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Speech at the 2nd Biel-Bienne Communication Days
Economic recovery in telecommunications- Is land in sight?
View of the innovator

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What Marc did not mention to you was that when he persuaded me, asked me to come, we had had almost as much wine as he is giving each speaker. And when we drank that wine, we were talking not so much about the Biel-Bienne conference as about a World conference, because Marc's not mentioned it to you, but he has a fundamental responsibility for the conference in PAL Expo in December. For between 50 and 150 Chiefs of State, to discuss what is the impact of what we do that is of technology, communications technology, media technology, on the world and in particular on the poor.



John Gage

One of us was talking at that wine drinking session in Davos about the Secretary General of the United Nations Kofi Annan and when he won his Nobel Prize, he gave a speech. This is a big organisation the UN, many people work there. And sometimes you think they loose sight of what Kofi Annan said which was: "everything we do, bringing new communication technology to people, at the end can be measure by its effect on those who have the least. And in particular he singled out; use the image of a young girl in Afghanistan. What do you do that can change her life?"

And we heard earlier on this morning the statement that technology can indeed change the lives, we might call them customers, we might call them citizens, but of those people that are involved, using what we bring to them, to alter what they do. And as we heard earlier this morning and if we don't do a good job in bringing to them something useful, then they won't use it. We saw that even the president of Orange, when he was given his little cell phone he only knew how to push buttons, on and off. He says he can now use three buttons, or maybe four, I don't know, I don't know how many. But he made the merit of his small device, only knowing one or two things.

Since my topic today was innovation, where does it come from, what's it doing, I though I would show you an example of innovation. Now, since you are a technical group I will describe to you what you are about to see. If I were not taking the time to explain it I would say: "You've all seen this if you've

watched any of the coverage of the war in Iraq, if you watched CNN you saw 'flying over Iraq'. It illustrated the story. They're moving, they're flying north and this division and that division", and you could see images taken from satellite or plane. You had a Magic Carpet and you flew over. That is what they did a little bit on CNN, to show you things. Well this is that application. And until the Iraqi war and until CNN began to use this, this was free. You could get this, show this to your kids, use this, download it on the net, now they are charging some money for it, so I will tell you about that in a minute.

But let me show you what this is, behind that image. Well a satellite took that image, a satellite, American satellite, Russian satellites with sub-meter accurate data, French satellites, European Space Agency with a little less than sub-meter accurate data, very accurate data. When you try to see a person or an automobile you need imagery from an aerial survey camera, you need data from a predator as they used in Iraq, cameras that are close to the ground. But the idea of taking the pictures is easy, well known. They've known how to do this for a very, very long time. You just take the picture, you have a technical problem, here's the ground, you take the picture, the camera is at an angle to the corners, so you have to rubber sheet the image, so it appears the cameras is perfectly vertical over every point. Auto rectify, trivial really. Easy to do but you have to do it for the pictures taken of Biel, by the cameras in the aeroplane at the airport; every pretty day people at taking picture.

For real-estate companies, well you combine them all of together and since they are auto rectified they all go into spatial database and you put it across the Internet somewhere. Who cares, it's on a pile of machines somewhere. Which allows me; if I want to for example see a place that none of us will ever see, let's say it is the centre of the Imperial Palace in Tokyo. Across the Internet you get imagery, higher resolution, higher resolution, higher resolution, higher resolution, higher resolution, higher resolution, until I am at a place that only those that work for the imperial household, or are Imperial itself can to go. So, here is the Imperial Palace in Tokyo. If you want to see Tokyo a little bit we will go this way, and we will go up a little bit, there's the Imperial Palace. You will never see it, but you will see it this way.

Now, what's involved in this? Well, auto rectifying is trivial. Taking pictures is trivial. This little application running on the PC that does this, or this, this is all simple. Data, plus a nice way to see it, a metaphor, I have a Magic Carpet and I am flying down to see what people do, well we could apply this as well. Why don't we go look at Los Angeles, or actually while we are familiar with this, why don't we go take a look at, here come Los Angeles, closer, closer, closer, closer. Now unfortunately at this moment, this machine is not on the Internet, so what you see here is stored in the machine. So, since it doesn't have that big a memory it's merely a memory of where I went recently, sometimes it will be blurry. Sometimes, ok, let's go take a look at what you saw on CNN, these are the images that all of us saw, if we watched that coverage, photographs taken at different times, a year ago, a day ago, a second ago. Imagery, where is Saddam, let's see if we can find him, we'll look, is he, maybe he is over there! So, this way of travelling, I'm in control, I

can see things, I am on the Internet. If someone took a picture 30 seconds ago and dumped it into that database, I could see it.

