



Oral History of Georges Nahon

Interviewed by:
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Marc Weber: I'm Marc Weber of the Computer History Museum and I'm here today with Georges Nahon who is the CEO of Orange Silicon Valley. And with Julien Mailland, Minitel Historian who will be asking most of the questions. And Bernard Peuto, trustee of the museum. And it's May 4, 2015. And thank you very much for coming down to do this with us.

Georges Nahon: My pleasure.

Weber: Julien.

Julien Mailland: Thanks for being here. We thought we'd start with a little bit of background about where you came from before we jump into the heart of the matter. Do you want to tell us who you are, where you were born? A little bit about your family, your childhood.

Nahon: Okay. Great. Well, thank you for having me today. I was born in Casablanca in Morocco in 1951. Back then Morocco just got out of the French protectorate status but there were a lot of French people, still some French people living in Morocco. Then my parents decided we should move, when I was ten, to France to make sure that myself and my two brothers could study in France in French universities in France. So we moved to Nice. Spent two years in Nice so that we could benefit from a similar climate as in Morocco although it was not as hot, not as warm in Morocco and then we moved to Paris and that's where essentially I had most of my life when I was in France. So my original passion was really telecommunications, remote communication. I remember very well how much I was impressed-- how impressed I was with the simple experiments you can organize with two yogurt pods, right, in cupboards and with a sort of rope and you could actually transmit voice without seeing the person on the other side, you know, behind two doors. So long story short I really enjoyed playing with all kind of electronic-centric games. That's what I was interested in, making things myself. And that took me to my background in electronics and engineering which I studied in the city of Nancy where I joined the National Polytechnic Institute in Nancy.

Weber: And to step back, so this was as a child you were doing the yogurt in Morocco, in Casablanca?

Nahon: Yeah, and then, of course, I was more interested in more mature stuff. That's where I started to play with the games for fifteen year-old kids so to speak and they were all about radio transmission, about doing transmitting yourself, receivers, and this was before the days of computing, you know, the way we know computing today. It was analog stuff, basically. And I really enjoyed that so much that I followed engineering type studies in the French lycées in Paris (which is high school.) And then I decided to follow courses in an engineering school and this is this National Polytechnic Institute in Nancy where I spent three years studying both the science of electronics, and general electronics and nuclear physics. Then I decided to stay out of nuclear physics. And I focused on essentially, the signals, the digital signals and I became an engineer in digital signals.

Weber: But at the beginning, what excited you about telecommunications?

Nahon: Telecommunication is this ability to extend the natural power of a human being, the ability to communicate with remote places is something that is not easy to do. It's not even possible unless you

come up with technologies. Some were originally very basic with smoke and things like that, you know, people could see from remote places. And the other one is really the invention of radio transmission. And so but the radio, the one-way radio is kind of cool but it's not like being able to communicate or exchange real time, you know, in a sort of bidirectional way with people that you don't-- you cannot see, and that's really what was interesting to me. And I was fascinated with the potential long term users of this ability to communicate with people all over the world. I remember being impressed, back then short wave radio, you could get signals from very faraway in the world, you know, places and weird languages that you were not exposed to. You could even listen to languages you had never heard before. And that was also part of this magical, so to speak, attraction that telecommunication broadly speaking, you know, being able to communicate remotely which comes from the Greek, the Greek language. So that's essentially it. So it's still-- I remember, later on when I was already working as an engineer at the ancestor for France Telecom which was the Ministry of Post and Telecommunication in France I remember being fascinated with the idea of communicating with images, not still images but like you know today. We used to call it the visiophone, like video telephone. Like AT&T created one here also in the U.S. But this notion of being able to see people in a sort of interactive way so just a step beyond talking to people but actually seeing people was the next frontier for me. And I could not wait to see it become what it is today, but it happened in a way that was not how engineers had originally anticipated it.

Weber: And were your parents in either communications or technical fields?

Nahon: No, no, no. My mother was a PA, a personal assistant and my father was a hairdresser, an artist hairdresser but nevertheless a hairdresser. But they felt they should do anything they could to encourage me and my brothers to follow our taste, our ambitions and objectives. And in my case it was all about being able to do stuff myself, to make stuff.

Weber: And your brothers also went into technical?

Nahon: No. One became a professor of philosophy. And the other one became a designer for homes and things like that.

Weber: So I guess the universe-- what did you think you wanted to be as a child, when you grew up when you were a child?

Nahon: So when I grew up I had a couple of ideas in mind. One of them was to become a sort of journalist reporter. I was, of course, influenced by Tintin. Reading The Adventures of Tintin [a popular comic series written by Belgian cartoonist Hergé] is the type of a lot of young people did at least in Europe. And I was really interested in all of the sort of older places in the world where you could connect with existing civilization and ancient civilization, old civilization. And so I was really impressed with this ability to travel the world and meet people and go to nice interesting places and write about the experience. So that was one other thing-- I'm still interested-- I write a lot, actually. And I co-wrote a book with the former CEO of Orange, Didier Lombard, about seven years ago. And that's one aspect. The second aspect, I wanted to be an inventor, like a scientist, really a scientist. I was looking at myself like these people like Einstein with a white blue coat in a lab with all kinds of equipment which is what I found when I was studying engineering in my school. You know, we had the lab and I was feeling very good

with all of this equipment, and my friends and colleagues we were trying to test a number of new ideas and build new things, again, make new things. Try to make new things. So that was a second objective or ambition I had. And I think a third one was music. I always played guitar, all kind of, classic, modern, postmodern <laughs>. And I actually had a band when I was like eighteen and we were playing just for fun and the pleasure of being together with friends. Yeah.

Weber: What genre of music?

Nahon: So when we were playing together it was really more like the sort of pop music like the Beatles type of thing or the Rolling Stones, my generation, because that was the easiest thing to do together. We were not practicing a lot together, so it was like-- we were improvising all of the time. We had a little bit of jazz music also like New Orleans, like New Orleans Jazz music.

Weber: And then at university were there any-- or in high school were there if there was any particularly important teachers or mentors that effected the direction of your career?

Nahon: When I was studying right before I joined my engineering school I remember a professor in-- actually there were two individuals. One was my professor of mathematics and the other one was a professor of physics. And for some I think random reason I would say but retrospectively may not have been so-- it might not have been so random, they sort of opened my mind to the depth of what needed to be researched beyond what had already been found and codified both in mathematics and physics. And back then I mean the big thing was the discoveries in the nuclear field and all of the finding of the scientists from Schrödinger, Bohr, of course Einstein and the French, Pointcaré. And there was so much that needed to be researched, again, that both of them opened my mind. And one area, of course, mathematics is pretty nonphysical so to speak and the other one was really physical. Even though what I found was that studying researching in the physical space, I mean the nuclear physics, the space, was going to bring a little bit of transcendental dimensions to the findings. It was not just tangible like a traditional visible thing that you study. So that's really what I remember. Those two gentleman really helped me realize that there was still a lot to research and to find.

Mailland: So you went on to study telecom and engineering?

Nahon: Yeah.

Mailland: When were you first exposed to computers?

Nahon: I was exposed to computers when I joined this engineering school in the city of Nancy in the east of France. Back then...

Mailland: What year was it?

Nahon: This was in '72, 1972. And all universities back then and engineering schools had a mainframe. It happened to be an IBM 1800 which was a sort of scientific version of a traditional IBM mainframe. And we were all using FORTRAN to program what we had to do. And I remember very well that we were working with wide logic circuitry, TTL type things. And it was just before the microprocessor emerged as

a-- I think Intel was founded in 1968 if I'm not mistaken, as a company. But really when we got exposed to the first microprocessor right after I left the school in 1974 this was the beginning of MOS technologies. I mean at least we had access to MOS technology in a way that was not possible before. And we could see the first programmable microprocessors as opposed to all of these bulbs with TTL circuitry, you know, wide logic essentially that we had to play with.

Mailland: So you graduated in '74.

Nahon: Yeah.

Mailland: What was your first job? Where did you go?

Nahon: So what I did after I got graduated I joined what was then a telephone switchers manufacturers called LMT, like *Le Matériel Téléphonique* in French. It was owned by ITT which is a company that then disappeared, it was International Telephone and Telecoms, I think. AT&T was for the domestic market in the U.S. And ITT was the equivalent of AT&T but for outside of the U.S., and they were selling and deploying telephone technologies both switches and transmitters to various countries. And at some point, Alcatel, the French company bought ITT and all of the subsidiaries of ITT because ITT had gone for a wave, a series of acquisitions in many countries because you couldn't sell-- each country outside of the U.S. was very protective of their domestic market when it came to telecoms. So the only way you could enter a market is by acquiring a local manufacturer. So back then, you know, there were a lot of-- like the early days of the car industry where you have all of these car manufacturers. So you had a lot of small to medium sized telecom equipment manufacturers. And ITT did that. And then Alcatel bought all of the ITT assets all over the world. So this was really my first job and I was working in a department in this company LMT, *Le Matériel Téléphonique*. Their main customer was the Ministry of PTT in France because they were buying from then and others to modernize the old post-war telephone system that we had. Back then it was essentially if I'm not mistaken I think it was just for voice. There was very little happening in data transmission or it was reserved to government bodies or large, very large companies and it was essentially leased lines type of circuitry. So data communication was not a major thing back then when I started. So that was my first job.

Weber: Okay. And where was that, which city?

Nahon: This was in Paris.

Mailland: How long were you at that company for?

Nahon: I stayed about I think it was two years. And then I was interested in going international and looking at what was happening in the same space outside of France and possibly outside of Europe. And I saw an ad for a new job at the ministry of PTT. This was at the time when the French government had decided that giving a good quality phone service to every French citizen was a priority, a national priority. So they launched this major initiative and asked the French PTT, French Post Telephone and Telecom, and the part of this ministry responsible for telecom was DGT, directorate general for telecommunications, to really take full responsibility for putting together the right plan and finding the right financing to deploy a

good quality post war telephone system in France. So I was there when they started to create their new teams. You know, what they had was essentially a good number of super high caliber engineers but they needed also more people-- well, number one they needed more people, more human resources, more talents. And number two they needed more people able to also speak other languages so that they could sort of complement the existing teams of people going to standardization bodies, for example, among other things. Or negotiating deals with vendors from outside France. Although this was minimal back then because each country had its own rules. And I remember when you couldn't really buy even a modem or a phone set, traditional phone set from another country and use it. You were not allowed to do that because you needed the-- like the FCC approval in the U.S. You needed FCC UL, you needed the equivalent in each country. And there were tough constraints so it was very hard to use equipment from other countries in your country.

Mailland: So what was the job description at the DGT?

Nahon: So the job I took it was in the newly created international department of the directorate for industrial and international affairs, DAII. And this group, this large group included R&D. It included the equivalent of, I would call it product development, as opposed to R&D, traditional R&D, and international affairs. It happened that when this initiative was launched by the French government, a number of countries in the world were experiencing the same need to modernize their telecom networks. So everybody was looking at who's doing it. Maybe we can learn from other countries if they had some interesting best practices we could use, or technologies. So the French government back then decided that it was also a good idea to ask the minister of PTT, the DGT, the telecom arm of the ministry, to initiate some cooperation with various countries. So we had the traditional relationship with some African countries. It was back to the days where we had colonies, French colonies. So we started there to have exchanges. But also many countries even already well developed countries that were looking at how to modernize their telecom and telephone systems. So there was a need for people like myself and my colleagues who were hired to bridge with the international scene, so to speak, with various levels of interactions. Some were focused on the standardization, technical standardization and discussion so people were going to ITU meetings or the equivalent of ITU, it was a-- there was a telecom institute also here in the U.S. and people were - more rarely than they were going to meetings in Europe - but they were coming to meetings also here. And also there was this thing about this cooperation with other countries as telecom operators in other countries who needed some training. So my team was also tasked to essentially share knowledge and best practices, train people. We also had the training facility for other telcos in the world and that kind of thing. And at some point, part of the original initiative to modernize the French network came this whole new idea of what digital telephony could bring in terms of new services like conference calls, like call waiting. I mean today it seems kind of awkward, etc, but it was this whole energy and enthusiasm around the new services that the new-- we used to call it electronic switching technology, before it became digital. It first was analog. They were using an analog environment with electromagnetic relays and things like that but there were some computers already and switches. And then it became time division and when it became time division and the labs at France Telecom or the ancestor of France Telecom were kind of advanced in this area probably among the top two labs in the world defining digital time-division multiplexing technology. So quickly the management of what became France Telecom decided to switch from the original analog electronics centric-- electronic

technology to full digital technology. So that was a switch which really gave birth to a number of new ideas including the beginning of data transmission. Although time-division technology was not about data transmission per se but it sort of gave people the ideas that we could also use it as a way to carry and exchange data. And then, of course, packet switching became the sort of manifestation of these original ideas. But the need was not really present because computers were present but they were in companies and government agencies but they were not so much interconnected back then. They were just standalone offline. And the need to communicate remotely with terminal or having computers talk to each other came later and this is when the need for data transmission network became a reality.

