INTERVIEWER: This is the 150th anniversary interview with Timothy Berners-Lee. Where were you born and where did you grow up?

BERNERS-LEE: I was born and grew up in London, England.

INTERVIEWER: I've had great fantasies about how your dinner time conversation probably went at home, but tell me a little about your parents.

BERNERS-LEE: Well they met working on the first computer to be commercialized in the U.K. The Ferranti Mark 1, which came out in Manchester University. They're both mathematicians. So I suppose I grew up in a house where mathematics was everywhere, it was celebrated. And it was found everywhere. So if you're cooking or whatever you are trying to do that then it'll be an excuse for me, a reason for noticing that mathematics comes up.

INTERVIEWER: Besides the influence of your parents, were there any other significant events or influences that you remember from your childhood that you impacted your career?

BERNERS-LEE: Taking me towards technology and things. Well I suppose I built stuff. The fact that my parents kept a scrap mat drawer or scrap materials drawer so if you wanted to make something you could go and find out what was in it. My mother would secretly throw things in. as something like a dish-washing liquid bottle became empty she'd put it in there just as a surprise because dish-washing liquid bottles gave these tops, which you can use for axels. And they have a bottle, which you could use for funnels and things. So I think the idea of a scrap mat drawer came from a local teacher training college. We had students staying at the house. Then after that I suppose in high school my math and chemistry teachers were both very enthusiastic and encouraging.

INTERVIEWER: What drew you to Queen's College?

BERNERS-LEE: Complete random chance. Given the list I was entering on math and many do enter Oxford in math and we had a choice of all the colleges. You weren't restricted to a particular group. So I had really no idea. Picked it. Looked like it was a medium-sized college near the middle. So I had a great time of it. I had no idea how to pick them.

INTERVIEWER: Yeah, sounds how 18 year olds make decisions.

BERNERS-LEE: It still seems to be.

INTERVIEWER: Yes. How did you transition or how did you decide to make the transition from math to physics?

BERNERS-LEE: Well I was good at math and enjoyed math, but on the other hand what I did at home was build stuff out of electronics. So that was electronic engineering. And I was torn those two ways. So I thought that physics will be in between math on one side being more theoretical and engineering be more practical on the other side. That was I think, the logic that took me to apply to do physics at Oxford and I found out it was something completely different. I didn't know what physics really is and it's a totally separated subject in it's own right. Related to both. I enjoyed physics a whole lot too and in some ways maybe it ended up being a really good choice.

INTERVIEWER: And wasn't there where you built your first computer?

BERNERS-LEE: I did. I started off building a display unit, so in those days the display unit in the computer was separate and there was a serial cable connecting the two. So the first thing I started with was an old television. Building into this. Turning it into a character-based display. And then building a keyboard, a qwerty keyboard by putting together banks of switches I had found discarded. And rubbing letters onto them and painting them and varnishing them and so on. So painstakingly built the display unit. And then just about the end of my time at Oxford I got a microprocessor chip and had a big rack-mounted computer system.

INTERVIEWER: Were there particular mentors or professors at Cambridge who were influential?

BERNERS-LEE: Very few. I went to Oxford.

INTERVIEWER: Oxford, sorry.

BERNERS-LEE: A lot the people when they go to Oxford, they have a tutor. They have different tutors for different parts of the subject. But John Moffett, who was my physics teacher and he taught me all three years, basically everything. Which was for me, which was great. He was enthusiastic in a quiet sort of way. He'd very quietly allow you to bring your work in and he'd go through it and explain where it could have been better and then think of what you should do next. But he'd do it very much in your own pace rather than he'd never stuck with the pace of the lectures. In fact he was often teaching as a different subject to the ones which were being lectured on by the university at the time. We found out that different students were doing completely different things at different, but he just arranged for each student as he thought fit for them. He had a great knack of seeing it from your point of view. If you bring him something worked out, I'd sort of find my own way of figuring out some quantum mechanical thing and I'd used totally different symbols to the way one nobody would, I'd come to it a completely different way and he'd look at it from my point of view. Take all that on and then show me where I'd gone wrong in my terms. Which was a great ability not many people have.

INTERVIEWER: Now when you graduated you chose not to go on immediately for an educational degree. You decided to work at CERN, I think?

BERNERS-LEE: No, when I graduated, well I didn't really have any role models for people doing the next step in physics and I didn't really want to go into a particular narrow branch of physics. I think maybe if I had know more about the world what I probably should have advised myself would have been to go to the States, do a masters or maybe then a PhD in computer science, but Oxford didn't have computer science at that stage. And I didn't really have any role models who we're enjoying doing a PhD, but the microprocessor revolution was happening. You could suddenly buy a computer this big. And the telecommunications companies needed people who understood how to take a big rack full of electronics and replace it by programming a chip. That world was beckoning.

INTERVIEWER: So why don't you walk me through some of that early work. Like I know you were at Plessey Telecommunications. You were at CERN and D.G. Nash. Tell me a little bit about what you were doing at each place.

BERNERS-LEE: Well Plessey Telecom was a big Telecom. So they made telephone exchanges, but I worked in a little area which was doing things with microprocessors. At the time when I arrived they had a ground-breaking device. A barcode reader, which you wheel around a supermarket. The barcode reader, I think it had a car battery in the bottom. And then it had a rack full of 7 inch cards. It was all designed in the hardware and it had a wand on it. And Sainsbury's, the supermarket were breaking new ground by tracking the stocks they had on the shelves and sending to the store exactly what was needed. So they saved having to have a storeroom above the shop, so this was a revolution in how we run the supermarket and it was being made by this trolley that you'd run with a car battery in the bottom. When I arrived the group at Plessey were replacing that with something the size of a large transistor radio, it had a tape on which it recorded the barcodes read and it had a microprocessor inside it so that was sort of a change that was happening. The bits I worked on were barcode readers for library systems. So when you brought back a book somebody could scan it to find out whether somebody else had reserved it. Very simple system to save people a lot of time and we used these microprocessors to do that. Where there had been a board for electronics I designed some electronics to interface to the microprocessor, so that the microprocessor could emulate the electronics which had been there before. And then program the microprocessor.

INTERVIEWER: And then what did you move onto?

BERNERS-LEE: Well, I was at Plessey for two years. And then a very good buddy of mine, Kevin, had left to join a start-up and he called me and said that they needed two programmers, not one. So that made a total of four. The two hardware engineers, John Paul and Dennis Nash. Kevin Rogers and I went out and joined the programmers because they were doing the same thing. They'd made smart printers and these printers, dot needle printers, which had a head which moved backwards and forwards, which were driven completely by electronics. They were doing the same thing. They put a microprocessor in. Realized they could do a whole lot of interesting things, but needed people then to program it.