So could someone with a small handheld device. Now, not yet in Europe, but if you are in Japan and you buy a J-phone that has a graphics chip in it, that, this ability to go to, lets go back up to California, this ability to go to someplace as if you have a Magic Carpet. The graphics are powerful enough in the J-phone, the expensive one, to be able to do exactly what I am doing here. Now, that begins to be interesting to people. Let's go to, I'll come down here a little bit, let's go to here. The reason we are not connected to the Internet just at this point is- Bill Gates knew I was coming and even more of his usual bugs are in his software and so this, that did it, see, just there. Never mention Bill Gates, he has ears everywhere, this is... Don't worry, we will start again, it's a little boring. Let's see, the clock is ticking, Bill Gates owes me 5 Dollars a minute. That's fair I suppose. Let's send him a bill for the amount of time we are all wasting.

So let's go back to LA. So if we go, here we go, now normally you have the pictures which let's you do this Magic Carpet thing, it's a metaphor. It's a choice of language that we all understand, and you can see, well look, we are just coming down to look at people. Could be your house, well that broke again. So, what I am going to do it move this, move out, ha, well ha, great. Maybe we won't be visiting Los Angeles, we are not moving block there somehow. If you could take all the data that is interesting to people, what's interesting? Well, where is my car?

Let's go someplace that's, oh, let's go to P'yongyang. Let's see how P'yongyang is doing. Is it running? Yeah. If you could take the movement, out problem at the moment with North Korea, the imagery, is it, not it isn't cashed here, ordinarily it is much shaper. You can see all the governmental buildings; you can also see some of the 11 000 artillery tubes. They are buried right here in the mountains. Notice, there's Seoul, from Seoul to P'yongyang, let's see how far that is. Let's try doing a circle from P'yongyang out to Seoul. About like that. It's a 111 miles in radius. If you go just to the Deemzee, so we go from P'yongyang to Deemzee, Deemzee is right there. If you go to the Deemzee it's about 24 miles from the artillery tubes to downtown or the suburbs of Seoul. 100, that's a lot of artillery. Switzerland has things hidden in the Mountains but it's nothing like Korea. Korea has been digging for a long, long, long, long time and then you have the ability to hide what you want to hide everything that you have. Then you do what they do, you prepare yourself for an onslaught later that will keep everybody from challenging you because you've got all of your weapons. So, if we go back again, no, I tried that and, Bill Gates was killing me, let's just go back to Los Angeles in general.

If you take the In-car-navigation-systems, they're all done; the car speaks to you, meter accurate, sub-meter, turn left at the next corner. If you take every entity that you are interested in, all of the roads, all of the schools, lets tilt this up so it looks more of less, you take all of the things that you care about, they're roads, let's see if the schools are here. Let's go down on Los Angeles,

a little bit, as we get closer you will begin to see, in, if this has been stored in memory here, If, we would see every street in Los Angeles, every street in North America, all streets in Europe. Let's go up here and see if I can find, we'll stop on top of this school. And let's see if I have all, yes, those dots. We saw them there for a second, represent police stations. Let's stop, let's go up, there, there is a meter accurate location of the Westlake Medical Centre, hospitals and police stations. There is the Malibu Fire station.

So, anything that is part of the infrastructure of a city, of a town, the schools, the police stations or retail stores, or any of the facilities that you all use, you have the ability to see them, and to allow anybody else. Ah, there is a school, what's the school? That is St. Jude the Apostle's School. So you can see the ability to overlay the information about what really matters to people. Where do I live? Where can my child go to school? Is there a traffic jam? Where's the location of the bridge that I need to get over later? What can I use this type of capability for, the moment it is untethered from some big bad software behind bad operation system PC and is running on the device that you saw that Orange had or that the J-phone shows in Japan?

Well, suddenly the services, as the telecommunications companies call them, the services, the mix of services that change. People will find a way to use this, just as the kids have found the very crude ability to use their fingers to send short messages, now imagine when I am trying to meet, the reasons the kids send sort messages is to meet each other. I am here, you are there, let's go there, let's meet there, will so and so going to join us? That is what most of the short messaging traffic is. There location based capabilities, in this case built by 20 people, doing nothing more complicated than putting picture on a database, putting the database on the Internet and writing a simple application for a PC that does the graphics, that's it. Well, they have to get the data for the streets, cheap, they have to get the data for the restaurants and the police stations and the schools, free, put this all together and you have built something that has an enormous potential.