Mailland: Just so we have the dates right, so you would have taken that job around '76?

Nahon: Correct.

Mailland: And who was your boss, was it Gerard Théry?

Nahon: Gerard Théry was not directly my boss because I was relatively young employee back then <laughs>. Yes, he was running DGT back then and he's-- actually there were two individuals, himself and another gentleman by the name of Jean-Pierre Souviron who was running this DAII department I was talking about, international and industrial affairs, which included R&D. And those two gentlemen plus a group of I'd say super smart people decided on the vision, number one, and moving beyond the original plan, which is a very interesting story in itself because this is what led to the creation of the Minitel among other things. But they tested many things. I remember they were calling this environment "new product and services for telecommunication." That was the original thing. It started with purely voice messaging and then they talked about using satellite for telecommunication. They talked about using remote diagnosis for senior citizens at home. I remember this thing. They were talking of the original use of fiber optics and the original experiments in Biarritz in the southwest of France where a small city was totally wired with fiber.

Weber: In what year roughly?

Nahon: This was I'd say 1983. It happened at the same time we tested the original concept behind the Minitel called videotex near Paris in Vélizy, Versailles and Vélizy in 1980. So at the same time they had this other experiment or trial going on with fiber so that we could visualize what the future might look like. When the day was there, we could, you know, at a reasonably cost, wire many cities with fiber which is happening now. Of course, back then it was too expensive.

Weber: In the home the fiber would connect, what would you have at home?

Nahon: So they had a very large CRT terminal, a video terminal with, I think, it was a color terminal that was designed just for this experiment with the keyboard, a camera built in, so video communication-- a two-way video communication was one of the things. There were things like remote learning, remote teaching, remote learning. There was remote keeping people at home like people with some sort of disease. They had to stay home and they were monitored. It was a small sample. If I remember correctly I think there were like 1,300 households and 150 local government departments being tested in the city

at home and there were a couple of SME's, small medium size enterprises, also tested. But see back then, the focus on data transmission was not there, really. It was totally focused on application and services that high speed could provide particularly in this fiber city in the southwest of France. Whereas at the same period we were testing the original concept of videotex which was a relatively low speed 1200 bauds, bits per second I should say, data connectivity. I remember very well that no one was really concerned about the data itself. It was really about what kind of services can people come up with if you can transmit over telephone lines something that is not voice and it's not yet video because we couldn't transmit video. But it would be like maybe a magazine online or something like that. So the idea of having graphical representation on the screen, TV screen or dedicated screen later on with Minitel, graphical representation of some original content that people would produce specifically for this new technology. Videotex came, in fact, as a television technology original. That's why it had some primitive graphics, you know, the mosaics, and it has some limited colors that you could-- I think it was like eight colors including black and white. And you had all of these little squares, the mosaics, that were used to generate some shapes, some drawings, or in some situations it was used to even represent faces of individuals but it was really basic as a technology.

Mailland: So was your team involved with the Vélizy experiments with Minitel?

Nahon: We were not involved in running the experiment but we were constantly connecting with our colleagues who were running the experiment to, number one, understand exactly what was going on, to be able to communicate outside of France what progress we were making, what we were discovering. And we had a lot of visitors coming from outside of France particularly from the U.S. who were interested in seeing it in action and learning more about it. So we had people from various activities from the U.S. both telcos, but we also had media visiting. We also had regulators, I remember, visiting to understand better what was involved in running such a service. The context in the U.S. back then was the breakup of AT&T with the regional Bell companies and very strict regulation which really worked at least at first sight against the notion of having a telco do what we did in France, which is give people a terminal. It was the story behind the Minitel. And you make money based on the additional traffic you were going to generate on your phone line. Of course, in the U.S. that was not trivial given that local calls were almost free. Back then it was flat fees, and mostly in most big cities it was a flat fee. Whereas in Europe, in France in particular, you had to pay for per minute, blocks of minutes or something like that. I don't remember exactly how it was. But you paid as you used, even for local phone calls. So, we could make more money by generating more traffic on our phone lines when people are using their terminal really, their terminal, yeah.

Mailland: So, we're about around 1981, '82 right, at this point?

Nahon: So, this was 1981, '82. This is when the two experiments, the two videotex experiments were launched. One was based on turning the phone directory into an online directory that people could use to get not only the phone number they were interested in but also all kinds of additional information coming from the yellow pages online. So, by putting the yellow pages online, you could get almost catalogs, guides. It was a beginning of something interesting. And that was tested in a small city in Brittany called Saint-Malo where they had I think less than a hundred people using just the telephone directory online, with dedicated, small dedicated terminal, which then became the Minitel. It's black and white with shades

of gray. It's on a nine inch screen, and a basic keyboard built in the device, somewhat like a small CRT terminal. So, that was one thing that was going on. But in parallel, we had the Vélizy-Versailles experiment in the suburb of Paris with about, if I remember correctly, about three thousand to five thousand households being tested. And what they were using to access the services, the content online, was what we would call today a set-top box, which was an adapter for the TV set. And so, you were connecting the adapter to the TV set and to the telephone line. And you would get on your TV screen the content that you were getting from various services and servers online. So, I think they lasted about the same time. I think Saint-Malo didn't last as long as the Versailles-Vélizy trial. And then there was this idea that what we found by testing the type of services that people would be happy to use and maybe pay for in the Vélizy experiment, they were not exactly what we had in mind. There were some clues that people would want to use messaging, but it was not totally obvious. We had seen a few things in the U.S. Like there was this experiment-- the cable experience called QUBE. It was an interactive-- sort of-- one of the first attempts to turn cable TV into an interactive medium. I think it was in Columbus, Ohio called QUBE. So, we looked at that, and we saw that people were interested more in exchanging messages, even primitive messages, than actually consuming massively content like putting a newspaper online and expecting people to just read the newspaper online. And other things like games, yeah, it became obvious that people were looking at using videotex as another way to have games on their screens, TV screens, or.... And then remember this was a bit before the game consoles became significant game machines. There were just primitive, basic Pong machine. And they came right after videotex, in fact. So, this is when we realized that the types of services that people were interested in would be more transactional than informational retrieval only, which was the original concept in the U.K. with- their videotex system first called Viewdata and then Prestel..

Weber: Prestel.

Nahon: Yeah, with Prestel. And we knew that people were interested in transacting even to the point where they were ready to buy online. So, we had two large mail order houses in France, *La Redoute* and *Les Trois Suisses*, and then *CAMIF*. They came. They were selling by catalogues. And they came online, so we sort of invited them to join. And we saw that people were happy to buy online, and so transacting with other people, email, small messages, games. You know games were sort of primitive network games where you could play with other people playing at the same time. You were not necessarily playing against other people, if I'm not mistaken. But you could play together, with the same game.

Weber: Adventure type games like Fief [a kind of tabletop RPG].

Nahon: Yeah, exactly. So, you weren't just alone interacting with the game. There were other people, and you could see that other people were, at the same time as you were playing, they were also playing in the game. So, there were some sort of competitive environment, but very basic paying. And also I should say home banking. It was the beginning of home banking. So, we had a few banks in this Versailles-Vélizy experiment. And they were able to tell that people were prepared to use the service. Paying for phone transfer, and paying your bill, etc. was not obvious. We could not really reach a conclusion. There was a way the original system could allow us to charge when people were using some services. So, the content or service providers could rely on us, on our system, to bill the user.

Weber: Before the Kiosk, you're saying.

Nahon: This was before the "Kiosk billing system". It was based on identity. So, people were identified. They almost -- if I remember correctly, they had to accept some terms and conditions to be part of the experiment. And one of them was that we will use their identity to send them bills as opposed to using the phone bill as a way. Later on, we decided to bill for the use of the system essentially. So, we learned a lot. And one of the things we learned in Saint-Malo is that people really like, among other things, they really like the idea of having access to an online version of the yellow pages and not just the white pages and phone number because there's a limit to what you can do looking for phone numbers unless you are a marketer, of course. So, the combination of the two things led France Telecom, the ancestor of Orange, to decide to launch a nationwide online information and transaction service called Télétel. The brand was Télétel, but it very quickly became, in people's mind, the name of the device they were using, which was a Minitel. So, people-- for like maybe three years at least there was the sort of coexistence of the Télétel brand to describe the services and Minitel as a device. And then it became Minitel. People were just talking about Minitel, or, and, they were talking about the access number, which was 3615. It was the number you had to dial to actually connect your Minitel terminal to the network.

Mailland: So, as far as your career is concerned, we started since '76 you get hired as a young engineer by the DGT, the Telcom arm of the French ministry of Postal services and Telecommunications;. And then not too long thereafter, you appear in the archives repeatedly as the CEO of Intelmatique.

Nahon: Oh yeah, sure. Absolutely, yeah <laughs>.

Mailland: How do you go from one to the other? How did your role evolve within the company?

Nahon: Yeah, So, they-- at some point in the development of the Minitel program, there was a concern that in Europe in particular, countries will adopt different technical therefore incompatible standards. There was no real standard for videotex. And so, it became a sort of competition for influence. So, basically three standards existed back then, the one that created originally by the BBC and the British Post Office, became Prestel. Then we had the French standard, Antiope, which was used for broadcast teletext, which was used for the Minitel. So, the equivalent of Antiope in the U.K. was Ceefax.

Weber: Yep.

Nahon: And the equivalent of Minitel in the U.K. was Prestel. And then the Germans came up with their own version, the Bildschirmtext (or BTX). It was sort of an interesting evolution of the original British standard because the Germans had the constraint that they needed some characters to be like that ß, umlaut, and these things. They needed it to be added. So, they could have been added to the actual silicon used to display the Prestel characters. But they decided to come up with this notion of downloadable character sets. So, you could download character sets if you had enough memory, which was a new generation of terminal. So, I think it was a RAM that was added to the terminals. So, you could define this cell of six by eight points, or pixel if you want, that were used I think it was mostly by the French. I'm not sure if Prestel was using six by eight, but it was very close. So, the minimum cell where you could display a character, a predefined character with six by eight. So, the Germans thought that they

could use the cell to download a new definition of the pixel so you could use a pixel to draw small pictograms. So, it added to the capabilities of the terminal to display more sophisticated patterns like basic circles. Not really like a geometric system, but you could really show more fine details that you couldn't do with both the British and the French system. So, this really created a sort of tension in Europe between several countries. So, some countries decided to go with the German system, others with the French system. And really there has never been something called a European videotex standard. It was never possible. It was just the recognition that there were three standards and that if you were going to use one of the three standards, you were kind of okay. But the standard itself was there. It was officially approved being three standards !!! So, that there wouldn't be another fourth standard, or fifth standard. So, it was sort of a, "So, hey guys stop."

Weber: Who approved this?

Nahon: It was CEPT, the European Conference for Post and Telecommunication.

Weber: And around what year?

Nahon: This would be I'd say about 1986, around 1986. Even the Greek had their own problem with the character sets. They needed Greek characters. And then we had issues with other languages. Like when the Arab world was interested, they needed different writing, from right to left, etc. So, and then of course, at the same time, the PC industry was gaining ground. And as the cost of PCs was going down you could do so much on a PC screen with a decent graphics board at a reasonable price. Nothing compared with the cost of a Minitel. The Minitel was about-- I think the cost was around back then twelve hundred-- sorry, twelve hundred francs

Weber: Two hundred.

Nahon: Two hundred U.S. just to give you an idea. And back then any basic PC, even a home PC, like there were all these brands that have now disappeared like, similar to Atari. And there were many, many in Europe different brands. And you had to pay at least twice that price to just get the device, but no screen.