INTERVIEWER: So you are definitely building toward computer science.

BERNERS-LEE: Well, programming computers-- I had this computer, which I had at home and so that was progressing as well at the same time. That was a 6800. Nobody I worked for used a 6800. Slowly the price of memory was coming down. So you could get more memory. So I could write an interpreted language, which would mean I could program it more effectively and so on. It was a very exciting time really both at work and at home thinking of all the things you could do.

INTERVIEWER: So how did you wind up working at CERN?

BERNERS-LEE: CERN had a minor crisis because there were all these great big accelerators that they build had big control systems as well. And those set of control systems for the proton cyclotron and the systems around, which had to be ready at a certain date, their new control systems were all based on minicomputers. So it was a software issue. And they went out looking for people. They went to contractors looking to bring in people. Like hiring a bunch of cowboys you know, to basically round up the herd. They needed people to fix this and so a whole bunch of contract programmers arrived and Kevin and I were two of them.

INTERVIEWER: You wound up leaving CERN and then you went back there. Is that correct?

BERNERS-LEE: The first six months, it seemed like a year at the time, seemed like we'd done everything. We learned to ski, even though we must have been for only a few weeks or so. So yeah, that was just for six months from June to December.

INTERVIEWER: And then where did you leave there to go?

BERNERS-LEE: Then John Paul and Dennis Nash had split up. John Paul was starting a new company, Image Computer Systems and Kevin and I went back to help him.

INTERVIEWER: And then tell me about going back to CERN. It was a fellowship, I believe?

BERNERS-LEE: So in 1984 then I left the U.K. to go back for what was supposed to be two years as a fellow in CERN. It was a fun place to be. They had these fellowships in which you would come along and I think we're supposed to do things which were useful to your own education as well as helping. Get CERN working, but mostly people ended up just putting some shoulders to the wheels getting all the software written.

INTERVIEWER: Can you walk us through the story of the origins of the World Wide Web and HTML and how that thought process developed?

BERNERS-LEE: So I went for 2 years, I ended up there for 10 years. And during that time I had a number of projects in which I had an idea about how things could work. I put it out there and I needed volunteers from other groups to work on it. CERN didn't have a very centralized hierarchical management structure because people came from different universities. Physicists came having designed pieces of equipment. And of course they had to collaborate very well because each piece of equipment had to fit together. Eventually be lowered down a few 100 meters below the surface and then work out of other extreme conditions. But all the same, it was not a military like place so people arrived with different computers. They used different documentation systems. So when you wanted to know what was going on you'd have to find-- you'd typically have to be introduced to the person. So the coffee areas were really important. They still are and of course the coffee areas still are important, but at that time they were crucial because talking about things you'd get introduced to the people who'd written other pieces of the system or designed different pieces of the hardware. And then when you'd nailed them you'd try to remember their face and try to get a clue as to where they might've buried the documentation. What system it would be on. So back then, this is 1989 when I proposed the web. I'd thought about it for years beforehand. We got to the stage where computers were running different operating systems. There were Unix-based computers, VAX/VMS based computers and different flavors of Unix. Now there was a mainframe computer running its own operating system. So there were different flavors of software, different flavors of hardware. They were actually connected. The internet was just starting to become available. Although the people didn't in practice transfer files very much from one computer to another. You could if you knew how. So if you knew somebody had written a document that you wanted and it was on another computer and as they were both connected to some sort of network with enough research and installing enough bits of program you could install things like Telnet, the remote login program on both and you could Telnet over to another system and run some programs there which would allow you to root about for the information. Eventually you could transfer it back to the terminal you were using. So that wasn't really a great way to get information. But on the other hand, there was such a potential. There was so much information, which was actually sitting there on desks, going around and around, carefully prepared by somebody-- lovingly prepared. Documentation of the part they had been working on for the last five years. Lovingly written up. With references to other documents, which again, we'd have to go through the same process to find. So once you had the idea that actually this could all be part of one virtual documentation system in which you just click when you want to follow a reference then it becomes pretty compelling. It was difficult to explain to people because the world was a paradigm shift. The idea is that you could get that any document could be available variable in a click was just too difficult to explain. Only a few people got it, but that was enough, a few time. Each time somebody would talk about it a few people would get it. The others would go away shaking their heads.

INTERVIEWER: So you wrote a grant? Or you asked for some money to pursue this?

BERNERS-LEE: Not really. There was no where for me to do that. There was no way for me to ask for a grant because CERN didn't do software development. If it had all kinds of people, physicists would have decided that our processor was not good enough and there were, God knows, enough rewritten word processors, probably. So CERN had a very thick skin when it came to people saying I'd like to rewrite some of the software. I'd like to write a new documentation system. People had in fact been asked to write new documentation systems, but they always ran on one particular machine. So that they're being fined for people running on that machine. Most of the [INAUDIBLE] they can tell you how to think. They tell it to insist that you put your documents in a tree or in a matrix or something. Which if you're a tree person the matrix doesn't appeal and vice versa. So the systems which people had, tried out the systems which you could buy and they tried building them and none of those systems had worked. So really there was somewhere where I could go if I'd wanted to make a new physics experiment. I could take it to committees who were set up to look at the pros and cons of the different physics experiments. But for a new software project then there was nothing setup. So I wrote a memo. Distributed it in March 1989. Sent it to a few people that I knew. A year later somebody asked me, what about the hypertext idea you were talking about? And I said, well, I wrote a memo. I think I sent it to you. They said, send it around again. So I sent it around again labeled March 1989, March 1990. Just to rub it in. So March 1989, May 1990. And again, so it fell on stony ground, but then my boss just let me do it in my spare time the following September.

INTERVIEWER: I bet he's glad that he did.

BERNERS-LEE: If he were alive today I think Mike [? Zindell ?] would very be amused by the whole thing. We didn't know at the time, but when people went through his things after he died they found the original proposal I'd written and his handwriting in pencil, "very good, exciting," written on the top of it.

INTERVIEWER: When you first started to work on this after you finally got the okay, what would you see were the sort of two or three biggest obstacles you had to deal with? One of them may have been that people didn't quite understand where this could lead, but what would you identify as the biggest obstacles you faced?