So, it's pretty, it's fun, I guarantee you when you do this, I'll show you the web address where you can download this, I think they will change their pricing ideas, when you do this, you will spend hours. Because when you ver go to Tokyo you never see the city, you are always in the subway, up in a tall building, down in the subway somewhere, you have no sense where you are. Every place aside from your home, where you know every pathway is a little vague, but suddenly with this it becomes sharp, you become a citizen of the world, you revisit places. Now, these images, we don't show them time stamped, but now imagine they are time stamped, so you can see what your house looked like yesterday, or last week, or last year, or 5 years ago, that data exists, there are huge spatial databases around the world. Also the data exist that has the building plans for this building. A 3-Dimensional can system designed this building, and that is on file in Biel. The Canton has the drawings, every electrical outlet is in the drawings, 3- Dimensional.

So you place on the map like this the 3-Dimensional buildings, the data already in computers. Now you have something completely new again. In the

context of today's interest in terrorism, if I have the ability to know where all buildings are that have a natural gas turn on and turn off. Or the electrical powers turn on and turn off. If I am a policeman and I am concerned about what I want to be able to do when there is an earthquake, or there is a fire, if I've got all of those capabilities simply in my hand, then I am able to use them when an emergency occurs. Save lives. Turn off the gas, stop the fire, turn on the electricity, turn on the pumps for the water. So the ability to bring together the individual components, OK, I think I will give up this idea, you got the idea. The ability to bring these components together, they are in this powerful way, in this instance was done by 20 people. Oh thank you so much. I must be talking too slowly here. I'll speed up.

I show you this because this is innovation in a practical level. I must say, I have never thought very much about the telephone companies' abilities to innovate because of the layers of the meetings. And oh my god, can't we and we have heard a very precise, Jens Arnbak gave a very precise formulant formulation about what's the future if we have 'n' countries, they have to each send 'n' minus one copies of regulation to everybody else. And they have to receive from everybody else. So by the time you multiply 'n' times 'n', minus one, you have a great big number and they are all supposed to harmonise. Well, where is the innovation? Paragraph 4, page 312 and by the time you harmonise it somehow gets lost. I prefer the kinds of innovations that are built upon simple things that everybody understands. It's almost poetic because I didn't need to tell you anything about how this worked. I could have told you simply those words 'Magic Carpet' and you'd have it. You don't have to say anything more because you already know what a Magic Carpet is. Now, let me switch from this breaking machine here, here is my major advertisement of the day, I'll switch my Macintosh, I'll switch.

So, we're talking about innovation in communication and tomorrow we are going to hear a lot more. Wait until you hear about Al Jazeera, this is a story that is fundamentally important. Nothing new, people know about television cameras, know about satellites, know about, we've used all this stuff, but the moment a little group renegade BBC people, who decided to take their group and devote it to news coverage in a new way in Arabic, it had a power. It has affected all of our views about how the world works; 10 people- powerful by using existing things, in new and powerful ways. That's innovation in the future.

So what did we hear about this morning? Well first this is a major statement. If transactions go down, transaction costs go down, there will be a change towards a looser organisational form. The 20 people that built that earth-viewer application, half of them were Sun people, half were Silicon graphics people. They built the control rooms for the United States, National Security Agency, the White House Situation room, all the Pentagon, there are several different control rooms in the Pentagon, and realised that the PCs are becoming powerful enough to do what I just showed you. They didn't realise three years ago when they started this, that the cell phones were powerful enough to do it but now that you look at it, of course. Of course, because we

have such a volume in the cell phones, we can begin to add capabilities and people will find new uses for it.

If transaction cost goes down, then we are going to find that the entities that make these innovations have a different organisational form, than the 'n' by 'n', minus one world that we are now in. Unfortunately the regulators are doomed to be in. And we have to find the method to combine these two worlds. Because I agree precisely with Professor Arnbak, we have, regulation is a critical component in allowing it sounds contradictory, in allowing the freedom to innovate.

If you lock something down in a way the innovators can't touch, there will be no innovation. And so he said, during a process of attempting to change things. I did get this accurately, didn't I? I hope I will be retired by the time this comes. If we find that there is a significant market presence by any in our 18 defined markets or 19, 18, 18 defined markets. Well, there's a slippery arch, is defining what a market is. Because if I am correct, and we are merging things, and Al Jazeera, and Telecom, and the computers we use, and the handheld are all starting to use the same things, we are going to have an increasingly difficult time in defining what the market is. But these five steps would be the five steps we should use, I assert, in all the new, looser forms of organisation allow innovation to occur.