Weber: You were talking about your career.

Mailland: Yeah, so how did your role within that organization evolved from '76 to being CEO.

Nahon: Exactly, so there was a concern that there will be a sort of-- from what used to be a competition of standards in Europe, there could be some sort of isolation of the French environment by whatever new standards would be available and widely used elsewhere. Plus, we had a lot of investment in the country, in the minitel network itself, all those terminals. Back then I think we already had shipped like three to four million terminals, which was significant for the size of the country. And so, the idea of being more combative, if you like, and more influential outside of France became almost a priority. So, what used to be a few engineers including myself, traveling the world, talking to other PTTs or telcos became a real project. So, it was decided that we would create a separate subsidiary so that it could also do business, sell or resell products to other PTTs and telcos all over the world. And sometime the publishers, like we

did one in Switzerland with a French speaking daily called *La Suisse*. And in other places, like in Greece, it was actually not even a telco, it was a PC distributor in Greece who wanted to create its own Minitel network. So, this group Intelmatique was created. And I was the number two in this small company. We hired a gentleman who used to run the equivalent entity in the U.K. for Prestel. He became the head of this organization. Roy Bright. And he essentially helped us understand better how to position our products vis-a-vis not only the British product, but also what we had identified as different needs in different places in the world. So, not all telcos had the same idea about what their role should be, not to mention the U.S. which was a very complex environment. But we went to places like Australia, New Zealand, Middle East Africa, and even I think some Eastern countries, South America and of course Scandinavia. So, everybody had the slightly or significantly different approach to videotex. So, this gentleman helped us identify how we should position our technologies, services, software. A lot of good software was created in France by independent vendors to host and distribute content over the Minitel network. So, that's why Intelmatique, this subsidiary, was created. And it acted both as a marketing arm for the PTT, the telecom, the French telecom. But also it became a sort of conduit for French products to be exported, if you like, to other telcos outside of France.

Mailland: So, what year was it you started Intelmatique?

Nahon: '81, I think.

Mailland: '81, okay.

Weber: How many employees?

Nahon: We had about, it was a small-- about less than twenty employees.

Mailland: So, maybe going into a little more depth about the goals of this company, the business plan. What were your short term goals, long term goals? What did the business plan look like?

Nahon: I mean retrospectively, I think what we were trying to do is have a long term impact. Back then, long term was probably five, ten years. And we were looking at explaining other potential user of French technologies, Minitel technologies, why this was an interesting, different approach from a number of competitive systems. Most competitive systems back then, competitive to the Minitel, were mostly information retrieval system like the British system. They added some transactional facility and email. There's no doubt about it. But fundamentally, it remained a TV set centric experience with a modem, of course. And people-- the concept was that people were looking at TV. And then they were looking at the videotex thing as almost a natural extension of television. And if you remember what teletext was, it's like Ceefax. It was exactly that without the interactive capabilities that you were getting through a phone line and a modem. So, our approach was based on a dedicated terminal, a simple-- it was black and white and 8 shades of grey for cost reasons. And it was largely based on the notion that people would want to transact by communicate with others with email or similar communication services, play games, do things like buy shares and stocks online. This thing became popular. Find a job online, things that today look in the Internet era, particularly with smartphones, seems like it's a platitude. But back then, it was totally new. I mean these things were just not available. There was a world with PC and home PCs, but they

were offline. Most of them were offline were using diskettes and CDs, and then DVDs when-- but by the time DVDs became popular, of course, most PCs were also connected online. But I remember very well the time when people were buying CDs with encyclopedias like Microsoft Encarta. They were just enjoying the offline experience. And because online was not going to give you even from far the type of quality you were getting with a CD-ROM game or whatever application, content, dictionary, encyclopedia, that type of thing.

Mailland: So, Minitel, the whole adventure takes place in an international political context of rivalries between countries. The Nora-Minc Report on the computerization of society clearly flags IBM as kind of the enemy that's going to take over the world and that France has to fight so that French culture keeps existing. And so, there's this political context. Did you see yourself as part of this ideological mission that Nora and Minc were writing about? Or was it strictly business for you? Or was it something different?

Nahon: The Nora-Minc Report on the computerization of the French society was really a big thing. When it was released with at least seven appendixes at least, they had seven additional books, kind of complex to read. But the main book with all the summaries was interesting because it was flagging the importance of online access to knowledge. And knowledge online back then was databases like LexisNexis, like in France it was Questel where you would pay. But it was more for enterprises or business users or government people. You would pay a substantial subscription to access the service. And every now and then you would pay even extra to access a particular content like patents, for example, a database of patents, or things like that. So, what the Nora-Minc Report identified is what they, I think if I remember correctly, they describe a relative, how do you say, *retard*, [speaking French] delay I think in the way the French society-- the French economy was understanding the value and the implication of using databases online, France was running the risk of being sideline in this new digital networked world of knowledge.. And I remember that in the U.S. they were a lot of interesting things transitioning from a business usage to consumer usage. There was thing, again in Columbus, called OCLC, I think, online whatever computer library which was I mean I think University of-- the main university in Columbus, Ohio decided to just offer access to consumers online, anybody who could connect with a PC, a home PC or even from another terminal PC, a pure computer terminal, could do it without essentially any restriction. There were a few project like Control Data had this project PRONTO for education using online content. So, the notion that the Nora-Minc Report pushed to the French government was look, unless we do something, the whole economy in France will sort of be lagging behind these other economies in the world who understand faster the importance of online access to knowledge, essentially, and being able to share and exchange knowledge. I mean paying for it, or not paying for it was not really the question. And so, they came up with this term which became famous later on, which Minitel used, called *télématique*, which was a sort of conjunction of telecommunication and *informatique*, which stands for data processing, computer data processing in French. *Télématique* became the sort of emblematic brand that both government people and essentially the industry and the private sector used to define this new era where we were using, mostly centered around the user, the Minitel and the Minitel service, but also additional things like the user of the smart card for payments online and a number of interesting new developments around the Minitel initiative. So, yeah, it was a concern very similar to the original concern behind the standardization of the technical characteristic of French videotex, the concern that we might be isolated. And as a result, that would have created some issues in terms of cross border communication. If you

wanted to connect to a database in Belgium or in Germany from France, then you would have experienced some incompatibility. There was also this concern about the flows of knowledge and, actually, content. So, that's why this thing became a bit political. But it didn't last long because the PC took over, essentially. And online PCs, I mean they're putting PCs online became the thing with CompuServe and all these people. Apple sort of popularized in Europe as it did here, the use of online access to content and services. There was a service in France called Calvados, which was the Apple-- it was an online service just for Apple computers not run by Apple !. And a number of other similar initiatives with the emergence of the bulletin board service, the BBS, etc. So, that was really the beginning of the end of the Minitel era.

Mailland: How did the-- so, you were with Intelmatique until when?

Nahon: I stayed there in the same role until I left to join a French magazine, *Le Nouvel Observateur*. I think I probably stayed there, I'd say five years at Intelmatique, something like that. And then I joined Le Nouvel Observateur. It happened that a number of media, print media, in France were super active on the Minitel network. They were offering content from news to classified ads, games, chat lines, horoscopes, all business information services. And Le Nouvel Observateur was a very active entity in the media. So, they needed someone to help export or expand outside of France what they had developed for the French market.

Weber: We should ask a little bit later.

Mailland: Yeah, so as-- while you were with Intelmatique, are there significant-- so, you went to a lot of countries it sounds like.

Nahon: Yes.

Mailland: Are there significant countries that maybe were more important than others that had you kind of rethink your vision for the online world, or rethink your business plan, or that had you really learn things?

Nahon: We actually learned the most from the U.S. scene, which was a scene that was in a deep transformation after the deregulation of the Bell System, and the early successes of things like CompuServe, The Source, and other equivalent ASCII based, text only, online services. And so, in the U.S. there were networks, data networks, that looked pretty much like what we were trying to do in France with our own packet switching network, Transpac. There were things like Tymnet Telenet, and similar, Autonet. And so, the similarities between the sort of French approach to online services and the U.S. scene were striking. And at the same time, the Canadians came up with their own videotex system which was very much sort of the opposite of what we were trying to do originally because it was a rich graphic, purely graphic oriented system. In the end, they were not so wrong when we see what we have today on a PC screen or even a smartphone. The importance of graphics and even video and thing like that, we can see retrospectively that they were betting on something that could in fact find a way to finance the overall economy of online services different from what we did in France. In France it was really people were just dialing a number. They were connecting their terminal. And they were paying per minute as they were using the network. And a portion of what they were paying to the carrier, to France Telecom, was in

fact returned to each content provider based on how much their services would have been used. This was one system that several countries didn't want to implement for various reasons. One of them was regulation, like in the U.S., but not only in the U.S. And another one was purely commercial. Some carriers, like in Italy, thought they needed a sort of centralized billing system similar to the telephone billing system where you could have fine detailed invoicing so you would charge something special for news, a totally different scheme for transactions like-- so, would we charge-- would the Italian telecom charge when someone was buying online? And why? That was their question. I mean if people buy, we don't have to do anything except charge for the communication cost. Whereas, in the French system, which was very simple that everybody could understand, but also was lacking this sort of sophistication like you couldn't charge for an increment of content. It was per minute, per second, in fact. I think the increment was-- was it ten seconds? Every ten seconds, I think, there was a pulse, as we used to say. And it was, essentially, a unit. I remember we were using originally the technology used for international telephone calls. There was special billing meters that we could use for the Minitel because when you were calling from France, say, Australia, you had to run the meter very fast to generate the right amount to be billed. And it was all, of course, reported on the monthly invoice. So, we had a system in place that worked very well for telephone, which we used for Minitel. So, that was also a way to not turn the whole thing into a very complex nightmare. But going back to different countries and how much they influenced our thinking, clearly the U.S. scene has always been predominant, not because it was well organized and well-structured -. there was no single player. I mean there were many attempts from Prodigy to people like, I don't know, GENie and all those people, like Viewtron by the old AT&T in Florida, and others. The banks also were playing an important role. They had their own service like Chemical Bank, Pronto, and things like that. So, it was a very--

Weber: They had their own service for what?

Nahon: For home banking. Chemical Bank had-- but they added stuff to it. They added content so that people would use-- it started with an Apple II, I remember. They had other reasons to go online rather than just checking your bank account and do a few minimum transactions. So, Pronto-- and there were many like Pronto, in fact. Pronto was the most sort of venerable one because it was among the first very well designed, very well done, just for Apple II owners. But it was the beginning of something. Home banking, I mean banking online became a major thing as we know, like buying.

Weber: And tell-- you were saying that Telidon, they wanted a different business model?

Nahon: Yes, because they thought that having-- it was based on the notion that advertisers will use the service and only if the quality of the graphics on the screen were close to what you have on a TV screen for traditional TV programs. And the difference was that you could design ads specifically for, like we do today, groups of people. It was before the Internet days. So, their idea was unless you have a very high quality representation of ads and ad campaigns on the screen, you couldn't charge advertisers. But their idea was it would not be possible to reach a satisfactory business model if you were just relying on users paying a fee for the consumption of the content. In fact, it was tested by AT&T in Florida. They had this Viewtron thing, which was totally focused on the U.S. version of Telidon back then called NAPLPS, which was totally graphic oriented, no video, but very nice, beautiful graphics with a very special terminal, the Sceptre was the name. I remember the name of this terminal, which was a set-top box actually, not a

standalone terminal. And they tested exactly that concept that yeah, people would pay-- users will pay to use a service, but that was not enough to justify economically the entire operation. So from day one the original idea was to charge advertisers and marketers to-- so that they could launch campaigns and put ads here and there and, in return, they would give what we call today analytics-- <laughs> so, detailed information on the consumption by different types of individuals-- when, how, etcetera-- which is really the-- if you look at today's web business model it's largely, and from far, it's advertising based.

Weber: And the initial rise of Minitel must have been very exciting. Can you describe and what was that feeling of expanding universe?

Nahon: When the Minitel became something significant really is when we started to see billboards in the streets-- you know, in big cities where "type 3615," which was a Minitel phone number, and then a sort of short name for a game, news, a bank or a mail-order house. We used to call them mail-order house-- catalog house. So when people saw that, they say, "So what is it?" And then, in parallel, they heard about the fact that if you were interested in replacing your phone book, the printed phone book, with a terminal, you could get the terminal for free as long as you were going to accept not to receive the phone book anymore, which was the original project.