BERNERS-LEE: I think that paradigm shift that I could show the hypertext and clink on a link in the original browser that would cause a new window to come up with a new document in it. And it's no good saying sort of, tah dah. They'd say yeah, we've got things like that. We've got help systems which will do that. The tah dah is now when we followed that link it pulled the document off the internet and it could have got any document potentially. So they'd say, well, so what documents are there? Well, I've got some documents about the World Wide Web Project. So okay? Big deal. So the problem was getting the ball rolling. There was a chicken and egg thing so that where the chicken and egg were the servers and the browsers. Until people had some servers running with some interesting information of them nobody was going to install a browser. Until people have browsers running, who was going to put up a server? But in times like this there's some people who do get it. So a few people would. I'd explain the system and they say, wow. You mean that could have gone to something on my machine? What do I have to do to put something into the system? You know, do I have to ask you? I don't have to. I can just run a server. okay. So then I get an e-mail back from somebody saying, I'm running a server here and then I make a link to it. Kept a link of all the servers. A link to all the servers that the people told me about early on. So those people got it and fortunately those people put up a few servers. One of the ones which we very deliberately put up was a CERN phone book because there was an outstanding need. Everybody had to log on to the mainframe because that's where the CERN phone book was. The CERN phone book was a database which was being put together by merging information from the HR database and information from the computer users database. And those two merged was done across a firewall, which normally there was no network connection so somebody had to transfer some sort of physical medium in order to create that. So the social arrangement behind the CERN phone book, the online phone book had taken a lot of energy to create. And so that was exactly the sort of situation where the web was ideal. You just had to leave that. Say, don't change it. We'll run a little program which allows people to access it from outside the web. So some people they knew the web initially as a [? well-aware ?] sort of phone book.

INTERVIEWER: What was your original vision for what the web would be?

BERNERS-LEE: Well, the web wasn't the first project I had had where I had an idea and wanted other people to work on it. The situation I was in was writing software, creating systems with the help of other people. Typically, people who for one reason or another they thought it was a good idea. They didn't necessarily have their bosses permission to work on it, but it was in informal collaborations. And so the idea was that it should be a play space. What I was interested in wasn't just in it being something in which finished documents would go. What I was really interested in was capturing the meetings, capturing meetings and all the things discussed in the meetings. I was really interested in capturing the process. So that I imagined a student comes for the summer. I liked to be able to just point them at the project and say, look, this is where we are. This is what the design is. If you're interested in how we got there here's the paper trail. You'll be able to burrow down and find why we made these decision here. You'll be able to go to look at the background documents that we had when we made those decisions and so on. I was interested in it being an encapsulation both of the design, which was being collaboratively evolved, but also an encapsulation of all the social processes going on around it. So really it was supposed to be a play space. It was supposed to be place where you together make a hypertext design of something. A bridge, a program, whatever it is and because you've done it together in hypertext then it's available for other people to get up to speed very quickly and it becomes a resource for everybody else.

INTERVIEWER: Then how did that original vision change as you worked through and developed more and more of the web?

BERNERS-LEE: Well the original vision was to a certain extent is essentiated in that first program I wrote. The first web browser editor. It wasn't just a browser, it was an editor. So while you were looking at a webpage you could correct a spelling mistake and say, save. And it would save the webpage back. Or if you thought, oh, that's interesting. I think it's good. I think that idea is connected to this idea that I saw before you could go to find the other idea, you could press the mark combination. Highlight a phrase, press mark. Go back to where you were in another window, highlight something and press the link keys and then a hypertext link would be made. So in real time as you were thinking about the problem you could make a hypertext link. That program ran on a NeXT machine. Now the NeXT machine was a wonderful machine. It was a magnesium black box that Steve Jobs put together when he rebelled from Apple and put together NeXT. But not a lot of people had it. And in fact, at CERN in a rather unusual attempt to rationalize it, it was decreed that no one should buy them. So there was something like 12 on site. So that was really disappointing. So the web had spread to be as a collaborative medium in a digital space among people who had the NeXT machine. But then various other people built [? rogue ?] browsers. Pei Wei made one called Viola and that was a very interesting browser because it had scripts in it. A little bit like the dynamic for pages you get today. There was Cello, written by [? Lewis Midas. ?] And there was Mosaic, which Marc Andreesen put together. Which was about [? fourth ?] browser. And that became very popular, but these were all just browsers. So the moment people knew the web as being something you see from a browser, suddenly it became not a completely passive medium-- not as passive as television-- but a whole lot more passive then the read-write web, which had been the design goal.

INTERVIEWER: At the origin of this, how long did you think it would take for the concept of the web to spread? How did you sort of see it developing and how is that different from the way it developed?

BERNERS-LEE: I didn't really have any plan for it spreading at a particular speed. All the time I was worried about the thing falling over. Being overtaken by something else. Falling foul of rumors that you'd have to pay royalties or the various different ways it could get tripped up or just fizzling out. So it was going up exponentially, but a lot of things do this. So we were always worried that it was going to do that. And so in fact, it's a lot of logarithmics going through the orders of magnitude, a factor of 10. Over the first three years the logs of the first server, the number of hits on the first server went out from something like 10 through 100, through 1,000, through 10,000. What's interesting is that was pretty much straight line. In fact, it's two straight lines. The number of people looking on the weekdays was always slightly more than the people looking at weekends, but that was an exponential growth curve, which was really remarkable. And it was such a strong exponential. The load on the server would double every three months roughly. So now it was clear that because it was exponential and wasn't tapering off over those three years, it was clear that there was no indication it was going to stop. It was we call it, a slow bang sometimes. Like the big bang, but it's just happening over the months. So there was no plan really. But you could, looking at that, you got an idea of how people were getting excited about the project. Remember, that was only on one server and meanwhile the number of servers was also increasing exponentially.

INTERVIEWER: Were there any surprises with how this was developing, things that you weren't expecting?

BERNERS-LEE: A huge number of surprises. I suppose the number of exciting things people found to do with the web was just really gratifying. Very exciting when people produced the first web server, which had really beautiful pictures on it. They scanned in the Vatican Renaissance Exhibition manuscripts that somebody put on the web. Being able to follow through a silly little website with links and then suddenly the whole screen filling with a gorgeous picture. That was sort of a breathtaking moment. When Steve Putz made the first map server, I think that certainly people realized, wait a moment, each of these webpages, it doesn't have to be a file. It can be something put out by program. And every single time somebody clicks the program can return to something completely different. So the fact that you can move around the web, the map I think then opened peoples eyes. So bit by bit, the creativity that people put into the way they used the web was just great.

INTERVIEWER: Did you expect that this was going to turn you into a public figure? How did you feel about that?

BERNERS-LEE: It happened slowly over time. So I think I built up a pretty good resistance to it. So the same time I was putting the first web software together we were expecting our first child. So then we had these two children who were in lots of ways much more important than this silly project. And it was also very important that they grew up just as normal kids. So I had rules for them and the time I left there was no discussion of the web really. I didn't give any talks about it or anything. So for 15 years or so it was really, very much low profile and I wasn't really somebody that people recognize in the street or anything. And around MIT so many bright people have done all kinds of [? wild ?] things that this just completely blends into the wallpaper.