Transparency of course at the beginning, non-discrimination, everyone can use it. Then we separate of self-interest of entities that have to meet their quarterly numbers and look good, and start cheating and it's not just telecom. The energy companies, Enron as prime example would constantly be trading the same block of energy with a partner until the prices got very high and everything looked very good. Well, criminality comes by requirements; for daily quarterly profit and the last observation, technology comes in cycles.

There is a cyclical term that we are entering just at this moment; you could call it the cycles merging, just as that perfect storm movie pointed out. Four or five separate things, which by themselves have no impact, when then they come together, create something new. Marc, of course in response to all this said: „Well, we're Switzerland and we have similar rules, but we do not have to follow the rules of EU“. I like that, that's an important point here because just as in the United States „this is a really fundamentally important reason for the French“, because if here are no French, there are no challenges to stupid policy. So you have to always have someone that says: „we are the rock in the centre of Europe over which all water must flow“, or something like that. Now the tenor of my talk about language and metaphors and the rules that allow us to interact I actually stole from Moritz Leuenberger this morning because he said, he was making his comments about, well this would this become just like Christmas, we are going to come back all the time and I will be like Santa Clause. He did not quite say it that way, but, I will be coming back, you know, and I will give things but he listed a series of rituals.

Now, I'm listening to the English because my German is not good enough, so the word used by the ritual, the technical crowd uses the word

protocol, it's a rule for how we behave to each other. Jee, I arrive with a device that has 110 volts at the back to plug in to 220. So we have a little rule that the plug won't fit because the plug won't fit because it will save you. Well, here are these rituals or protocols, so I put Leuenberger on the left, handshake; I have no dagger in my hand. Well on the network when you handshake, two entities across the network say to each other: „ I am not evil, I'm know your identity and you know mine and we've now have just established some contact here. We haven't gotten much beyond this, we're not married yet, we're just touching and already knowing that you are there is pretty interesting. Then he said, now go deeper into the Latin culture. When they hug each other, as we all do today it seems, what are they really doing? They are patting down, they're frisking the person for hidden weapons. You never know, the dagger wasn't in the hand but the dagger could be in the belt, be careful.

So, what's the equivalent thing in the network world? Only idiots like me take a piece of code across the network and just run it. It could do anything, well on this operating system it couldn't do just anything. So when you do something that involves millions, tens of millions, hundreds of millions of devices that are not only exchanging data, Telco's talk about mobile data. It's not just data, data is just easy, when you move programs and they change the functioning of the device, it's a pathway for innovation. So, in particular look at Docomo. Why did Docomo, why did NTT get all the little companies? NEC, Sony, Fujitsu, the little guys and get them in a room and say: „We're NTT, and you little companies, we will allow you to make the handsets but there are standards we require of you. And the first and most important is that you must allow programs to move from device to device, that change what the devices do. That's a powerful new idea, and in the past you have to return the thing or throw it away. Now you can just change its functioning by printing some piece of software but if you don't know it's a friend, if you haven't given it an embraceor, if you haven't hugged it, you better have a way to do that. So, that's the point to all the jargon and stuff. You better make sure that when these programs move, they are not going to do something evil.

Alright the next thing he sited. There's another style of „oh santé', raise the glass. Well know what's that mean? That's the way the programs running somewhere independently can say to each other. „Ah, you have something that I want. I recognize you have something you want, woops, are you still there?“ Because things break, so you have to be constantly saying „I'm fine, how are you?“ „Oh, I'm fine. Are you there?“ Where did you see this most recently? On the desert floor of Iraq, 200 truck rolling through the dirt, receiving from weapons, from sensors, from planes, from people on the ground, from this entire network mesh of armorment, which automatically allowed something to arrive in the networks base and say: „I'm here! I'm a canon that goes 200km. „Oh, thank god“, all the other programs say. „We have a target that's 130 and nobody it able to hit it. Thank god you are here. Here are the coordinates“. Now, this is interesting technically because it allowed devices to arrive and to depart from the network. They had to identify themselves, they had authenticated themselves but it allowed a mashing of capabilities, never possible in a normal commander control world. You talk down, you don't know enough, it's too crazy out there. You just don't know. So

that capability, from peer to peer stateless query. Why stateless? Because if I remember that you are well and I trust that memory, you might be sick. You can't have a network that works like that.