Weber: And what was your vision in the early days of this expanding worldwide? How did you-- what was your vision for the future of the online world?

Nahon: So in terms of understanding where it was going we saw the limitation of the technology used for data transmission, X.25 and the international gateway, so that a country's videotex or data network could interconnect with another network. There was a gateway called X.75, which essentially was the equivalent of how telephone companies in the world would compensate for the voice traffic they were exchanging between one another. So there was this sort of telecom operators industry group entity at the CCITT in Geneva where there was some accounting thing being done every year, I believe, where different carriers would say, "Okay, I sent to your country so much traffic; you sent to my country so much traffic. So let's agree on--" It was really a reconciliation of-- so the same idea, which was used for voice communication between countries were applied to data transmission. And data transmission, the way it was used originally, was not really for consumer services except in France, where Transpac-- the national data network, Transpac, was an X.25 network, was used for Minitel, was unseen before in other countries. Then it became, like, everybody was doing that, using data network to convey traffic as opposed to creating the separate network from the existing data network. So it was very expensive and we saw that-- the fact that people could not connect. You know, if you were in France interested in a service in the U.S. and if you were making the assumption that they were compatible technically-- that you could actually visualize on your screen an online service coming from the U.S, say on your Minitel, then the issue was the international communication costs. That was not easy to fix before the Internet came along. Actually, there was no real good solution for that at the time, when finally the Internet became a big player, so to speak, and people suddenly realized that "Hey, there's a way that we can connect anywhere in the world and we pay the same price, the price we pay to the internet service or provider-- the ISP." But this concept was totally alien to the world of telecoms back then, because that was not the way the economics of telecoms work. I mean, the economics, it's based on the fact that people use-- pay for the usage and the usage, it was based on time. This was the only way we could

really-- depending on the destination, of course-- we could charge differently depending on the destination. Like, a country close by you would pay less for phone and data transmission; a far away country you will pay a more. So having this is an interesting element of the history of what happened. Basically, it was a confrontation of two worlds; one was the telephone world and the other one was the computer world. And you saw that in many places, but particularly in the U.S., the sort of-- I wouldn't want to say rivalry, but competition between AT&T on one hand-- the original AT&T-- and IBM on the other hand. I mean, you saw that everywhere in the world, to the point where the actual protocols, technical protocols, used to carry data, they came from-- retrospectively, you think it's obvious but they came from the computer world, right? And the TC/IP and all the Internet protocols came from the computer world, not from the telecom world. Telecom was about guaranteed connectivity. The Internet world was about "best efforts". So there were two totally different mentalities and cultures and they were just sort of conflicting even intellectually. You know, as a carrier of voice services we need to guarantee that a call that is originated gets to its destination hundred percent of the time. Whereas in the Internet world, it was best effort. You know, the packet will get there if it can and we do our best to make sure the packet arrives at its destination, at least at some point. You know, maybe it's delayed, but it will arrive. So this is an interesting part of the history. And Minitel was the sort of convergence-- sort of simple convergence, the first simple manifestation of convergence of telecoms, the telecom industry, and the computer industry-- for the consumer market, I should say.

Mailland: So who were some of the main people you worked with? Can you talk to us about the personality, how'd that work? Because you were from the telecom world, but you're also saying that Minitel is, for the first time, you got kinda this computer culture involved. So who are the different players in your world?

Nahon: So in France the many, many amazing people were involved in this project, both from inside the telecom world and France Telecom or DGT, the original unique telco name in France. And also outside-- people both from-- people in the software world, entrepreneurs-- this is the first time, I believe retrospectively, one can say that we saw the first entrepreneurial movement in tech in France or in Europe. These were market-dominated by very large players, both telecom and software and hardware in terms of the computer industry. And you saw that Minitel opened the door, like the Internet did later on, to a number of entrepreneurs who decided to write their own software, create their own server technology by assembling-- it's almost like the early days of the data center in the web space. You had all kind of entrepreneurs like that. And then on the regulation--

Weber: Who were some of the-- who were the people you worked with? Talk a little bit about the people you worked with directly.

Nahon: Okay, so I worked directly mostly with the people within the French telco and particularly the head of the project, Jean-Paul Maury, who's a well-respected figure even now in 2016 in France even though he is retired.

Weber: And he's been interviewed for this.

Nahon: He's been interviewed and he's really the-- he's both the architect of this sort of hybrid system that, you know, no one-- a pure telecom person would have had a hard time designing. He was at the same time a very-- he was a fundamentalist in terms of-- you know, he came from the telecom schools, etcetera. But also he was very open. What characterized Jean-Paul Maury was his curiosity and, still now, openness for "What else can be done? And what are the other people doing outside of France?" I mean, "How do they deal with it?" So that he would make decisions based on well-informed presentations of the competitive environment or even alternative technologies. He was interested in alternative technologies and he knew about the PC movement and things like that. So I think retrospectively you probably need— someone, probably needs characters, strong characters like Jean-Paul has always demonstrated in terms of pushing exotic ideas, but viable ideas at the same time. They were perceived as exotic because nobody thought they could be done. Like the network, the physical network he created in France to cope with the Minitel traffic was something that even the majors from the computer industry said to him, "It cannot be done. You could not do it like that." And he said, "I will do it like that," (he meant the Telco way with enhanced switches and packet switching systems but not mainframes) and he did it. So he sort of-- this was the first incarnation of the concept of distributed computing, where he was using not mainframes or main-frame centralized approach, but a distribution of what was then called mini-computers. So the mini-computers acted both as telecom nodes so you could connect them, but also as almost you could call them cache or mirrors systems like CDNs today. I mean, it was a mixture of many things, but some of the things we see today on the Internet, they were already present in Jean-Paul Maury's mind when he designed the original Minitel, so he was one of the key persons. I also worked, not directly, with the gentleman who was then the CEO, so to speak, of the French telco, Jacques Dondoux, who passed away a few years ago. And he was also one of the heroes, if you like, of the Minitel story. He's the one who decided to create this billing system that we call the kiosk, by analogy with a newspaper kiosk, a newsstand, so to speak. And we call it "kiosk" in French. I don't know exactly why, but it's a newspaper kiosk. And he said-- I remember him explaining to his counterpart at the Italian telecom, a lady, and he was telling her, "Look, your system is not going to work," 'cause it was based on subscription and paying for each thing. He said, "It's almost like," he said, "if you go to a kiosk (a newsstand) and you have to be a subscriber of the newsstand so that you could buy one magazine just one day and maybe never come back again. That would never work, plus you don't want to be necessarily buying at this particular newsstand all the time. You may want to buy one day somewhere else. So how can you be a subscriber of a particular newsstand?" They said, "It needs to be open and it needs to be like I go wherever I want, I pay what I want, the newsstand keeper gets the money and gives the money back to whoever is providing the printed magazine or daily." And I was really impressed with his ability to simplify things. It's all about making things simplified with consumer eyes. So he is one of the person who played a unorthodox super-important role for the development of Minitel that was not about the technology; it was about the principle-- how you pay for what you consume. Okay, is there a way you can do it in a sort of natural way, an extension of the way you behave in your normal life with newspaper and things like that? So he was another person. I think I can say also that there was a-- on the regulations side, there were two persons who were essentially crafting laws, trying to adapt the law, understand or interpret the laws to decide whether or not what was happening was legal or not, if it should be prosecuted because, you know, some people were using the Minitel network for things that were not acceptable, you know, like copyright and things like that. So there was two gentlemen-- one was Mr. Huet, and the other one was Mr. Bresson.

Mailland: De Bresson?

Nahon: De Bresson. Sorry. Not Besson. De Bresson. And both played the very important role in both representing the establishment, you know, the corpus of laws that we had in France, for everything essentially, and their ability to interpret the law or adapt the law to not put the law in the way of the development of a new technology that nobody knew anything about. So there was no precedent and they were very pragmatic people and said, "Look, we never seen anything like this. Let's not put--" it's essentially the-- they were doing-- they were applying law *de facto* and not *de jure*. So in other words, they were very flexible in their approach to new things that emerged from this totally new world. So they were regulating, so to speak. I mean, there was also regulators-- authority for the TV and the media; CSA was the name of this sort of authority, the equivalent, I would say, a part of the FCC, to a large degree. But they were originally designed for a time when Minitel was not there and what was there was not doing anything similar to what the Minitel was doing, so it was very hard to use the regulators back then to help. So we had the state-- the government had this very wise approach that was "Let's regulate as we work," basically.

Mailland: Now going off that, Huet seems to have been fairly progressive, whereas De Bresson has been described by many, including Jean-Paul Maury, as a bit more authoritarian and top-down person. Maury said De Bresson kept threatening that-- him to end up in jail. He said, "Monsieur Maury, you're gonna end up in jail." How did you feel about this? How did that impact your work?

Nahon: Yeah, yeah. I mean, we could-- and this why all these people, you know-- Jean-Paul Maury, De Bresson, Huet-- were so important and played such an important role in making the whole thing. Because none of them was really trying to stop the whole thing. They were trying to find ways to make it happen in what you could call an acceptable framework of laws and regulation and decrees and things like that. So, yes, it is true that, you know, there was this thing about the postman: Is the postman liable for the content that is in the envelope that he's bringing to the customer? You know, the whole thing about if you carry content, are you responsible for the nature of the content you carry? Which is, you know, what the carrier does, I mean, including the telco. So this whole thing expanded into many places, like "Are you liable for an ad you put in the classified ad section if you are allowed to do it online with no moderator?" You know, the whole point about a service like Minitel or Internet today is that you don't have moderators or they're very-- I mean, the sort of community of users act as a curator or as-- back then it was not possible. So I think to answer your question about whether or not this was creating a difficult environment, it was because like for the VCR, video cassette recorders and players, with, with, you know, the for-adults-only stuff that was on VCRs and other technologies, which were used at some point, for the type of usages you didn't want to see there. It was difficult to fight against those people who were at the margin, so to speak, the minimum, you can say, of the decent use or ethical use of the system. It was difficult to use the existing laws. So in some situation I guess Mr. De Bresson had nothing he could use, but: "I'm not gonna stop it unless you change this and that." There was always a suggestion to do something. So "Unless you do this or that I will not have any choice, but I will have to close it down." It was never his intention to close it down. He was--you know, I met him myself several times. I think I was representing as-- I was running the French Association. I was the president of the French Association of the Minitel Content Providers for a while, called AFTEL-- I was president of AFTEL.

Weber: So you know Henri de Maublanc?

Nahon: Yeah, he took over from me.

Weber: And Gérard Ladoux?

Nahon: Gérard Ladoux was Secretary General.

Weber: Yeah.

Nahon: He has always been, right from the beginning-- from Vélizy. It started during the Vélizy trial, this association. And this is an association that did a good job at working both with the French telco and the regulators, trying to sort of bring some sort of mediation one way or another depending-- and to make sure that no decision will have a definitive impact on the whole thing, bearing in mind that we didn't know much about how these things will continue to develop itself, you know. We were not sure and not even the newspaper industry, they were-- some of them were against it, pretty much, because they saw that as a sort of loss of revenues, 'cause of classified ad, but others like in the east of France, you know, the DNA-- what's the name of this? *Dernières Nouvelles D'Alsace*, they were pioneers and they were pushing very hard on Minitel. So I think it's fair to say that there has been a good will-- manifestations of good will from all the places where people had a word to say that might have impacted negatively the entire equilibrium, you see, so they knew-- everybody knew what was going wrong when it was going wrong, and everybody was trying to find ways to remedy, bring remedies, so that it would not have a negative impact on the *entire* system, which was running well.

Mailland: Within your work at Intelmatique what were some of the main turning points?

Nahon: So there are two things: One, what we did with other telcos in the world and what we learned from the-- our contacts with other markets. The first real thing-- there are two really big things we learned. One was with the telco in Brazil, in San Paolo, in the city of San Paolo. It was the first telephone company in the world to deploy more or less a clone of the Minitel Vélizy trial that they wanted to turn into a full-blown commercial service. So we learned a lot with them 'cause it was the first time we were facing a totally different environment. There were a lot of similarities at the end of day we found, but there was some difference in terms of, like, for example, the media wanted to be involved right from the beginning, almost to the point where they would have loved to see a sort of joint venture between the telco and them to run this thing. They thought it was a newspaper thing mostly. So they found ways to work differently and then they did their own things. So when the technology became-- the Minitel technology became obsolete, they moved on and started to deliver to PCs, etcetera. So the whole thing turned into a sort of web Internet system just before the web became available.