INTERVIEWER: Yeah, you can totally hide here. okay, so as this is going along you were increasing or you came to understand that there needed to be standards. And that led you actually to come to MIT, can you tell me how that happened?

BERNERS-LEE: Well the whole design of the web is standard. The reason it works, the whole initial architecture diagram of the web shows that you've got different servers, but the big connection bus, that the lead servers connected and different people, browsing clients, people using the data connecting into the top of it. And the connection buses is the fact that they all connect in exactly the same way. That each computers talks the same languages when you're browsing and your computer asks the server somewhere for a webpage and pulls that in. The fact that they've all got to use the same language, HTML, that's really important. That's why it works. Now HTML started off as a really simple language. It was a one page specification. I just wrote it as I coded it up. Everything with the http protocol. The whole idea of having these names for each document that sometimes start http:, those are URLs or URIs. Those are the three pieces of the architecture of the web. The really important thing was that all the web browsers and servers speak the same languages. Initially, when it was just me, nobody looking over my shoulder, it was easy. I could just write them up. And I had a little webpage about HTML. A little webpage about http. As time went on and I got a visit while I was still at CERN from four people from Digital Equipment Corporation, among them Alan Kotok. Alan Kotok is, I didn't know that he was very much a tremendously an MIT allowance, tremendous MIT enthusiast. But he worked for Digital Equipment at the time and he explained that the company was preparing to revise its whole product strategy because of the internet and the web. And the people he brought over were part of a committee, which was planning the response to the internet and he said, I believe that the system works and the specifications for the system are on some sort of disk somewhere in your office, I understand. So we're a large computer company, we'd like to be involved in the future of those specs. We'd like to be able to think about what features they need in the future. We'd like to make sure about that. We're concerned about the stability. So I asked him about what he thought would be a good way forward and he said, well for example, making a consortium. Like for example, the X consortium, which had looked after the X Window specifications. And I asked him, what form it take. And he said, well for example, you could base it somewhere like MIT. He said the X Windows consortium was based at MIT that it worked out very well for Digital. So something like that would work. That visit was followed by a number of months, a year or two for me. I did come over to MIT. Went to the lab for computer science for a month. I went to the West Coast, to Xerox Park. Stayed there for a month or so, a guest of Larry Masinter. And looked around. Went to see NCSA where Marc Andreesen was working on the Mosaic browser. And looked at different models for different platforms of consortium and so on. And that decided that yeah, Alan was right. When I talked to MIT and Al Vezza, Michael Detourzos knew how to do it. In fact, Michael was extremely supportive. Michael went to all trouble to meet me in Switzerland when he was on a trip back to Athens. We met in Zurich and in fact, I'd gotten his name from David Gifford. David Gifford I met at a networking conference in the north of England somewhere in a rainy day when we had to get a bus from one part of the country to another. I sat next to this guy, professor from MIT and he asked me, so what are you going to do with this web thing then? And I said, well I didn't really know. He said, well you should talk to Michael Detourzos at the Lab for Computer Science. mld@lcs.mit.edu. So I scribbled that down and said thanks. And I think David had previously just discussed this sort of thing with Michael. The fact there was a fairly deliberate plant for that e-mail address. I've had a lot of support from David and Michael turned out to be great. A huge person, large as life and twice as natural. And also very supportive. And very supportive of not only of doing it at MIT, but also making it into international thing. Making sure that it would have a leg in Europe because I really didn't want to abandon Europe. That was very important to me and he talked to me and he saw completely eye to eye with me on that.

INTERVIEWER: Can you elaborate a little bit about what it was about MIT that seemed to make it the right place to do the consortium?

BERNERS-LEE: Well, for one. MIT was a place full of interesting people. So it was important for me to be somewhere where I could chat to people and I already had spent an amount as a guest of [? Camp Sullins ?] who would be working on network names and names in the network and things. I gave a talk. In fact, somebody came across a copy of the announcement of that talk, which I gave back in '92. So full of interesting people. But more than that when it came to running the consortium they'd run the X Consortium. Al Vezza had put together the contracts for the X Consortium. He was prepared to do it again. So long as it looked pretty much like the X Consortium. If I wanted to make it something more like the United Nations he did not know how to do that. But if I wanted to make an industry consortium based at MIT then he did know how to do it. What was important for the consortium, is that from the industry point of view it should be neutral. It should be a place where different members of the industry can come together and talk about the future in such a way that they knew there was no inherent bias towards one of their products. So MIT, as an academic institution, and having done that very well for the X Windows system before that I think that was one of the things that MIT could produce. But also, it was the clout, there was a reputation. The fact that Al could pick up the phone, call five major computer companies and say, we're doing a web consortium, are you in? And they call him back and say, yes. But it wasn't instant as that. But it took a few months, but I think having it somewhere that was credible, with an international reputation as MIT was really important. Getting industry onboard, getting all of the industry onboard. Not just getting the people who happened to have come to MIT onboard. And also making it clear that the fact that there was going to be one web was really important. It had to be really good design. It had to be really fair between different industry. It also had to be very technically good and it had to be developed really rapidly. Because in those days the web products were turning over extremely rapidly. So it had to work faster than any of the consortia or any of the standard bodies that had worked in the past. So when MIT stood up and said that they were going to do that then people believe it and it happened.

INTERVIEWER: Did you find a lot of resistance to standardization?

BERNERS-LEE: Well, there's always a resistance. When an engineer is sitting there making a design, they're designing something new, webpages haven't had tables before and they say, oh, we could put tables. I know where we could put tables because I have tags table. Then somebody else is designing the same thing. They don't know, but somebody else is making one where these little tags they would tab. Somebody else has got tables where the tag is t. They're all so excited to build webpages that have got tables for the first time. They've all got users who are itching to use them. To actually get them to slow down and talk and agree to use the same tags, it's boring in a way. Besides what they want to do is get there first. And what they'd like to do is get there first so that everybody is using their particular form of tables and if they can do that then they won't have to recode. Everybody else will have to change their software to catch up. So they'll keep their lead. In fact, the ethos of getting everybody to admit during those early days, you know, we're all in this together and we're all smart and we should respect everybody's ideas. That was one of the difficult things. It's been very important. But the Internet Engineering Task Force had done a lot of that. Sort of had a track record of developing internet protocols in very much that way. Way in which people who have working software were respected because you know, if they had running code then that is respected. If you have crazy ideas about how it should be and you haven't justified it by writing code you're not so respected. So we took on a lot of that ethos from the Internet Engineering Task Force, the IETF into the web consortium.

INTERVIEWER: Has some of that resistance lessened over the years?