You have to have things that are constantly checking to see if you are alright. That is how security works. So are your cellular telephone systems. The phone is saying: „here I am. Here I am.“ Six antennas, here they talk about us behind our backs. Who has the strongest signal? The one that does, wins. But if I move 5 meters, here I am, somebody else gets me more loudly and it takes over. It all works locally. It's a new form of control, distributed control, not centralized. Something allows you to do something, now for instance to site the regulatory view that as you changed the transaction costs, so does the organization change. We've just watched the transformation of a higherarchical military organization into a self-distributing entity. Those people all commanding those American and British troops, to what extent is another question, but commanding them all, didn't tell each tank what to do. They had a direction and then everybody's out on their own. You go and follow it, and check back in.

The last, the last thing he cited a letter he sent, I guess, to the mayor of Zurich saying „Re: Received. Honorable Minister“, and at the end it said „Love, Mayor of Zurich“. Not in our world. There is no emotion. There is not even irony about well, how amusing it would be if the mayor of Zurich in fact said something nice to the minister. There is not that in our world. You can't use that. That's too bad. How can we make our business dealings? By trusting our emotions about whether we trust and believe somebody. At bottom, that's why we come to meetings. We could do this all on the net. Bad idea, we went to come, talk to each other and drink wine too. That was another idea for instance. So, it counts to how people that are understanding each other, again, this is Leuenberger saying this, is how you behave in a civilized manner and that's how we are driving the changes of technology, lots of ugly things that did not work very well; we're now trying to work in a civilized manner.

Trujillo showed that phone, that science said: „You know we have failed interoperability“. The US is a disaster, I mean really, the cellular phone systems don't work and he says another thing we used: past the 60 second test. Do I understand it? Can I understand it as easily as ‚Magic Carpet‘? No, I got more buttons than two. What do I do? So, this change in what we are going that brings some form of civilization to the utilization of technology is innovation. Just as I showed the world build on that earth-viewer thing, built on nothing new, we've been able to do all those things for 30 years. Now, same idea comes to play in the world of the merger of telecom and tomorrow and the media. So, tomorrow, as he said, if the mobile phone is the deliverer device you can use these words; turn on an internet radio station. So how does that fall into the regulatory theme of 18 separate industries?

Is it a radio now, is it a television? Who are these people; who determine whether or not that wonderful device that, say Palm Pilot, with color TV and GPS? What is this? What industry does this belong to? Well, regulatory regimes are named by the kings of wire we use- cable industry. Does this

make any sense? I mean really, are we, we're stuck. We need to harmonies things; we need to alter the language we use to describe things. You know, and I liked very much, how often do you hear a CEO say we have no idea how we are going to make our money in ten years. He was trying to spell the idea that we have no idea how we are going to make our money now, things change so rapidly that we don't know how we are going to make our money and innovations are coming at high speed.

And I wrote down what people say because I find for me it is the easiest way when I am thinking back, what did I learn at that conference. I have to have written it down, I find that if I write it on pieces of paper, I put them into my pocket and I never look at them again. So I decided I'd do this and I have a way that makes me realize that in an industry, as ASCOM is, focused on, he said was doing surveillance and payments systems. Well this is what's underneath that, he is doing identity. Who are you? Are you are in the right place? Do you have the right authorization to use this equipment or that pay? To be paid? To walk into the airport? Identity systems underneath?

And what I want to argue in this talk, in the new areas of innovations, this perfect storm of new things coming together, all the ways we relate to the world, buying things, selling things, trying to find where our husbands or wives are, trying to find the car keys, trying to pay the electric bill, trying to bring down the peak electric load for all of Switzerland, trying to utilize water effectively. All those things at the bottom are built upon identity. You have to enable those distributed devices that speak to each other, to tell you who they are and to establish to tell you is true.

It's a mess right now because we are dealing with so many different identity operations. VISA, the Hotel Elite, the most active bar in Biel only wants to know that I have a credit card that I can pay with. They don't care about anything else, unless I really drink too much. They don't care about anything, except that that thing asserts that I have money and I can pay the damage. So that's all they care about. But if I am attempting to walk into this building and go into the swimming pool, I should probably show something more. I mean who knows who I am. Am I somebody that might want to damage the place? Am I somebody who might want to change things? So, the idea of identity at the bottom is fundamental.

Now I put up a number of instances if things that are changing with the time very rapidly, these are technical changes. I think it attacks the foundation economics of the media industry and the telecommunications to some degree. So, in Athens, if they ever build the stadium, which will be a very interesting exercise by the time the Olympics begin, in NBC who paid a lot of money, oh, hundreds of millions of bucks, lots of money to cover this and we are all going to watch it. They are going to do 24hour a day coverage. First time, never done that before, but why? Well, because they can do it, they can put digital cameras around.