Weber: And what years was that that you were working with them?

Nahon: That was, I would say, '82. So the system stayed there at least three- four years in San Paolo and I think it was also used in another city in Brazil, because they had different telcos in each city, more or less, or each region. So there was no such thing as, you know, an AT&T or France telecom or something. And the other thing we learned was in the U.S. when we worked with a bank in Minneapolis

called First Bank System and these people were looking at ways to get closer to their customers - most of them were farmers in North Dakota and Minnesota. But most in North Dakota. So they were interested in the system we had because it was simple to implement, low cost--'cause the terminals were essentially low cost compared with anything you could find on the market. This was the best way to go back then. And they were looking at ways to provide more management tools to the farmers, so that they would find it useful to not only be a customer of First Bank system in Minneapolis, but also remain a customer, because you had all these additional services you would get. I think they were charging a nominal thing for this service, 'cause that was not the intention, to make money on the service. The service was used to both make the farmers happy with the bank, but also learn from the farmers new needs they could express via this fluid interaction. So the farmers would send emails to the administrators of the system and people would define new features in accounting, the accounting application. I remember the gentleman, Stuart McIntire who passed away and who was running this for First Bank system used to tell me: "I mean, the farmers-- back then they were using," he said, "shoebox accounting and we wanted to turn that into a Minitel accounting, which is another box," he was telling me. So. And we learned a lot because this was a totally different motivation, to launch an online service from a bank, like, Chemical Bank with Pronto at some point. So we learned a lot and it helped us work with banks in France and, in fact, the banks in France also helped First Bank system, at least one of them I remember, CCF, which is now HSBC, it was acquired by HSBC. But by then a lot of people said that CCF, Crédit Commercial de France, was the most advanced home banking service on Minitel. They were quickly joined by all the other banks. So these are the two things. I think what we also learned during the Intelmatique days is why and how the Minitel as a device and as a system should evolve. And this is where we really saw the successful evolution of CompuServe and how CompuServe was evolving into a graphic-oriented model. AOL was becoming a lot more mature and, in fact, competing <laughs> with CompuServe very much. And so we told Jean-Paul Maury who was running the Minitel, "Look, the Minitel needs to look like a very basic PC so the keyboard should be like a PC keyboard and not like, you know, a Chiclet-type keyboard for computer averse people, basically. Because they're very--the original keyboard was very simple by design. They were function keys, but speaking for them-- it was not designed to program anything, as opposed to a classical keyboard, a PC keyboard. So we told him about the need to have a compatibility to find a compatibility with, like, the computer terminal. Like, so we said to him, "Look, we need 80 columns and not only 40 columns of characters on the screen. Forty columns came from the TV world. This is why we had 40 columns-- 40 characters per line, I mean. And then we said to him, "Look, we need 80 columns. We need to have cursor control keys on the keyboard. We need to have carriage return [the Return or Enter key on a PC keyboard] on the keyboard." And he was always super-interested, always. He was always buying these new ideas. He was just struggling to find a way to keep the whole thing compatible when moving forward, when adding new features on the terminal and on the network. We also told him that the terminal needed to be compatible with higher speed modems. So we were at 1200, so we said, "You need to go to 9600." Back then it was a big thing. <laughs> And they had this great idea of using the chip set used for fax machine, mass produced, low costs and so he said, "Let me go to 9600 but I will use the fax machine modem." So it was positive, because we could have 9600 in the-- it was really the final generation of Minitel. Few of them were, in fact, distributed. But also it had this issue that it was half duplex and not a full duplex modem. A facsimile is half duplex, essentially. So these were some of the things we brought back to him. We also brought back to him the need for more graphic capabilities, superior graphics capability. He came up himself with a new color Minitel. There was a color Minitel,

which met relatively modest success because very few content providers were prepared to really exploit or leverage the fact that you had color. People were using shades of gray as opposed to color. And the way the network itself evolved-- when the first-- we first heard about the Internet we knew that it was difficult to interconnect an Internet world with a traditional telecom world, like X.25, but we found companies in the U.S. who could provide essentially the adapters, right? And this is how he-- it was just before he left that he decided to experiment with a sort of bridge between the Minitel environment and the nascent Internet environment.

Q: And so you actually did test--

Nahon: Yeah, we had some-- actually, there was a service called, if I remember, 3615 INTERNET and you could use your Minitel to access me text only services on the internet and most importantly text based emailing via the internet.

Mailland: Yep. So you were with Intelmatique until when? And why did you leave to go Nouvel Observateur?

Nahon: I think it was '87- '88, something like that, and then I-- when I joined the weekly magazine publisher, Le Nouvel Observateur I stayed there after we created subsidiaries in New York City, Milan, we had one in Finland even and opened our services in Germany, the UK and Italy

Mailland: What was the company in New York called?

Nahon: Newcom, Inc. And it was essentially doing some of the services we had in France, but of course in English. And it also helped us understand how to bring real-time stock quotes from Wall Street to the Minitel in France. So Le Nouvel Observateur was the only company in the world offering access to real-time stock quotes from the New York Stock Exchange to essentially anyone that is not a licensed broker. So we had delayed stocks, , and the New York Stock Exchange insisted we had a contract signed by each person who would get real-time stock quotes. So this was before the Internet, of course. So we were able to have a waiver to experiment. They did not know what the Minitel was, but the only reason we were able to do it is that we were in New York City and we went to talk to them, we showed them what we had, they used the Minitel-- tested with the Minitel and they found it was a great idea. So this was not a huge market in France for accessing real-time stock quotes from the New York Stock Exchange, but there were a lot of people interested. I mean, not millions, but a good number of people, yeah.

Mailland: So why did you decide to leave Intelmatique and to go to Nouvel Observateur?

Nahon: I think it was just the-- it was really compelling to move to the other side of the system, you know, -- I'd been essentially working for the French telco side, the operation, international-- that type of thing; and then the idea, when there was a need for such a profile as mine in this company I said, "Well, this is the time to try the other side. And so the first thing we did was to open New York and then Milan and then Helsinki and we had a deal also in Germany. It was not a subsidiary; it was an agreement with the distributor in Germany.

Weber: But there was-- had the politics changed at all within your role? I mean, was the role less interesting than you were doing?

Nahon: -I think it was a role less interesting. It is probably that it was getting to the sort of end of a cycle, you know. So we had-- and the technology was more mature. For example, one of the original missions I had, which was to market the Minitel concept outside of France, this was not necessary anymore as much as it used to be, because most telcos in the world had already made the decision at that time, so it was some with Minitel, some without Minitel and some nothing. They're just waiting for the PC to come. So there was no real point of continuing with the same intensity. I mean, after I left they continued to do a great job with countries in Europe, for example. I remember they did a joint venture in Ireland after I left. Something else, I think, in Greece. So they did well. But it was like the model didn't need any more this type of marketing thing that we had back then. Plus, the technical standards had been established, which was not really started in Europe, but it was three standards, a standard with three standards inside. So there was no more need for a lot of education for the regulators in Europe and things like that. All the different players like the content providers in various countries, they were all interested in understanding the difference between each standard and what you could do. So this part of the job was not that anymore. Not as much. And I said the compelling nature of working for Le Nouvel Observateur-- it was a big name, you know, on Minitel, very successful and they kept adding products, new services all the time and so, you know, that was interesting. It's like when I left Le Nouvel Observateur it was for similar reasons. I went to Microsoft, because Microsoft was super-interesting and they were looking for someone who had a profile like mine or experience like my experience. Knowing well the telco and carriers in Europe and online services.

Mailland: Okay, so we were talking about Le Nouvel Observateur and your efforts to take it internationally. Can you highlight maybe some of the main things that you did?

Nahon: So at Le Nouvel Observateur it was all about expanding to other markets the success that this group had met and in France with the Minitel, and many new ideas, new services, etcetera. So we started with the US, because there was a clear appetite in the US for various approaches to getting online. So we created an office in New York City. And from there we started to do two things. First, we were able to get some US-approved Minitels from Alcatel via what used to be Honeywell Information System (HIS). It was an arrangement between HIS and Alcatel. So we were able to start selling Minitel to some users, and people would connect to our servers in New York. And we also had a leased line between New York and Paris. So that we could also provide access to all services we had in France, and some of them had already been translated into English. So they were more adapted for a US scene. And then we realized that the online PCs were really the thing that was going on, and bulletin board services, BBS's and things like that. So we started to experiment with IBM PCs back then. And we developed an adaptor for the IBM PC, it was a piece of software that would turn the IBM PC into a Minitel. So we called this product-- it was originally co-developed, if I remember correctly, with Intelmatique, when I was at Intelmatique, and it was called Mimix, like, you know, mimicking the Minitel. And it was basic. It was making-- it was doing the job of allowing people with an IBM PC and this piece of software to connect to all Minitel native services, both in the US and in France. And so that was interesting and it gives us some ideas even for the French market and the European market where we started to distribute this piece of software, so that people

outside of France, or even in France who wanted to use their PCs, could use it to access our services. Then we created a subsidiary in Italy, in Milan. The Italian videotex scene was sort of evolving from an original British concept, à la Prestel, into something that was, yes, a hybrid between the Minitel and Prestel. So they were interested in the Minitel for the terminal. They were interested in the services that were developed because of the Minitel and the network, the Minitel network, sort of decentralized as opposed to what they had. And they were still interested in using their centralized billing system, the one they had developed, which was a real billing system. And they used things like email, messaging, games, in a way that they were not doing before with the Minitel. So we created this subsidiary, and we were very successful, because we were the first-- we had the first mover advantage in a way, 'cause all the Italian content providers were not yet used to working with a Minitel environment. So they learned from us. And they learned a lot from other French content providers and service provider. So there were all kind of joint ventures, distribution agreements between French companies and Italian companies. So that's essentially what I did when I was there. Also I brought a couple of services from the US to France. One of them was so that the New York Stock Exchange real time quotes to the Minitel. But also there was a service in New York City which was totally developed from the Minitel. It was a movie database. It was like IMDb today. It was a movie database crafted by someone who was both an entrepreneur and a Professor of Cinema at NYU by the name of James Monaco. And his company was New York Zoetrope, and his service was called Baseline. So we bought a contract to distribute Baseline. It was already in a Minitel format. So all we had to do, so to speak was to connect it via our leased line we had between New York and Paris to our computer center in Paris, and we were able to deliver the service to the Minitel users in France. So it was a pretty specialized service, which, of course, only those people interested in the movie industry, and also the advertising company were also interested in the database. You could easily find anything. Like in a movie database today. But it was not that comprehensive in the past, and as easy to find online information on *any* movie *and* TV show. So that was really interesting. So, and we experimented also by with the idea of bringing services from the US. So what I did is I bought CompuServe from the US to the Minitel Network. That was kind of cool. And in fact, Daniel Hannaby, who was running Canal 4¹, and was doing a software download service called SM, like in server medical, , was helping me bringing the CompuServe services, which was originally designed for PC on the Minitel Network. So if you had the Minitel and the right connection cable, you could connect your Mac, or your IBM PC, or whatever PC, to the back of the Minitel and you could use the modem to connect to the service, so you were able to connect to a subset of the CompuServe services, which have been redesigned so that they could fit a Minitel screen. So most people were interested, in fact, in the freeware and shareware collection, libraries, if you like, available on CompuServe. They were among the top players in that space. And freeware/shareware was a hot topic, and there was a sort of scarcity of good software in Europe. And people were-- I think there was a fascination also for it, forevery piece of software that would come from the shareware community from the US. But then this sort of things matured in Europe, and you had a number of local developers of freeware and shareware. So, this--

¹ See the Computer History Museum's oral history with Daniel Hannaby at <http://www.computerhistory.org/collections/catalog/102740083>

Weber: So actually, Daniel gave us one of those cables².

Nahon: Yep.

Weber: For the collection. So that let you use your PC, use your Minitel as a modem, in essence for your PC. But then in that case, you would not need to use the CompuServe reformatted for the Minitel .