BERNERS-LEE: None. Because as Mike Detourzos would say, it's a constructive tension. So what happens is, you get a good idea. You think, I'm going to put tables in and for one of the marketers department is saying, hey, you know how browsers got tables. A few months later, you know what? Everybody's browser has tables and now the engineering department is having to write code which will accept three different flavors of tables. So that's a waste of time. It's a waste of time for the users. So after a certain point, it stops being a product differentiator so then there's no incentive to make yours different. So now, we want to make your code small. You want to make life simple, so you just want to settle down that the tag for table is called table and the tag for table row is tr. That's how it is now been since then. Still those are what the tags are for the table. HTML is developing and we still have these tensions. There are still people who want to rush things into HTML without talking to other people, but there's a general understanding that you really have to listen to everybody else because they've also got interesting products. Even if they're different sorts of products. They use HTML. And also, even though you're really smart, there's also other smart people out there. There are other smart people out there and they might even have some ideas which blended with yours will be even better.

INTERVIEWER: Well, it's a little discouraging that it doesn't get any better.

BERNERS-LEE: The constructive tension drives it forward. It's the urge to get out there in front and then the need to have one web. The need to have one web so you have one market so you have this huge galvanization of people using technology. But a lot of the drive is the urge to differentiate your product by putting something new in. So it's like a sailing boat in a way. That there's a huge force pushing the sail this way. Which left to itself would push the sail over. And there's a huge force pushing the keel this way, which left to itself would flip the keel up. But correctly managed, what happens is actually you take those two forces and the sailing boat goes under control. Off and into the future. So it's a bit like that. There are always tensions. Lots of which are commercial, which are competitive. But everybody wins when the whole field advances. When the whole protocol from when http becomes faster or http does something new. Everybody wins, so the competitive pieces all feed into the common piece and the common piece advances very rapidly.

INTERVIEWER: So much of the development has been prompted by people trying to make money and yet you've been pretty consistent in your belief that the web technology should be free and open, can you talk about why that was so important to you?

BERNERS-LEE: Well, going back to those days when the question of whether somebody would put up a web server. Whether it would convert their information into HTML or whether they would use something else. Why would they? So I was asking them for every document they had, every page out there, give it a URL. Give it something that starts http. So that when I look up that http thing in my browser I get a reasonable rendition of this information. That's a big task. I'm asking everybody to do that. You can't go to the whole world and say I want you all to give these funny http things to your documents. And then come back and say, oh by the way, and you're going to be paying me $0.02 a click or something. It wouldn't have happened. If I'd gone down that route then there would have been lots of other people setting up different ones. Incompatible ones. The web would have fractured into a whole lot of small ones. Small webs don't work. A small web wouldn't have taken off. It's only because the hypertext link could point to anything that it's at all interesting. So in order to keep that you need to keep one web. In order to keep one web it has to be royalty free. There was the story of the Gopher system. Gopher was a competing system in the early days, actually gaining ground faster than the web. You know, the web was doing this exponential increasing. It was doing this. Then one point, University of Minnesota, who employeed the people who designed it, they sent around an e-mail message which said that under certain circumstances, not for academics, but only for commercial people and not for people using the client, only for people using the server. And not now and anyway, not very much, we might charge a fee. That's when Gopher did that. People just dropped it. So that was a trigger for me to go to CERN and Robert [? Kayu, ?] my colleague just hammered on the CERN director to get them to say that CERN would never charge royalties for it. It would be really important. And the W3C, the consortium, that the idea that it should be royalty free has been a really important part of the way people come together to design the new technology.

INTERVIEWER: You've been working on the semantic web for at least 15 years now? 15 maybe?

BERNERS-LEE: Do I get to take away the mug.

INTERVIEWER: I don't think so.

BERNERS-LEE: So the semantic web in a way, I gave out some slides talking about web semantics. Explaining the semantic web ideas at the first web conference back at CERN. So pretty much for as long. That was almost 20 years ago. So the idea that we need to capture the relationships between things, we need to capture the data actually dates back to a program called Inquire within about everything, which I wrote way back at that first visit to CERN. Then I wrote a little sort of note card system, but it kept track of things. It wasn't a set of notes really. It was a set of things. And the machine knew about things and it knew about this program ran on this piece of hardware and this piece of hardware was documented by this document. Document written by this person. Capturing those relationships I thought was really useful. And useful to feed them back to the person, but also useful to analyze them. Useful to be able to generate diagrams. Useful to test, you know, see what state your project is in, things like that. So that was way back. I've always wanted to do that and it took awhile to actually get it to happen. To get it deployed out there. So there's a basic technology, RDF, soft description framework, which was now many years old and now we've got a whole suite of specifications in order for putting data onto the web. In 2009 I spent my time, some of my time wandering around talking to governments, explaining that they should put their data on the web. Not just the documents, but the data. We need to be able to access the data so we can compare it with data from other places. So we can join it with data, so we can analyze it. That's been a really interesting little movement. It's been great. 2009 was just a few weeks ago, the beginnning of 2010 launched a data site in the U.K. There's a data site, data.gov in the U.S. which is competing for the number of different databases it has in its collection. That's a simple way of looking at semantic web. That it's data. But the important thing is that it's linked data. It's data which connects together just like the web.

INTERVIEWER: How far along do you feel like we are toward a fully developed semantic web?

BERNERS-LEE: Well, if you asked me at [INAUDIBLE] how long, far along he was into the fully development internet I'm sure at every point you would say, we're not there yet. Similarly for the web, similarly for the semantic web. We'll never be there. However, I suppose there was a point when the internet became a stable platform on which I could develop the web. The web then became a stable platform on which we could develop the semantic web. Just by taking the web protocols and saying, yeah, we'll use extensivosity of the web to introduce new formats for data. So now we're at a point where we've got the protocols. We've got all the design of the semantic web really out there. And the areas, there are people who are using it. People in life sciences are using it. They've been using it. There's a lot of now linked open data, which is data out there using semantic web standards, which is just available about well-known people, about cities, about singers and bands and tracks on albums and all kinds of things that are interesting to the public is data about out there. So in a way we've got a platform. but on the other hand the amount of data which is out there, which is not on it is huge. But more importantly, it's not just about data sitting there. It's really about machines communicating with each other by expressing themselves in relationships and data in the web. So in fact, the semantic web is getting to be an infrastructure for all kinds of really, really exciting new things which are going to come. And I think it'll be a few years before the basic semantic web where it's sort of publication of data and its query has been out there enough for us to see some really exciting new things built as a layer on top.

INTERVIEWER: So give me an example or two or what I might be able to look up or find in two or three years that I can't do now.