There will be a hundred cameras out there, even more but use a hundred and the cameras taking digital pictures, IMPEG coming right out the back. And the

IMPEG goes into a pool of disc, sits there, while at the same time 50 editors are taking this little peters-peters fencing, finding the videotape of the champions home life and putting the two together and sending them out across the network. This is a very big operation. The Olympic Committee doesn't allow any of us; Athletes in Sydney, in Australia they told everybody Athlete, you can not write to your home newspaper tell them about the Olympics, because we own it; we the Olympic Committee own it. You can't tell anybody, your words belong to us. Well, now that a number of them have been fired or have gone to jail, we're in a better state. The ability in Athens still for you to take pictures, they are not going to take away your camera but they are not going to allow access to the networking.

We are running the IT in Athens and so all of the plans about how this is going to work, we are putting fiber all over and we are linking things. Building this system, which we are doing, is all dedicated to the power that runs the Olympics. Now, let's jump ahead to Beijing. What happens by Beijing? I wonder if you saw the notice this morning. But the 6 mega pixel cameras have just plummeted in cost, big change in cost. So by 2008, five years from now, instead of 100 cameras, there will be a million cameras. We will all have one. The cameras won't be 6 mega pixels, they will be 50 because the 50 mega pixel chip exists today. They don't cost any more than the 5 mega pixel chips. They are going to be generating 500 mega pixstrings. At this moment if I thought about it, I could have brought the new little Apple; Apple makes this wireless hub, 54 mega pixs; 54 mega pix in 2005, no problem- 500 mega pix in 2008.

So suddenly the money that they paid, NBC paid to be showing the world the Olympics, 100 000 people, us, wearing hats with our little camera, stabilized are going to be taking long distance pictures, and sending them home so everybody will be able to watch our version of the Olympics. And we are not going to pay NBC; and we are not going to pay the Olympic Committee. There is a shift cap that just changes in technology, nothing new, we know about cameras, we know about networks, big change. So this is a lot, you know these sort of changes where you have video everywhere, you have screens in every bar, you have, you could tell the Hotel Elite that you are going to be their person in Beijing, as long as they'll let you have good Swiss wine forever, and you are covering the Olympics for them.

This is something interesting; it changes people's ideas about how you make money. Broadcasters, Telecommunication companies, somebody is going to carry this traffic and it is going to be a lot. Today we have 100 Million of these mobile Java devices. This is a big number, Docamo put out I guess about 40 Million of them, Java devices, Motorola has got its new Java phone. So all these new things coming out, Nokia, all Java phones, are enabling remote devices to change what they do. So we've been waiting for quite to use the capability what we all this huge bandwidth we used a bunch of money for but nobody is using. The devices are reaching the point where this bandwidth will be used. And it is not just the pictures, that is 80% of what's on the internet, but the idea that you can place something in space, because everything is somewhere.

That location data is not in your databases today. You have a customer name, you have a customer ID, you don't have their location, you might have a street address but you won't have an idea how that street address relates to their work address and what trajectory they take to get there. That is interesting data. The beginning to merge location data with identity data, with sensory data, you could call it 'let's make the world more efficient', let's get around that roadblock in Geneva in the afternoon, when everybody is absolutely frozen. You can't go anywhere, why? Because you don't know which side streets to take, because nobody is telling you your location, your destination.

So, this innovation is suddenly coming in an arena that is new. All we are doing, same old story, nothing's new, more bandwidth, more storage capability, more ways to distribute things, the new story is who is going to be using this stuff. We are going to be creating things all by ourselves. So let me show you the morning news this morning. Here is one piece of news, this is May 8th, this is this morning New York Times, The Technology, which says: „if we are going to use this new imaging capability, if you are up 10000 meter in a plane, can you find the fire?“ I don't want to see a big fire, I want to see a smoldering stump.

So here is a guy from the University of Toronto, running a fire management laboratory and he says: „we've used all these infrared pictures and so forth but here is what we can do, we can, the infrared will overcome several significant problems through the video camera, fires as small as 1 foot across, from a height of 10000 feet“. That's interesting. The fires in the western part of the United States, devastated the United States, fires globally, look at Brazil, look at the Indonesian Fires. Often set by Farmers but to ability to see the world in some way, this is this morning's story. The guy says, what does he say at the bottom? They used to work at Eastmann Kodak, that make all these satellite and airplane cameras and they were using 25 year old technology, and this is multi spectral so you could see things that go on. So this is going to be cheap, that's lots of pictures.