Nahon: Right. The CompuServe had other services. Like purely information services you could use, like you had news, you had weather, you had-- you know, sort of the traditional package of online information services. They had some things like-- I remember they had horoscopes, they had games also. So they-- I'm not saying that people were using in France intensively the information part of the Compuserve service.

Weber: But you could see it on your Minitel terminal.

Nahon: Yes, you could see. You could only use your Minitel if you wanted.

Weber: So you could either view it by connecting your PC through the Minitel terminal as a modem. Or you could see it on the Minitel terminal screen.

Nahon: Correct.

Weber: Okay.

Nahon: But the only reason why you would want to use your PC was to use the shareware, and download shareware and freeware. You know, it was not so much to retrieve information than it was-- so a lot of people were interested in-- there was a lot of news on the PC world. You know, new software, new PCs, new printers. You know, you had all that available. And very often some of the products were not yet available in Europe. So people were-- they had a great appetite, if you like, for sort of advanced information on hardware product, software and things like that.

Mailland: So on that CompuServe product, would you connect from France to the CompuServe mainframe in the US--?

Nahon: —Correct. They were using a PDP-10, I remember, in Columbus, again, Columbus, Ohio. And so we had the connection via the Minitel in France. Our leased line, transatlantic leased line to New York. And from New York to Columbus. I think at some point they didn't need any more the leased line, because they had nodes in Europe. So what they did is give us the right X.25 address that we could program. Actually the telco, France Telecom, programmed it so that it was a short name. And it was, I remember 3617, the phone number, COMPU, C-O-M-P-U. So people were just typing that, and you could see the news, you could see-- there was also financial information. I mean, I think it was delayed. That type of thing.

² The cable is part of the Computer History Museum's collection:
<http://www.computerhistory.org/collections/catalog/102741483>

Mailland: What year was that? Sorry.

Weber: What year, he just asked. And then how did the billing work between the two systems?

Nahon: So the billing, first. It was a traditional kiosk billing. It was, 3617 was a tier above the basic 3615. So we were making-- we were generating more francs per hour. So France Telecom was always keeping its part, which was about a third of the revenues. And we had something like – ourselves Le Nouvel Observateur and CompuServe, I think it was like 50/50. I mean, the net was shared 50/50. Because for them it was very little work. Yes, they had to create this special Minitel edition. But it was a subset of what they had already. And in fact, you could already for PCs, you could use settings on the real CompuServe, so that you had just 40 lines, 40 characters and 20 lines. Minitel had 24 lines plus the top line was 25 lines. But say 24 usable lines on Minitel. And I think CompuServe could for some basic display, you could turn it into 40 characters. So it was not big, big work for them. And it was available to Minitel and PC users in France, it helped them partly understand the French market, and then they opened their own office, and they had their own commercial activities. But it stayed a long time, the 3617 Minitel version of CompuServe, stayed a long time. Even after I left. So...

Mailland: In New York, what was your business model? Were you giving the terminals away for free? Leasing them like 101 Online would later do? Selling them?

Nahon: So we were actually selling them with almost zero margin. We were getting-- we were placing the orders to Honeywell, and they were near, where was that? They were near Chicago, I think. And they were shipping. So we were just interested in having people have a Minitel to use the services. The original idea was there would be a lot of French people in New York interested in connecting with the French contacts on Minitel. But that turned out not to be so important. People were not so interested in that part. They were interested in some services like messaging, like chat. And what we realized is that unless we found a way to replicate the kiosk system that we had in France, or pay-as-you-go-per-minute, it would not be viable. So we sat down with the NYNEX, which used to be New York telephone, I mean, the operating company in New York. And we sat down with those people who were doing the pay-per-call voice services, you know--

Weber: 1-900.

Nahon: Yeah, Dial-a-Phone, Dial-a-Job, Dial-whatever. And so we asked them if we could use their system to connect modems at the end, as opposed to voice. You know, sort of IVR machine [Interactive Voice Response]. So we-- but we had our server. And they said, "Yes, you can." It was not perfect in the sense that the way their system worked, they had put together a special version of their billing system for chat lines. They had a lot of chat lines. But voice.

Weber: Voice chat line. Yeah.

Nahon: So the--

Weber: The erotic chat lines. Mostly.

Nahon: Anything kind of-- yeah, mostly, most probably. Dating, I should say, mostly for dating – a predecessor for Tinder or similar services. And this was-- so they changed the structure of their billing service, so that number one, it was much less expensive. And it was per minute, but it was a small fee. You couldn't pick an expensive, which was fine. The only drawback was they still wanted, they insisted that they would charge immediately when the call was established. So you had what they called a call setup thing, which was like, you know, a substantial price to pay. So what we did is we used that to cover the first, I don't know, five minutes, if I remember correctly. So people wouldn't pay for five minutes. So we used the billing system in place and we would only trigger the pay-per-minute after five minutes. But it was a few pennies, it was not much. We used that system to provide access to our services, both in New York and in France. And then we created another system where people were buying, sort of credits. The way this work is that we are offering the voice-based time service. So you would call this number, it would tell you "it's 9:25 a.m. in New York and the weather is fine." Right? And then we would give, we would speak a code, automatically. Of course we would say, "978WXYZ," whatever. So people would write down the code, and then after this call was finished, they could login our system with a separate code, use this code, and this was like a coupon they would have bought by just dialing this other number. So they were getting the service, the time and the weather, and they were at the same time getting a coupon to use. So they money they paid for time on this call, they would then use by using it online with us. So it was a way to get people to pay in advance. And use the service in a sort of seamless fashion. It went okay. I mean, some people decided then to call us directly and pay us with credit card directly. They would buy in advance a number of hours or things like that to use our services. So we stayed there, I would say, what? Maybe I'd say three years in New York. And then I think we closed down, because we thought that there was not enough revenues to sustain--

Weber: How many users at the peak?

Nahon: Oh, I would say peak was about 700 to a thousand, maybe? Something like that? It was really-- we were advertising in New York only. It was only in New York.

Mailland: What year did you close the service?

Nahon: I would say maybe '90?

Mailland: Okay, so that's about the time that France Telecom started 101 Online in San Francisco. Were you involved with that?

Nahon: Oh, I was, I was not directly involved, but I had discussed with the founders of this project--

Mailland: Who were these people? I'm sorry.

Nahon: Lenoir

Mailland: Lenoir, okay.

Nahon: Lenoir and, Queffélec.

Mailland: Okay.

Nahon: And I remember why, because actually they started early. They started in something like '82 or '83, you know, something like that. I remember, it was after we had the new government, Francois Mitterrand's government in '81. And I think it happened two years later. And so they were asking the French telco to be an investor in their initiative. And I remember sitting in meetings, and there was both a lot of interest on the French telco side, people were-- admired what these two guys were doing. There were more than two actually. And at the same time, they were concerned that it came a bit too late, given that the PCs and the Macs and all those things were already well-established. And that's essentially what I observed. So when they closed down, I was kind of sad, because I think they were-- they had found an interesting model with education. They were focusing on education.

Weber: In Minnesota, right, in '92?

Nahon: No, I mean, 101 Online, I think they switched to a focus on online education. Even here [in the San Francisco Bay Area], if I'm not wrong. And so you know, back then there was another project from Pac Bell called Project Victoria here. They were using Mac that Apple had given to the project, and the ancestor for ISDN. It was a pre-ISDN network. I think it was called Project Victoria, yeah. And so the two things happened more or less at the same time. 101 Online, Project Victoria, so there was some sort of attempt to work together. And then the whole thing disappeared, because suddenly internet became what it is and stole the show.. You know, it was cooking somewhere. I remember visiting this company called-- what was the name of this company? It's one of the three companies created-- one was Telligent, I think, and another one was-- they were designing the intelligent agent. I mean, even France Telecom was investing in them

Weber: General Magic.

Nahon: General Magic, thank you.

Weber: Okay.

Nahon: And they were all playing with the web. But they had the workstation, Sun workstation, you know, and they were showing Mosaic. They were using the web, were they? So everybody was on it. So it was cooking, you could tell. That every company I visited, I toured the Valley, as I remember at that time. Everybody was playing with this thing. Nobody was really doing something substantial with it, but it was-- you could tell it was coming.

Mailland: So you left Le Nouvel Observateur in '91?

Nahon: Probably later than that. Because I remember joining Microsoft in '94. So I probably left in '93.

Mailland: '93, okay.

Nahon: And I stayed one year like a consultant.

Weber: And you were in New York or Paris at that point?

Nahon: I was in Paris. But, for example, I consulted for the *New York Times*, they were building their presence online in Europe. And they needed to have a better understanding of where to start, where to do. I mean, the European market was totally fragmented. Everyone, as we discussed, had its own-- their own-- you know, you had the videotex system in each country. And the regulation for modems was different country by country. And that type of thing. And I also worked for the European Union in Brussels. They were interested in finding creative ideas to align every country in Europe behind the same new standard, which was no longer videotex, it was in between videotex and the web. It was curious. It happened just between those two.

Weber: And what was it?

Nahon: It never happened. I mean, there was a period of maybe, I would say, less than two years when those discussions were taking place. So what's next after videotex? Okay, we couldn't agree on a common standard, so what else? So everybody was trying to find-- there was a standard called-- there was one for messaging, MHS, I think.

Weber: Oh, yeah.

Nahon: You know? MHS. And along with MHS there was a new standard for-- it was just right before General Magic came up with the agent thing. There was something cooking like it was an HTML, but not HTML. Never really materialized. It was-- so I remember seeing some client. It was just for PCs.

Weber: And from where? Do you remember which country?

Nahon: Clearly from-- I think it was a European thing. But the standard, the sort of foundation it was using was-- it was a part of SGML. It was part of the same school of thought. And actual standards, in fact, graphic standards. So it was how do you use a PC? Any kind of PC, Mac, etcetera, and have the same code, and the PC with the right software will display the best it can. Yeah, I think it was like SGML, but it was not, it was something else.

Mailland: So you were with Microsoft?

Nahon: Yep.

Mailland: In the US, or in France?

Nahon: In France. Actually the European Headquarters was based in Paris. And that's where I went to join the newly created Advanced Technology Groups, which was created at the Headquarters to go after new opportunities that had nothing to do with what the subsidiaries, the commercial subsidiaries were doing. They were responsible for selling commercially available products. And it happened at the time when the entire world was looking at Interactive TV. It was a big thing. And you know, the 500 channels, and all those things. And Microsoft came out with its own approach to Interactive TV, when other companies like Silicon Graphics and Oracle had, you know, you remember Oracle had acquired a

company called, was it nCube, I can't remember, but it was a company developing boxes. It was really about the networked computer. If you remember the days of the networked computer. And this is how they were looking at Interactive TV. Microsoft had a very different approach based on—actually, telecom. They were using the technical standards of ATM to stream, to cut the video flow into streams. And streams would, in fact, use the streaming function of ATM technology to reconstruct and carry the data flow. And yeah, because of the streams, the system work was called Tiger. So the origins of the system that Microsoft built was called Tiger. It was tested in a couple of instances, and they had created this group I was part of to look at carriers in Europe-- worldwide, but I was responsible for Europe. Carriers like Dutch Telecom, BT, France Telecom, who could be interested in joining a trial, or launching a trial of the technology. So that was one of the thing they were doing at Microsoft, and in the Advanced Technology Group. But there were many other things like the Wallet PC, you know, the Windows Wallet for payment. They had Windows CE, you know, their version for pocket computer. And things like MSN. MSN, the project was, in fact, called Marvel initially. And once they realized they needed a commercial name-- Marvel was taken, it was already a brand-- they decided to call it MSN. And it's curious, because it happened exactly at the time when the web became something substantial. And Microsoft was going after AOL. The old AOL. The AOL, you know, dial-up modems, and so they were interested-- Microsoft was interested in having my team in Europe negotiate deals with various ISPs. Originally, carriers, before the ISPs, because it was about access to the network, you know, with modems. So they needed a sort of a deal, almost like a wholesale deal where they would buy connectivity from various carriers to be present in various countries. So and then this thing turned into IP connectivity when MSN recognized that it was going in the direction that was not consistent with the emergence of IP and the web. So they decided to turn MSN as fast as they could into a web-centric system..

Weber: But that was in '95 with the famous memo from Bill Gates.

Nahon: Correct. <inaudible>

Weber: Prior to that they were looking at non-IP.