BERNERS-LEE: Well things that you can do now with the semantic web is there are systems where you can ask things like, let me listen to music which had been written by people who were born in towns in Minnesota with less than 200,000 inhabitants or something. So this takes geographical information and information about people writing songs, which normally you'd have to go to separate websites to see, but because that information has been linked together you can now ask for music theater places from your hometown or places within 100 miles of your hometown. Or only by female people and so on. So that sort of query, if you gave a query for something like that to a search engine it would come back with nonsense. So that's the query where really the computer has to understand what it is that you're asking for. So you could do that now with the data that's out there, but it's only really the tip of the iceberg. The things which people will build on top of it, just like with the web, the great thing has been that it fortunately has not been limited by my imagination. Sitting here we could think of all the things we can imagine being built on top of the web. We could imagine all of things we could build on top of the semantic web and in the next 50 years all that comes to pass that would be a total disaster. Because really what's exciting is that we can't imagine. The people coming along, today's students now have all kinds of crazy ideas. The ideas people have in the future will be wonderful and very powerful partly because they're starting with the web or starting with the semantic web as their foundation. So what we have to sure is that rather than trying to think of how we're going to use it we have to think about making people that are developing web have to make sure it's a really solid platform for the people coming in the future.

INTERVIEWER: Yeah, it would certainly be limited if you and I were doing it because of me. But can you tell me a little about the World Wide Web Foundation and why you thought that it was important to start that?

BERNERS-LEE: Well, if when there was a 0.01% of the people in the world were using the web we looked at our stuff and said, you know what? Everybody in the world should be using this. That wouldn't be generally regarded as hubris and arrogant. But now, that 20% of the world are actually using the web that begs the question, what about the other 80%. So for the last 15-20 years the web technology has been developed by people in places like MIT. People who are excited. People who carry several gadgets around in their pockets. People who have huge screens, very powerful processors and constantly thinking about what they need out of technology and thinking how it could be better. So the question is, is the web designed by these people for these people? If the web were to be designed for somebody in a remote African village, would it be designed differently? What do we need to do to get the people who are not using the web into the information society as effectively as possible? I suppose the first perioc of time, which we talked about was a time of building standards, deploying technology and that continues of course. After a few years, recently we realized that the web is now a really big thing. It's got 10 to the power 11 web pages out there. That's like the number of neurons in your brain. So the web, if we took the web and could somehow condense it down into this size, what shape would it be? The brain sort of falls into two halves. They've got various bits and pieces. It's got various organs within it and which correspond to different functions in a rather curious fashion. But the web has emerged. The web wasn't designed as a set of pieces to fit together. It was just a protocol which allows things to grow and as each thing grows, as somebody makes a link or somebody follows a link, somebody reads a webpage, somebody clicks on an ad, these are all people. So it has got this very complex system, which has got a structure which we don't know a lot about. And which we rather depend on. A lot of people kind of find the web kind of useful from day to day, so it would be nice if we had some idea about the stability of it. And so that we realized that we need to really look at the design of the web. We need to look at that state of the web and need to look at whether we should redesigned the web to avoid instabilities, for example. Or we design it to be able to do things even more powerfully than it can do now. So from that came the idea of web science. So a few years ago we started what a web science research initiative, what now we should now produce the websites trust. So that was a second way of looking, a scientific way of looking at the web. There's the engineering way of looking at the web, which the consortium does. The Web Science looks at this from point of view of science. The web foundation realizes that we need to do all of that plus there's a social obligation. There's an obligation to make sure that we make sure it works. The consortium gas always made sure it works, so that people, no matter what culture, no matter what language they speak. We've had a very strong accessibility initiative. To make sure that it works well for people with disabilities. But now we've added another piece to it. It should now work not just in every device, not just for each type document, at least in every language and now we want to do it for every person. So the Web Foundation is aiming to look at that new foundation. It's very exciting times. There are lots of people who are doing work in that area that it's going to partner with.

INTERVIEWER: You hold a chair in computer science at the University of South Hampton, can you talk a little bit about this association between MIT and the University of South Hampton and the reason for that collaboration?

BERNERS-LEE: Initially that came out of the need to be able to talk about semantic web in more than one place at once. I found that I was trying to spread the word about semantic web, people would ask me to give talks for example, in Europe and I felt that really it would be nice to have some people in Europe that I had a close relationship with and who got it. Looking around at people, University of South Hampton, they've got a very strong ECS, electronics and computer science school. And they have done a lot of projects with a very practical bent. Really demonstrating that it wasn't just nice theoretical technology, but demonstrating how you could do cool stuff with it. They got nice demonstrations. They've taken all the data from a particular borough. London borough. And put it together and demonstrated how you could really find out stuff about the London borough. They had some nice examples of taking for example, all the restaurants in the given area and on a map showing which ones had the different, had the Michelin stars and then comparing that with the hygiene. With the reports from the hygiene inspectors and looking at correlation of that. Finding data, which you'd, lots of fun stuff. Taking real data and putting it into a system, which allowed you then to discover interesting new things. So I that I found that by making a connection with them that meant that I had a foot in Europe, but not only that, but also a connection with these people who actually got semantic web and understood it and could help drive the idea on the other side of the Atlantic. So that was really Web Science. And also the South Hampton folks helped start. And Wendy Hall really drove the Web Science research initiative in light of that.

INTERVIEWER: Having grown up in, been educated in the U.K., how do you see MIT being different than what you were accustomed to before you got here?

BERNERS-LEE: Well, I haven't spent a lot of time and been in a big research university. I mean, I've been to Oxford studying physics as an undergraduate so I never got a computer science degree. I hadn't done a second degree. So coming here and talking to graduate students who were studying computer science, I can help with idea and technology and teach about protocols and things, but I can't explain to them how they're going to get through being a grad student at MIT. I have learned from them. So in a way, MIT-- it's been really exciting. It's been really exciting meeting exciting people, faculty and not faculty. Lots of ideas. The lab for computer science was interesting, but it was there, sort of relatively boring building and we were in an office where progressively we were built around until daylight was completely blocked out from our group. So coming to the Stata Center after that I think would have been wonderful in coming to the Stata Center where we are now was great. So we're on the fifth floor of the Stata Center, which is more or less in the middle of the computer science space. So people come past, come past in both directions. There are all these sight lines that you bump into other people doing other things, so now it's big on campus. There's a huge improvement being in the Stata Center. Also, I find I really like it. I think people either love it or hate it and I find it's great probably because of the way people have to find their way past us to get to other places and end up dropping in.

INTERVIEWER: Are there particular strengths that you think MIT's Computer Science Department offers compared to other places in the U.S or other places around?

