And so that was the way we talked to VX, the VMS machines talked to the IBM mainframes, and Owen Saxon was mainly with the VMS side, but also helped along on the IBM side. And then, of course, when the... when Unix came to fore and IBM came in with the 68 [---?]. And then that put TCP-IP and the Internet control just option came with every machine you bought, so that kind of was the end of XNS, but it was a good system while it ran. So...

Melen [00:24:44] When we get near the end, I want to make sure we don't forget to ask you, what you remember about the Comp Group.

Deken [00:24:50] The Computation Research Group, right. Were you involved with them at all?

Cottrell [00:24:55] Oh, yeah. That was a whole history in itself. The Computation Group was started by Bill Miller. He was in charge of Operations and in charge of the Computer Research Group. Now, when Bill Miller left, they hired someone to be in charge of the Computer Research Group.

Melen [00:25:12] Which, when Miller was here, he was in the Research Division.

Cottrell [00:25:15] Yeah.

Melen [00:25:16] Who was in charge of the Research Division?

Cottrell [00:25:17] Joe Ballam.

Melen [00:25:19] Okay.

Cottrell [00:25:19] Joe Ballam was very smart. He was very hands off, he would give you directions and then he would give you a budget, and he was also very good at making contact with you, with other people. Like I mean, I got lots of ... I would go to other labs to do reviews of other labs, so I get a lot of exposure with that, the SSC, I was going down there regularly, and that was Joe really made that happen, you know, because he was good at kind of getting you publicity, so to speak, so that other labs would be interested in getting you to come out and talk to them and things like that, you know. Joe Ballam was in charge of that, and he hired Jerry Friedman, who came from LBL.

Melen [00:25:59] No: Miller hired Friedman.

Deken [00:26:02] Or Ballam?

Cottrell [00:26:02] I thought...

Melen [00:26:03] Was it Ballam?

Cottrell [00:26:03] Actually, I don't know, it might have been Miller, it might have been by that time.... I'm not sure whether he came before Ballam, before Miller left or after, I imagine he came after Miller left.

Deken [00:26:15] Jerry Friedman did come after Miller left.

Cottrell [00:26:15] Yes.

Deken [00:26:17] I did look that up.

Cottrell [00:26:18] Okay. So I imagine he was either hired by Chuck or hired by Joe directly, I don't know.

Melen [00:26:24] Did the Comp Group exist before Jerry got here?

Cottrell [00:26:27] Yes, it did. But it was under Bill Miller.

Melen [00:26:28] Directly under Miller?

Deken [00:26:28] Yes, he was the head of both.

Cottrell [00:26:28] So Jerry Friedman came in and he had a joint appointment with campus, I believe, and he had a lot of students and really quite famous students now. There was Lenny Shustek, who worked on a smart terminal, which was basically one of the first... basically it took a Elast-a-scan [?] screen, put a memory in front of it and was able to make a graphical Tele-Writer Elasta-scan screen. And so it was the predecessor of what became the dumb terminals of the day.

Melen [00:27:11] Was this..this was even before ..um...Andy?

Cottrell [00:27:15] This was, um...

Melen [00:27:17] Andreas?

Deken [00:27:17] Andreas Bechtolsheim.

Cottrell [00:27:17] OK. So Andreas Bechtolsheim, OK, so they were continuing...at the same time..

Deken [00:27:24] Contemporaries?

Cottrell [00:27:24] Yes: contemporaneous. I think Lenny Shustek spent a lot more time at SLAC than Andy did. Andy was working for Forest Baskett, who was the head of... I don't remember what he was the head of, but he was a professor on campus, and he... he spent time up here...

Melen [00:27:45] Baskett did?

Cottrell [00:27:45] Baskett went to work for SGI as the head of research, when he left campus. So, Lenny was working heavily with myself and with Marty Breidenbach. Forest Baskett, and what's the name were more separate from us. But they were working on, they helped Lenny on the design of the terminal and I think they were working on campus, too. And of course, then...

Melen [00:28:16] Bechtolsheim and Baskett?

Cottrell [00:28:18] Yeah, and then Bechtolsheim left campus and joined...

Melen [00:28:21] He was co-founder of Sun.

Cottrell [00:28:23] Co-founder of Sun, that's right. He was one of the three.

Melen [00:28:25] Of the four.

Cottrell [00:28:27] The four. There was the the guy with the money...

Melen [00:28:30] Scott....

Deken [00:28:31] McNealy?

Cottrell [00:28:31] Scott McNealy, Bill Joy, from Illinois, who was.

Melen [00:28:35] The software...

Cottrell [00:28:36] The software guy....

Melen [00:28:37] Andy Bechtolsheim...

Cottrell [00:28:37] Who was a hardware guy.

Melen [00:28:38] And I think there was a Vinod [Khosla]? and I think he's now a venture capitalist?

Cottrell [00:28:42] That's right: who put in the money and got it all together. So they founded Sun. Other guys who were... There was another guy who was working here and went to work for Motorola...

Melen [00:28:57] Skip Streeter.

Cottrell [00:28:58] Skip Streeter and Shuster [?]

Deken [00:28:59] I've got a list of the names. [Presents list of authors of CGTMs]

Cottrell [00:28:59] oh, yes. Oh, okay. Right. So Sam Howry, yeah, beam switch yard that's right... John Ehrman, yeah... I don't remember ...

Deken [00:29:12] So, where did Skip Streeter go to?

Cottrell [00:29:19] Skip Streeter went to Motorola and designed the Motorola 68 thousand, which was one of the two, I think, chips at the time. There was also...Who was the guy who did the graphics? MaryAnne Fisherkeller and...

Deken [00:29:32] MaryAnne Fisherkeller and ...um... Tukey, John Tukey.

Cottrell [00:29:34] John Tukey was there, yeah...

Deken [00:29:34] He came on sabbatical, right?

Cottrell [00:29:37] He came on sabbatical, invited by Jerry Friedman, and spent a lot of his time on user interfaces and projection pursuit, graphical interfaces for doing projection pursuit working with Jerry Friedman. That actually went very well... John Welsch, yeah, I remember him, and John Ehrman... Ira Pohl, I couldn't tell you much about that, oh, B5500, Burroughs, yeah. Extended ALGOL...

Melen [00:30:06] Is there a Burroughs here?

Cottrell [00:30:06] I don't know. There might have been.

Melen [00:30:13] There was down on campus, so maybe that's possible?

Cottrell [00:30:15] Yeah, [unintelligible], [Ed Mueller?]. And I do vaguely remember him...they wrote a lot of papers, didn't they?

Deken [00:30:20] Mhmm.

Cottrell [00:30:20] John Harsh[?], I remember him, too.

Melen [00:30:27] Ehrman wrote a lot.

Cottrell [00:30:28] Yeah. [unintelligible] Spiral Reader, that was part of the John Brand stuff. John Brand did the hardware and I guess the computer group probably helped a lot with the software.

Deken [00:30:52] Okay.

Cottrell [00:30:52] It was really very early, I'll say.

Deken [00:30:52] Something called "PEEL"...

Cottrell [00:30:52] Don't remember that. No idea...

Melen [00:30:52] Lyle Smith...

Cottrell [00:30:58] A lot of these names I don't remember them... John Steffani... John Steffani was the guy who did the assembler, the PB11 assembler.

Melen [00:31:11] Octavia...

Cottrell [00:31:11] Which I shut down, folks! [laughs]