Nahon: Non-IP. It was totally dialup. It was a clone of AOL.

Weber: Yeah, and it was meant to be in every copy of Windows 95. It was like--

Nahon: Correct. Which actually was the case. I mean, it was-- but then they replaced MSN, the MSN client with the browser, Internet Explorer, which sort of helped move to a pure IP world.

Mailland: So you were in Microsoft and then all of a sudden you went back to your original employer, now called Orange?

Nahon: Yeah, it was not exactly the same anymore, because they had gone through more or less a privatization. They became a public company, traded on Paris Stock Exchange and various other stock exchanges, and under the name France Telecom. And yes, it was at the time when like many other large companies, France Telecom decided to introduce the internet protocols inside the company, inside the IT system, inside the collaboration system. And to accelerate the propagation of the internet protocols and

technologies, they had created a separate small group reporting to the Executive VP responsible for Development, and R&D, etcetera, Jean-Jacques Damlamian. And he decided to-- he himself decided to create this small group. And he just called me and said-- asked me if I was interested. So I had essentially done my time at Microsoft. I felt that that it was time to move on. And this was an interesting project. Because it was again moving to the other side. I was usually selling to companies like France Telecom at my-- you know, during my days at Microsoft. And now I was going to the other side and using the technology, and other technology, not only Microsoft technologies, to essentially develop the intranet of Orange, the portal, and they had already some good quality products up and running. And it really was about adding to what they had built, and bringing maybe new ideas, new products. But the foundation was already very strong. They had a very strong intranet called Intranoo, because they were using the "NOO" like their ISP Wanadoo. You know, so they had this new thing. And this group I was running, this small team of maybe 15 people was called Netatoo. You know, like Netatoo. So I think after a while it became part of the IT operations group.

Mailland: What year was it that you went back? What year was it?

Nahon: That was-- when was that? Whew! I guess-- I need to double-check when-- it's like-- it's 15 years ago.

Mailland: Okay. So 2000.

Nahon: A little bit after 2000, maybe 2001. Yeah, actually I joined the summer of 2001, yes! Now I remember. Summer of 2001.

Mailland: And they sent you here immediately.

Nahon: No, no, no. I spent about two-and-a-half years working on the project there. And as I said the project was well-- already well-established, and many, many great solutions, and new ideas. And so I added a few things. And I brought in some help from people I knew outside Orange who had also some creative ideas. So we were able to bring new-- and this was when mobile became data-centric. It was the beginning of mobile data with GPRS, if you remember. Yeah, just the stage after SMS. And so people had amazing ideas. You know, if you think that the speed we had back then. Like I think it was 20 kilobits per second on GPRS, or something like that. People had already great ideas of-- you know, so they were calling it the mobile internet. Not only at Orange, but everybody was calling GPRS mobile internet. There was this thing called WAP, Wireless Access Protocol, which, you know, went nowhere, but, you know, everybody was excited. And even internally, the company people were creating applications so that people could use their WAP phone to connect with the intranet. And so there was a lot creative ideas there when I joined. And you know, they continued after I joined. And then the role here became available in Silicon Valley. This is a first R&D site they created outside of France. And the reason why they did it, about 15 years ago, maybe, yeah 16 years ago, was because they had this vision that the world was moving to TCP/IP. And that the telecom world, including France Telecom, was not well-prepared for it, given they were totally new animals. So they made this sort of wide and wise decision-- I wasn't there-- to create a center-- the closest as possible to the root of TCP/IP. So somewhere between Cal and Stanford University. So, the idea was go there and create a lab. That's what they said to my predecessor. And

understand, play with the technology, tell us what we need to do with this technology, etcetera. So when I joined, which was about 11 years ago, so I joined in 2003, in July 2003. I joined when the desire was to evolve the mission of this organization. Still R&D, but with more open to what was cooking, which was the beginning of Web 2.0.

Mailland: So looking back, you had a very unique perspective, because you promoted the Minitel system, in a variety of countries that had different cultural systems, business systems, different regulatory hurdles. Minitel in France, well, France was pretty much the only place where the penetration was so high, right? And whether it's Minitel or other videotex system, other parts of the world didn't gather the same kind of customer base, right? Things like AOL or CompuServe weren't nearly as big as Minitel was in France. Looking back now, why do you think that was? What made Minitel possible in France that didn't make it possible for the other videotex system elsewhere to really succeed at that scale?

Nahon: Well, yes, the Minitel System was based on the notion that every telephone subscriber in France could get a free terminal. I mean, it was not given, it was a loan. I mean, it was still owned by the French telco. But I mean, the entry ticket for consumers, if you like, was essentially zero. And what was really good and helped with that, which you couldn't find in other countries, is that people immediately understood what they would do with it. 'Cause it was not so easy to think that one day you will use a terminal for the average citizen. You know, the screen was a TV set, period. And then you had a few games connected to the TV set. But the notion that you could use another screen, or a screen to connect via the network to something that could be interesting, funny, etcetera, was not obvious. It was not trivial. But the combination of a free terminal, the phone directory, and people were striving to get a good service. I mean, you would not have bought, purchased a terminal as an individual just to do online directory. But the fact that the telephone, it was kind of fun. I mean, we had all kind of stories in the press where people were telling how they were able to find an ancestor, or whatever, or discover a parent who lived in other part of the country, etcetera. So all kind of funny stories, added to the fact that the Yellow Pages, or their version online, was kind of attractive. It was like a guide, you could find, you know, like a store, or a restaurant. It was really a good service in its own right. And the press and the media were quick to use, with the railway system, SNCF, were quick to use and leverage the Minitel with their brand. So people immediately associated that, "Oh, if I have a Minitel, I can make a ticket reservation on SNCF, or I can buy something in this mail order house, La Redoute." So it was very familiar names immediately connected with a device that you could get for free. And that, I think was something that took a long time to emerge in other countries. And if you think about what happened, for example, for the internet, it only became significant when enough people had PCs and modems. And so it was the equivalent of a free Minitel, so to speak. Because people didn't buy the PC to connect to the internet. But once they had it for whatever, you know, word processing, what have you, I mean, home stuff, they could just connect it, and it was like having a free Minitel. But when they connected to the web, it was already a very rich environment. Everything was essentially-- everything that the Minitel brought, Minitel services brought to Minitel user, the web brought to online PC users. So it just took much longer.

Weber: But you must have, when you were talking with other countries that were exploring videotex, you must have encouraged them to do something similar. Why did-- was this a discussion with other PTTs about introducing a free terminal?

Nahon: There was other telcos, specifically, in other countries, they had this very firm notion that they wanted to control the business to the point where the notion of having an open distributed network where anybody could connect, and you didn't have to sign-up, because you were signed up by virtue of being a telephone subscriber already in France, they wanted to, like in Italy, they wanted you to subscribe to their Videotel service, like we had Télétel. So for them, it was a value-added service that they were offering. It needed to have a separate P&L. But a P&L that was easy to identify. Whereas, with Minitel, we had the P&L, but it was not as easy to justify, because you couldn't predict, you didn't have subscribers really. You couldn't say, "Oh, I have two million subscribers to my Télétel thing." Everybody was potentially-- every user was potentially a subscriber. But the way you defined the business, I mean, in the old days, you had to say, "Oh, I created this business. I have subscribers. They pay every month, so it's predictable revenues," okay? And, "On the other side, I have content providers, they pay me to be part of this thing. And when they generate traffic, or activity, I get a cut. I get a piece of it." You see? In a way, Minitel was doing the same thing. But it was totally distributed. So it was not visible like it's a P&L. So yes, we were making money when people were dialing, even for the directory. The first three minutes only were free for the phone directory. Very few people had to stay longer than three minutes. Or they would drop the line and dial again if they were thinking of gaming the system;. But we're making money on those people who were paying to get their services on the Minitel network. Most people use data centers, or service from other companies. But the companies had to pay us to connect their servers. But we were not really making money on the services or the content there. We didn't know which content and services were used by people. All we cared about was the fact that people were using our networks with their Minitel to connect to whatever services. In the case of most of the telcos in the world, they wanted to see that as a standalone unit. We never had a subsidiary or a company to run Minitel. It was part of the mainstream activities of France Telecom or the French telco. Whereas, these companies they were looking at having separate subsidiaries with a CEO, with special forces. A little bit like what we did later on ourselves for the ISP business. When we created our internet access business in France, we created a company called Wanadoo to do it, and they were able to hire people outside, and they were a separate P&L. We did the same thing for mobile. We had a company called Itineris in France, which was a subsidiary of France Telecom, to operate mobile. And then, you know, history changes all the time. There was a time when it was more beneficial for the company to sort of integrate those two companies inside the main ship. And so Wanadoo disappeared as a subsidiary, and Itineris disappeared as a subsidiary. I mean, they first were called Orange, but then they sort of merged into the company. So I think the reason why other telcos in the world didn't really enjoy the success we had, maybe number one they were not ready to bet, like we did, the huge CapEx to buy all those terminals and sort of give them away, so to speak, that's a big bet! They didn't see that they could necessarily make enough money with the traffic, you know, charging the traffic, and sort of cut of what people were paying on their telephone bill. And in addition to that, they didn't see themselves being able to finance all the marketing activities they had to deploy to convince content providers to-- or service providers to join. In a way they were right, because it took a lot of time and resources at France Telecom to go to talk to the banks, talk to the retailers, talk to the insurance companies, media, government, to convince them to create services online for the Minitel. It took us about three years, I guess, with a team. We had probably about 100 people, centrally. And we had people in the regions, also talk to the local payers, like local media, local government and try to encourage them to create content online. So, yes, all the other telcos were right in the sense that if they were concerned by the cost they will have to incur by developing all the marketing activities to get all this

content online. Otherwise, it's a chicken and egg thing. You need to have all those things happen more or less at the same time. Otherwise, people don't get the terminals to do what? There's nothing online. The content provider, we say, "Oh, you know, why should I invest? I mean, I don't see enough users on the other side." So that's probably why. And there was no government push in most of these countries. The government didn't see, like at least in France government saw the Minitel as a way to enter the digital era for the French economy and society, in general, which was the theme of the Nora-Minc report.

Mailland: The Minitel penetration collapsed as fast as it went up around 95. What do you think some of the collapse factors were, and why didn't Minitel evolve? Because we get a sense that it was kind of this thing that was stuck in 1983, and even though there were a few more modern terminals, it's seems in general, people perceive it as something that was frozen in time.

Nahon: I think retrospectively in a way it was a good decision. I'm not sure it was a totally a conscious decision to sort of slow down, and then stop the propagation of Minitel. Before the entire program closed down, a while after, because it is very clear now retrospectively, but not obvious back then that the PC world was taking over. And there was no way you could fight against, or compete, I should say rather than fight, compete against PC manufacturers. You had a vested interest in the PC manufacturers world. And you know, the people like Microsoft, etc, pushing their software along with the PC manufacturer. You could not compete with this momentum. People had to create, it was a survival thing, plus it was a huge opportunity before it became a survival thing for the PC manufacturer. And I'm not even counting IBM in this, because they stopped after a while. So the point is that on one hand you had almost non-existent videotex terminal industry, except in France. There was no terminal industry. The terminal industry was either for phone sets, telephone sets-- I mean, for fixed line telephone. Or you had the TV industry. In-between there was nothing, except in France where we had created a Minitel, I mean, a videotex terminal industry, which was one of the bets, I have to say, that there will be a need for manufacturers of standalone terminals. And then you suddenly have in front of you this big momentum behind the PC revolution. And you have all these vendors, including from Europe. At some point there were manufacturers in Europe for PCs. Olivetti was one of them. You had Amstrad, you had in France, Goupil; Bull was one of them, etcetera, etcetera, in France. But Siemens was one of them. Ericsson, Philips had PCs. So a number of brands, and all these people were, you know, inundating the market with ads, with, you know, they were in shows, all over. And so there was nobody else but Minitel, Alcatel maybe. At some point we had Matra, and Philips. And this quickly gave way to the PC world. So I think this is what happened. And you know, I think it was a wise decision, I'm not sure how conscious it was to sort of say, "We don't really know what's going on." There were attempts in France to create new generations of terminal. You know, with bigger screen. Some of them look like purely computer terminals. Like Digital Equipment VT-100 or VT-52, terminal. Some of the initiatives were to include somehow a PC inside a Minitel.