BERNERS-LEE: Well I can't really talk about it. The undergraduate curriculum, I am not really qualified. Because I haven't looked at them and I haven't looked at the undergraduate curriculum.

INTERVIEWER: What it is about MIT that's kept you here for so long?

BERNERS-LEE: Well, the people. The attitude to a certain extent. The general geeky excitement. The place where people understand that geek actually is a term of high praise, not a derogatory term to start with. There's a certain type of person who feels, sort of walks in and feels very at home when they arrive at MIT. They understand discussions. Anything which can you know, wander off into something philosophical or something technical or something mathematical or something curious or generally intellectual I think makes, you know, that whole spirit makes it a great place to hang around. It also indirectly makes it a good place to be because people appreciate coming here. I suppose self-fulfilling thing that once it has a reputation of being a good place to come to speak than you get good people to come and speak and then you can invite people to come and present their work and they'll be proud to do it.

INTERVIEWER: Can you give me the description of the person you think comes here and feels at home right away? What person is that?

BERNERS-LEE: Well, the person probably doesn't expect to be judged by their clothes. So certainly the people I work with they wear all kinds of things. There's no typical. Some of them wear shoes, some of them don't. Some of them wear lots of clothes. Some of them dress rather carefully and some of them have no idea what they put on in the morning. And they have to look down to see if you ask them. What sort of person? The sort of person who there's an intellectual space. A person who's curious I suppose and people who are creative. I think that a lot of people don't realize perhaps when in high school they're given the options of what to do that computer science is really a very creative thing. I think people look at it as being sort of learning about how to make a laptop work or how to build a commercial IT, information technology system, which may be really maybe boring. But whereas, I grew up when my parents were working with the first computers, it was clear to them because of chairing this work, that anything you can do on one computer you can do on another computer because computers in a sense they're universal machines. To a certain extent, if you can imagine it, you can program a computer to do it. And that is quite a challenge. It's a gauntlet thrown down to anybody who thinks themselves, to anybody who's complained that a computer won't do x, so people that realize that realize that actually if you want that done, if you find yourself doing something which a machine could do, you know what? You could be programming the machine to do it instead. It's that sort of person. People who realize that when they're dealing with somebody else's program rather than just complain about it they fix it. So it's that sort of person. And that's the sort of people all over here, so that it's very creative and there's a huge amount of creativities for creative people.

INTERVIEWER: Have the options for collaboration been important to you here?

BERNERS-LEE: Well, remember that the whole web is supposed to be this big collaborative space. So the way the Web Consortium works is that you work in the web. To be fair to people who are not in the room. Everything has to be in the web. If you have a meeting and you bring a document to it to discuss, if it doesn't go to URL it doesn't exist. Because when you talk about it somebody's going to drop the URL into a common chat session for the room and everybody in the meeting, remote or local will be able to click on it and see the document. That's how we work. Whenever minutes refer to a discussion, the discussion will have links to the documents. So what I'm used to working now in a situation where everything, fundamentally things are exist in the web. If you print a copy it's a temporary thing. It's curious, so when I then find myself working with lawyers or government departments where the paper copy is the fundamental thing and if you want to scan it in that's the ephemeral thing that's standard. That's very odd. So the collaboration that happens is the collaboration which we try to actually make work internationally across the web. And that's very exciting. So the Consortium is a huge collaborative engine. Its design is to get people to come together to agree on how to go forward, to get consensus among very creative people. So the whole Consortium has been a collaborative system and it's sitting within MIT. There have been lots of times when it's been nice to be able to collaborate with other groups. The theory group and it was the theory computing group, there have been lots of interesting collaborations. It's always good. So David Carver and I will walk into each others' offices occasionally to bounce ideas off each other and all kinds of things can come of something like that. Akamai, the company sprang out of a discussion about what it would take and what are the challenges, the theoretical competing challenges that the web poses? I said a lot. And somebody said, okay what are they then? So [INAUDIBLE PHRASE] selling Akamai. So it's great. Also, of course everything nowadays is happening in life sciences. It's been great to have people doing life sciences, bring their data to the semantic web. A lot of the early adopters of semantic web technologies, a lot of the great data sets have been about proteins and genes. So they've been very enthusiastic, early adopters of the technology there. There are lots of great collaborations.

INTERVIEWER: You have quite a list of awards and prizes and honorary degrees and things like that. I'm wondering if that kind of recognition has been an important part or an annoying part or how have you reacted?

BERNERS-LEE: I think initially I reacted by putting up a pretty good defense against it. Most which I've got still. I found that I was being asked to speak more and more often and then I realized and I found I had to say no because I'd have conflicts. And then I realized that when I said no, nobody actually died. Nobody was really hurt. They found somebody else. So then I realized that actually I could say no to the other people, too. And Dame Rennie Fritchie in the U.K. gave me this hint for the beginning of the year figuring out what sorts of day you wanted to have. Whether you wanted to have days by yourself, days with your colleagues, days doing something public, days doing something for a community, days doing something for income, so on. She would collect different numbers of different colored marbles. And when she did something she would pick a colored marble and put it into a big bowl, She [INAUDIBLE] herself. So if somebody called her and said could you possibly come and speak to these very deserving children who have just been shipped off-- are refugees who have come from Vietnam or even if they were very demanding. She would say, I'm sorry. I'm out of green marbles. So that sort of technique, just keeping things, designing how you want to balance your life, also I was under a lot of pressure to make sure I had a good family life. So I used to measure the cost of a trip in bedtime stories missed in those days. And so that pressure, which is very healthy I think kept me from zooming around the world too much. I mean, honorary degrees and things. I used to generally decline honorary degrees because I thought they were sort of vanity thing until somebody at a dinner faced me with the fact that he said no, we want you to do this because it's your duty to do it because we need you to be a role model for the students. You had a project, you wrote a program, it worked. okay, and so you have a duty to do that. So that changed my attitude to a honorary degree. So I now try to do some of those, accept some of the those. But always try to fit it in somehow so that I don't end up having to spend too much going around the world. So the recognition, I mean, at MIT I'm just doing my work. [INAUDIBLE] lots of people here, the town where I live people, you know just an ordinary person. The fact that I've got Sir in the passport sometimes means-- I suspect I get through passport control a little bit faster. Sometimes--

INTERVIEWER: They don't do the body search on you?

BERNERS-LEE: They still do the body search. But then they say, hey, what is this about? And sometimes it takes longer, but that could open some doors and it's meant that I suppose from quite early on I found I'd meet really interesting people. So that has been a big bonus. Sort of going to places and just being introduced to people who've done all kinds of interesting things. Having this sort of inventor of the World Wide Web sort of tag mode. That's been interesting. But on the other hand, you can't spend all your time zooming around the world.