Try this one, this is the Melony, Melony, this is this morning's Financial Times, Melony is going to launch smart Washing Machines, well why? Because what is the services contract for washing machine, we'll come and fix it? Who calls? People that don't clean the filter. \$200 to send the truck, your filter is not clean. Which our machines that are smart and in particular, this is a tying together with Benetton, the Eroston and Hotpoint washers are going to read the new identity devices. The new radio frequency devices, people will also call them AutoID. Tiny, tiny, tiny chips, you can also make it on a sheet of paper, print magnetic ink on a spiral, that's an antenna and put a tiny chip that cost nothing. So you've got one penny for a unique identification, for every retail item that's sold. In particular clothes, why clothes? Because you have some new fabric and when the fabric is put into the washing machine. it says „I'm here! I'm wool. Don't turn the water heat up high. Don't use that detergent.“ So this idea that we are bringing identity and intelligence into the devices in the homes, and the first paragraph of this story says: „Intense competition and margin pressure in the domestic appliance sector“. You've

got to do this, innovation, you've got to take advantage of these capabilities. That's an interesting story, so that was this mornings Financial Times.

Here this mornings, another, this is the BBC this morning. On Monday I watched the latest episode of ER, Emergency Room, just a few days after it was broadcast in the US, but I was not in the US. I'm in Britain, I was on my computer at home, I downloaded program across the internet, all on my availability of TV programs and films. I watched the latest installment of thriller 24 and Friends, all in the interest of research. He has to say that because otherwise the thought police come and arrest him for stealing things. And he used bit torrent, ok, do it Google on bit torrent and you can download it. You two can do what he, bit torrent that allows multiple users to exchange the same information. We call that pure to pure exchange.

So these little snippets from this mornings press, I had one more, oh yeah, here is another one. This is this mornings again. „Austin, Texas: All you do is put wireless“. There is a wireless plug right in that machine there, speaking to the other computer right here. You didn't feel it, it's an 80211 WIFI, wireless connection and these people are saying, we are going to put them all in our stores, free. It's already in Starbucks but it is \$30 a mug. Free. Why? Because then, one store, in an intense economy, has an advantage over another. So this is quite interesting. We are watching the changes brought about by these new technologies. Nothing I just mentioned is a new invention, and there are a lot of new inventions but we don't need to go into that because we are finding all of these brand new capabilities.

Oh, while I am here, I thought I would also just mention what Jens Arnbak said, remember that statement, in regulatory world about Ron Coase, and how you think about regulating spectrum? This is a website of this conference that was held in Standford at the beginning of March. And the Manhattan Institute is a right wing group, and the Standford Law School is supposed to be in the middle but it's more left wing I suppose, I don't know, it's law. And what they had at this particular meeting was a discussion, says here: „Would be innovators“, I will move this up slightly, „in the past, greatest limit on innovation is the Governments method of allocating portions of electromagnetic spectrum. Since it's discovery, small chunks have been auctioned off to highest bidder, given away to commercial interest, if they would submit themselves to government regulation“. Laws prohibit the resale, so unused spectrum can not be transferred to others that want it, it is therefore wasted.

And the diagram I was trying to find this morning to show you, if you look from 0 Hz to 10 GHz, you have almost no use of spectrum, all the way through the regulated bands. AM, FM, Television, Police, Fire, Military, until you get to 2.5GHz where that device, in that computer is broadcasting at this moment and the spike is huge. That's the WIFI stuff, unregulated, anybody can do it, go to Paris. Between now and the end of June, even with RATP can get free access at 12 Metro stations, free internet access because the Fiber RATP has fiber through all Metro and it pops up at 12 Metro stations. They are going to do 300 Metro stations, with a little antenna at the top, you come within range,

free internet access. That's interesting, this is something new, Paris might become the most wired wireless city in the world, Paris. Remember the spectrum fights in Paris, where they had to take away little Gestapo trucks finding the Braton Liberation League, you know, all these fights they had?