Mailland: That was the Web Easy? Do you know about this machine?

Nahon: The Web Easy, it rings a bell, but I don't remember what it was. It was probably already for the web.

Mailland: I think it was bi-standard X.25/TCP/IP terminal.

Nahon: Probably, yeah. So there were attempts to add intelligence to-- in fact there were manufacturers like small companies in France, they were designing boxes that you could connect to the Minitel, and it would turn your Minitel into somehow a low-end PC. So you could use with your keyboard, you could program this box, and it was like-- I can't remember the name of this company. But it was Maya, I think was the name, like a Mayan.

Weber: And you could also get emulators for Minitel on most PC.

Nahon: Correct. But so the question about why is it that there was no successful successor to the original Minitel. There were attempts to create a range spectrum of the Minitel-- but that had to be powerful, that's number one. Because they were more sophisticated. And clearly you could not compete in France with France Telecom, because we were renting them for a sort of nominal price. The one that were sophisticated like color, like larger screen, some of them had a PC inside, I mean, more or less a PC. So and this is really the end of sort of category. It really is a typical cycle, product cycle. It was-- we were getting to the end of this category. And there was nothing we could have done retrospectively to maintain the Minitel at a level where it could have lived side-by-side with a PC at home. I mean, most people, I had a Minitel a long time after I bought my Mac, or I had my laptop. But you know, after a while, we were not using it anymore. There was no point. Anything I needed to do online, I would do it with my laptop.

Mailland: So in retrospect, if you had been in charge of the platform from '81 to 2012, would you have done anything differently? Or do you think it was done well, and it was just the end of a cycle?

Nahon: So the platform, the platform, we had both the network and the terminal. I think that the terminal, the real issue we had with the terminal is that given the number of terminals we were ordering and delivering, when the decision was made on some specs, it was very hard to change the specs for the future generation, because then downward compatibility was very difficult. And which meant that the content provider were not going to change their services to leverage the new features, if there were not as many new terminals as the install base. Which never happened, because the installed base was quickly reached. I mean, this sort of maximum, with the third generation. I mean, some of them had a handset, etcetera. But they were basically in terms of the display, they were all the same, you know? Shades of gray, etcetera. So if, for example, it would have been a good idea to introduce superior graphics. At the same time, we were introducing higher speed modems. Okay? But this would have been a challenge given that we knew the PCs were getting more and more popular. Even though the original graphic counts, graphic box, were limited for the first IBM PCs, etcetera. They were kind of limited. But we could see that there was an industry there. They would be more sophisticated graphic cards, boards for PCs. So the network, now, if I talk about the platform itself, I would say that what really makes this whole thing work so successfully in such a short period of time is that there was no boundaries, there was no limitation to access. So you didn't have to sign up, so there was no need for a centralized billing system. You didn't need to be identified for each content provider. Some might ask you who you were, but at the end of the day, it never happened. Because people were not interested in knowing who you were, because the economy of the system was not advertising centric. So you know, there was no-- there was little - you could do surveys online and things like that, but content providers were not really interested in knowing who you were and how frequently you were calling. So that, I think, worked in favor of the

platform. It also worked against it when it had to evolve, when people were adding more high-value content and services. Yes, we had higher tiers on the kiosk billing system so you could pay as much as-- it was two-dollars a minute, almost two-dollars a minute, which was kind of significant, but it was a sort of deterrent. A lot of people didn't want to access that number, 3629, because-- in fact, they blocked it from there, if they were in companies, the switches. Because it was, you know, an open-- it was an open credit line <laughs>. So they didn't want to do it. So if we had developed back then a sophisticated billing system for *some* services. You know, high value content, maybe we would have been more prepared for the transition to sort of internet per subscription model. But when you look at the result today, there's no place in the world, except maybe North Korea, where they're trying to have a national internet, like sort of a cluster, that you could only access if you're an identified subscriber, when you pay a bill, and only if you do that, you could have access to some services on the worldwide web. This model never worked. It was tried, by the way, in Netherlands. Yeah, it was called HetNet, H-E-T-Net. And it was their idea was to create an internet for the country using internet protocol, web, HTML, all the good things about the worldwide web. But for the country, and stimulate the creation of services in Dutch, of course, for the Dutch population. The idea was the need to go to the worldwide web to consume English content was there, but limited. And we saw how history was written is that nobody was really interested in just-- I mean, if you're a content provider in Holland, you may want some of your content to be used by other people all over the world, and vice versa. You see? So I think it lasted like two years. And then they turned themselves into ISPs, pure ISPs with this hybrid period where people were doing portals. So HetNet became a portal, and you know, like Yahoo! was a portal.

Mailland: Sort of like AOL.

Nahon: Yeah, and then people were just bypassing this stuff. And the only reason why people were using the portal is that email was free. This was before Hotmail became available. If you remember before Hotmail, the only way you could really have decent email was by using the one from your ISP. And the ISP was a sort of portal. They had a portal, like Yahoo!, Yahoo! was a portal.

Weber: Oh yeah

Mailland: Are there some features in current internet business models that you feel were learned from the Minitel experience?

Nahon: I think the current web, I would say the other way around. Minitel ahead of the web, demonstrated that many of the exotic services, the way they were thought about being exotic in the early days of the Minitel, turned out to be the right services online from mail to transaction, to games to things like that, as opposed to information retrieval only. The whole notion back then of online access was accessing databases. So it was about accessing information. And Minitel proved, without necessarily knowing it when it started, that people wanted to do something else. Both the users and the entrepreneurs on the other side of the equation, who were-- had the total freedom to develop whatever they wanted. You know, games, horoscopes, stock trading, medicine online, education. And all of this was invented during the Minitel because it was the only online platform in the world that had scale back then. And only the web was the next platform to scale. That's what happened. So I'm not saying that the web learned from the Minitel. You could argue that maybe some services on the web were inspired by

some of the services. I don't think this is necessarily true. Probably true in France where a lot of original web, sorry, Minitel content providers, service providers, migrated to the web and adapted to the web what they had done for Minitel. Retrospectively, I think that most of the new interesting French web services came from new entrepreneurs. So I don't know how much we could tell, we could say that the Minitel entrepreneurs migrated successfully to the web. I think the successful web entrepreneurs were new people in France, which is kind of surprising.

Mailland: The French, generally, I think, are pretty proud of Minitel, or at least, you know, understand the value of it. Fred Turner, from Stanford University, recently stated that Minitel is the running joke of Silicon Valley. And every now and then you hear some very negative things about Minitel from people in the Valley. Do you think Minitel is the joke of Silicon Valley as Fred Turner has stated. And if so, why?

Nahon: I don't think really Minitel is a serious joke. Every now and then people can refer to it to sort of demonstrate, or try to illustrate how quickly a technology can reach obsolescence. And people who say that about the Minitel forget about what the PC looked like in the early days. And what you could get with the low-speed modem, a 300 baud modem when it was there. But people were happy to have a 300 baud modem with basic ASCII text. It looks ridiculous today that we were doing that. So you could say it's the joke of the PC industry to talk about the early days of the PCs. I think the reason, most probably the reason why people in Silicon Valley, some of them, at least, say that the Minitel, the joke about the Minitel is that they think it didn't help the French economy to move faster than other nations, and more successfully than other nation to the internet era. I think this would be a fair criticism, so to speak. And it's true that some countries, which had nothing, not even the beginning of a Minitel in Europe, moved much faster to the internet. It's a fact that is difficult to contradict. What is fair to say about the Minitel is that no-- it's probably one of the last major government controlled infrastructure initiative for a nation, for a country that happened in the modern world. You know, after the train, after the canals, after the roads, after the-- this is really the last manifestation of Colbert, I mean the French Minister of Finance Colbert under the rule of King Louis XIV, the way was he was thinking about the country with major infrastructure project that the French society as a community will pay for. And if you think about what happened before Minitel, the last thing was the Eurostar High speed train across the Channel, really. You know, as a major-- in this case it was French and British. It was a major endeavor in terms of infrastructure to modernize, in this case, you know, business, economy, because people could travel more, faster, etcetera. And the high speed train, really. In most countries where you have the high-speed train, it helped a lot. I don't know personally how you can measure the ROI, the return on investment on this project, but nobody would doubt that the high-speed train in France did something positive to the French economy. Maybe not enough, given that the poor status of European, the status of European economy in 2015, and 2014. But it played that role. Minitel was probably one of these-- was probably the last major government, state-sponsored infrastructure project that reached a recognized success. And you know, internet is really the phase after that in the digital space. And that's probably why some people are cynical about the Minitel is that it was not followed by a successful state-controlled or state-sponsored major infrastructure project.

Mailland: And can you measure the ROI of Minitel? I know that's something that's very controversial.

Nahon: It was done. It was done even without taking into account the difficulty to assess, and measure benefits, like in education, and etcetera. I think it was done, I remember, by my good friend, Jean-Paul

Maury who was the head of the program, came up with a complete analysis of the numbers, which showed that after ten years, which was sort of the original target for the program, I think he had reached-- he reached break-even after seven years, if I'm not mistaken. And then, you know, ten years was really the sort of the maturity life cycle of this thing was perfectly in line with the original plan. So that's why I think people can be sarcastic <laughs>. It's like when you look at the Texas Instrument Speak & Spell machine today, you know, should you be sarcastic about Speak & Spell? I mean, did it help the computer world evolve? Absolutely. Did the Minitel help the-- at least in France-- the French society, the French economy evolve? Absolutely.

Weber: Unless you have something-- maybe do just, you know, a minute or so in French, what was the legacy of Minitel? *En Français.*

Nahon: *En Français. Quel a été l'héritage du Minitel? Pour la génération qui a connu le Minitel et qui peut comparer aujourd'hui avec les nouveautés comme bien sûr l'internet, l'utilisation des téléphones mobiles à haut débit, les smartphones, il est évident que le Minitel rappelle à quel point les services que nous avons aujourd'hui sur l'internet et sur le mobile étaient pour quasiment tous déjà des services qu'on avait consommés avec le Minitel. Avec une technologie plus primitive que ce que l'on trouve aujourd'hui - à l'époque, elle ne l'était pas, elle était très avancée - et avec surtout une facilité d'usage que le Minitel a révélée, et qui a été continuée ensuite sur le Web. On le sait aujourd'hui, un des succès - des facteurs de succès - principaux d'une application ou d'un service sur le Web, surtout pour le mobile qui a un petit écran et qui se rapproche peut-être plus d'une philosophie Minitel, c'est quand même l'expérience utilisateur. Les concepteurs du Minitel dont les équipes de Jean-Paul Maury par exemple ont passé énormément de temps, ont mis énormément d'efforts à définir le terminal, parce que le terminal était l'élément qui allait conditionner la façon dont les services allaient être créés. Et notamment avec les fameuses touches de fonction qu'il y avait sur Minitel, qui étaient en français très clair, comme dans un livre, le sommaire d'un livre, ou on a tout. C'était vraiment conçu pour que tout le monde puisse l'utiliser. Aujourd'hui, les gens en France qui ont connu le Minitel reconnaissent que des progrès énormes ont été faits avec le mobile et avec le Web, mais se souviennent aussi de l'importance que ça a eu pour familiariser toute une génération à l'utilisation de services en ligne, directement, 24h par jour, 7 jours par semaine, 365 jours par an. C'était toujours ouvert, et c'est ce que l'on dit aujourd'hui du Web et du mobile. Donc c'est une expérience formidable. Il y a aujourd'hui en France beaucoup de références au succès de ce programme, qui est un grand programme - il y a peu de grands programmes avec une dimension nationale, de programmes d'infrastructures, il y en a de moins en moins, vu la complexité de la globalisation de l'économie, donc on peut moins, et peut être pas du tout, envisager - sauf dans les pays totalitaires - de créer un programme qui va rester uniquement à l'intérieur d'un pays. L'Europe est une union, comme les Etats-Unis, l'Amérique Latine aussi, et donc aujourd'hui, ça serait moins possible, tout le monde le comprend. En même temps, ça a été quand même un apprentissage remarquable pour notamment l'industrie du logiciel en France, le software a fait beaucoup de progrès, en particulier grâce au développement du Minitel et les besoins du Minitel, et la conception même des services en ligne a gagnée beaucoup en France grâce à l'expérience du Minitel.*

Weber: Thank you very much.

END OF INTERVIEW