INTERVIEWER: How many times when you're introduced or explained as the person who invented the World Wide Wide do they come back and say, I thought Al Gore did that?

BERNERS-LEE: About 25% of the time.

INTERVIEWER: Yeah, I've been hearing that a lot, too.

BERNERS-LEE: Then of course a lot of the times they introduce me as having invented the internet, which was 20 years before. Very different set of people. That we all owe a lot to, but trying to explain to a typical audience the difference between the internet and the web, it's really difficult. Because they don't remember what it was like. You know, they didn't know the internet before the web. Trying to explain to them what it was like is really hard. It takes 45 minutes.

INTERVIEWER: Are there any of these honors that particularly pleased you? Like the MacArthur grant or I mean, did anything?

BERNERS-LEE: Well, the MacArthur grant was very early on, so that was quite a surprise. I'd never heard of the MacArthur grant when I got it. So it was really being sort of woken up, called at some ungodly hour of the night. So that was a surprise. The Millenium Prize from Finland was a big prize. And I was the first person to get it and the Fins are tremendous hosts. So that was quite a day and that was also the time that we broke the rule of not involving the children at all. The youngest was 10 then and in fact, his 10th birthday was on the day of the ceremony. So he ended up being completely celebrated with five birthday cakes. But by that time he learned that actually you know, that whatever Daddy did it was no big deal and he learned to be sort of cool with being photographed. and he learned to take it, they both learned to take it with a huge grain of salt.

INTERVIEWER: Your children have grown up to be relatively normal?

BERNERS-LEE: Oh, what a horrible idea of them being normal. They're wonderful people. Wonderful people and they are completely unique and full of all kinds of stuff. Very different and very different from both of their parents.

INTERVIEWER: Isn't that wonderful when that happens? Is there anything that we haven't talked about, particularly about your impressions of or feelings about MIT that you think would be worthwhile to say? BERNERS-LEE: We've talked about Michael Detourzos. We've talked about that and now Al Vezza putting together the Consortium. That was an initial, very supportive thing. Actually I found out later that also, I think, Chuck Vest was president at the time and I think Michael and I had a lot of support from Chuck. I heard from Chuck later that after he'd retired from being president of MIT that when looking back, the two things that he was most proud of he said for during his time there were the open courseware and the Web Consortium coming to MIT. So that was really nice. I suspect that I may find out as the years go by, the places I've had support from, which I never. Sometimes support has come from places where very, very quietly and anonymously and you only find out indirectly later on where people have really actually played a role in making things happen. So I'm very far from understanding how the Institute works. But so far, it's been an exciting time. Recently, Susan Hockfield organized a trip to Davos, the World Economic Forum with I think, 17 MIT people went. I was in a group of five people giving back to back five minute talks, which is frightening.

INTERVIEWER: Sounds like a speed-dating.

BERNERS-LEE: We all ended up putting our slides on videos, so that we'd just perform in front of the video because there wasn't time to actually press the slide button and move on to the next thing so you could actually stage manage the whole thing beforehand. So that was just the most recent thing we've done that's been very useful. Going to the World Economic Forum where lots of interesting people to meet and talk to about all kinds of things web related and other. Coming with an MIT badge gives you immediately a lot of respect. It opens doors.

INTERVIEWER: How do you think MIT is seen abroad?

BERNERS-LEE: Well, there's two things conflated there. I think MIT is seen as with a lot of respect, and I think that of course how Europeans think about Americans is altogether something different. So I think there's a lot of disdain. I think when initially the Consortium started up there was some people who were very upset about the idea of MIT running the Consortium. They felt it should be done by something European and so I think a little bit of competition across the Atlantic had always been a good thing. But recently we have a good competition between the U.K. government and U.S. government putting their data online and each leapfrogging the other and that's pretty healthy. But yeah, I think MIT, the name MIT opens doors abroad. I think it's really important that MIT doesn't get arrogant about it and continues to make sure that it works very hard to deserve it. Also, I think there are lots of other great universities around, there are lots of great research centers with wild, wacky people as well. So I think more and more, you know, partly through the web and partly through everything else I think more and more MIT will find that it's part of a global morass of fun and exciting things happening. But then in lots of places like with OpenCourseWare, for example, it's pretty much been the leader. I think OpenCourseware is a really exciting thing. The Web Foundation has now taken me to Africa, where in developing countries where you meet people who've really put together courses using MIT OpenCourseWare. It was an MIT idea, really, and which other places have picked up. Another way they're changing the world.

INTERVIEWER: It sounds like you like being associated with it?

BERNERS-LEE: Yeah at the moment.

INTERVIEWER: What's your current focus of your research?

BERNERS-LEE: Well, the semantic web research I've only had a little bit of time to do. In fact, most of the coding has been done by undergraduates, which is great. By Europe's and for my own little pet project. So in the decentralized information group we've got various people working on semantic web related things. Lalana Kagal and [? Dali Whiteson ?] both work on the side of policy related things. That is, machines which are aware of the social aspects of information. They process information, but they're aware of where it comes from whether to trust it. Who it should be given to, what sort of use of this information are appropriate. Tracking all that. Making more responsible machinery. There's the challenge of how to make, if we've got all this data out there, all the semantic web data, supposing you give somebody a really big screen and really big goggles and all the keyboards and joysticks that they could possibly imagine, how do you give them the ultimate interface to all the data that's out there? That's a pretty big challenge. These are interface to the mass of the semantic web data and we've just started doing that. Those are somethings happening in the decentralized information group.

INTERVIEWER: Is there anything that you have planned to tackle in the future? Do you have a list of things that you want to work on?

BERNERS-LEE: Oh, have I got a list of things? So in W3C we call that the someday pile. And it's huge. Yeah, I mean, I've got this list of things. Should I be excited about it or depressed about it? The number of things which I'd like to do. Projects I'd like to do. Things I'd liked to try out. Challenges, which we'll never have time to write the grants. There are lots of things and of course, it's a continually changing world on the web. So as the web develops new technology then it suddenly becomes a different sort of place. There's analyzing. They're understanding it and then developing new things in that new environment. So it is constantly changing. It's a constantly changing environment as well. So constantly new challenges. The whole Web Science thing is very multidisciplinary, of course. Because the web is the web of people connected. So you need psychology and you need sociology to understand it as well as computer science and math and things and this big system. So you need complexity and network science. So Web Science is really new in that people have not really put together multidisciplinary groups to work on all the challenges of the web. So it's bigger than computer science. And it's in the early days of defining its challenges. It's the early days of just defining in the curricula for the graduate students should go to, to participate. To go to participate in it. It's not as though we're anywhere near seeing the end of this. It just gets more and more exciting and bigger and bigger.