Well this is something new. Innovation occurs when people have a regulatory regime that allows them to. The claim here is would be innovators never know when new spectrums are going to be available. So you have to come in this new world and make an attempt to allow innovators to understand what direction they are going. And the argument from Ron Coase, that we should be able to talk about spectrum private goods has led to inefficiencies, there's an assertion. Imperially said, you can test this. So we need to think about it. We have to have a new metaphor, where new words that do capture the technical reality, that I can use the same frequency that you are using and not bother you. That is what spread spectrum allows us to do. This debate went on and the panelist here, this guy has a Nobel Prize in economics and this guy, he was a partner of Ron Coase, and this guy is a judge on the Ninth Circuit Appeals, he is probably the preeminent judge in the field of intellectual property in the United States and after that Stanford session he got up at the end, after running this mute court and arguing about all this and he said: „I have changed my mind. I have spent my entire legal life with the property model as the way to think about the way we allocate spectrum and I am persuaded now that there is merit in examining“, he didn't say adopting, “in examining the notion of managing the spectrum as a comment.“ Now to me, not a lawyer, it sounded reasonable. To the lawyers in the room, they told me, this was a perfect storm. This was the first time that anybody of this weight had ever said anything like this, changing the foundation of the way that people think about allocation of a resource, which is not a physical, as intellectual property is not a physical resource, a new way of thinking about the language we need use in attempting to allow innovation to take place.

So, I should not talk forever, I did, this line is something that I put in, because I couldn't find the webpage but all of that transmission of movies that guy was watching television on his PC, sitting in England, all of the intellectual property world is attempting to put a flag in the broadcasts stream. Telco has ducked, we are just a carrier; the broadcasters are sending content out and making advertising money. Are we going to allow a movie sent over the high definition pathways, better resolution than DVD, be copied? Well, there is a major legal move in the United States. Force every broadcast to have a little flag, a bit changed in the stream of data so that when the device at the end receives it, it would look at this bit and say ah, this can not be copied. So it must be a lot of force, every device, every PC, every cell phone receiving video to enforce that so nobody can copy it, which is hard to do.

Well, there is a kid, Eric Blossom, he is actually about 30 years old, he built a three chip board that at this moment receives high definition television in all major US Markets and showed it on the PC and he doesn't care about the broadcast bit. So, if people, citizens can build devices to take advantage of our existing huge investment technology and use it to their own purposes, WIFI, huge use, ability to receive, exchange, your children, every person in

this room with a kid has a criminal for a kid. You kids are all moving songs around, from one to the other. Some people in this room many have moved songs around, well; we are all criminals together here. The ability to do what you want to do creates new markets. And the dilemma the telecommunication industry thinks it's in with huge bandwidth true, not used, true can find new outlets as you enable these capabilities for innovation. So, I'll stop, I won't even talk about the computer games and so forth, 9 Million people a day playing interactive games.

I'll talk about the very last part, that when you want to reach the community, that means you're a newspaper, you're reaching out, telling somebody about something, you are reaching the police, and helping them to know something. They need to know to help people; you are using the same tools that were developed to run these network centric warfare organizations. Increasingly decentralized, the co marginal costs of the transaction dropped and the organization became decentralized. So all of the methods used by the armed forces have now started to make their way in to states, and counties, and cities and hospitals, cantons, every village. We are beginning to allow managing things independently.

So, at the very bottom, and I promised you I would show you how you get to find all this stuff, I am going to go right down to the bottom, geographic information, size location information, location data, here comes the magic carpet citation. www.earthviewer.com will take you to the site where that software is I showed you, they changed their pricing, send them a note saying you are an in particularly important person and should get a free copy because you run telecommunication companies and every one of your customers wants you to know how to use this, so you can provide a new service to people, the company is called Keystone, there are just 30 terabytes of image there.

And then one other assignment to check out, one guy, one, using these new cheap discs, the same ones your kids use to store 47 days of solid music, one guy started www.archive.org and has 10 Billion WebPages archived, every webpage that he could find since 1996 sitting on his discs. You can go to the website, put a date in and that first website you built, that you are ashamed of now, it's still spinning on his discs and you can see it. And on September 11th he turned all of that to a new use, first time ever. www.televisionarchive.org, he recorded 20 channels, BBC, CNN, ABC, all the local, Iraqi television, Russian television, Japanese television, so all of the Satellites, dumped it onto disc. You can go to that net website and you can see a grid of 20 channels, 168 continuous hours of video for each channel, one week solid 24 hours a day, the week the world watched television, it's free.

And when you hear from Al Jazeera tomorrow, we are in the middle of a negotiation, I do wish that people who observed Islamic rules would break them and drink some wine so we get into this negotiation in a different way, but I am at a disadvantage I guess. So, we are going to talk about taking all of Al Jazeera and every other channel that lets the world see how the world is and put it up free on the net, which means for the first time ever in the world of

media, there is accountability, because what you say does not vanish. It stays forever.

So with that I should really stop talking. But I want to thank you very much for your attention. During the rest of the panel and during the rest of the two days, I think these issues about how do we describe what we do in language that allows us to do innovation, is probably our biggest challenge. And with that I should stop. Thank you very much.