David Isenberg's speech to the TUANZ Telecommunications Day 2008

Like other Americans before me, on whose shoulders I stand, I have a dream.

I have a dream that the Internet becomes so capable that I am with you as intimately as I am right now -- but without leaving my home in Cos Cob Connecticut. For starters, today's best attemot to do telepresence -- which, in my opinion is Cisco's high-end telepresence system -- this means about 20 megabits per second, guaranteed, in each direction.

I have a dream that the Internet is so capacious that Kiwis no longer feel like they're dangling at the end of a 12,000 kilometer long cable. That ADSL loses its "A" and becomes truly symmetrical -- upload speeds of 128 and 256kbit should be New Zealand's national shame. (and I'm American, so when I say "national shame" I know what I am talking about).

(I actually did the arithmetic: when you divide the one terabit of Southern Cross by 4 million kiwis, you get 250 kilobits per second per person.)

I have a dream that DSL loses its DSL too, because, DSL is all about copper. , and let's face it, fiber, the all-optical network, is the end game.

I have a dream that the Internet becomes so omnipresent and useful that we will think of the people in Accra or Caracas as "us" not "them" much as we think of the people of Auckland and Christchurch.

I have a dream that a cornucopia of new and wonderful applications, some of which we can't even imagine today, will make our lives even more satisfying and productive tomorrow.

I have a dream that one day the climate change problem, which today threatens to turn our Earth into an orbiting cinder, will be a thing of the past thanks, in part, to the Internet and trillions of smart vehicles, heaters, refrigerators, air conditioners connected to the Internet so as to mediate real-time auctions for energy, urban access and carbon credits.

I have a dream that the two billion human beings who live on less than dollar a day today will use the fiber optic cables that connect them to the rest of the world to connect them to food and water and medical care, to connect to transparent, democratic governance, to connect to customers, suppliers, markets and innovative ideas.

I have a dream that one of these two billion is already so smart as to be another Einstein, that another is so compassionate as to be another Gandhi, that another

is so diplomatic as to be another Mandella . . . and that someday soon we will discover them on Technorati, leave comments on their blog, and subscribe to their flickr photo stream and their twitter tweets.

But I also have a nightmare . . .

In my nightmare, the telephone company has convinced us that it needs to know the nature of every Internet transaction, so it can -- quote- unquote -- manage -- what it calls "my pipes".

This might happen in any of several ways. Maybe it says it needs to stop terrorism, or protect the children, or serve blind and deaf
people, or protect authors and performers from theft of their work.
Or maybe there's a genuine emergency -- a pandemic or a nuclear attack or a 9.0 quake that wipes out San Francisco and LA at once, and causes the network we have to overload.

In my nightmare, whatever the excuse -- or the precipitating real- world event -- once the telephone company gains the ability to know which apps are generating which packets, it begins charging more for applications we value more.

In my nightmare, this becomes a form of blackmail, because if you tell, say, a bank, that there's a secure transaction service, and it doesn't use it, and there's a security breach anywhere for any reason, under US law, the bank becomes liable because by not choosing the so-called "secure service," it demonstrated that it did not take
all the precautions that were available.

In my nightmare, once the telephone company has some applications that generate more revenues because they're subject to management -- and others that don't -- the former get all the newest, shiniest, fastest network upgrades, while the latter languish in what soon becomes Yesterday's Network.

In my nightmare, new innovations that need the newest fastest network, but don't yet have a revenue stream, are consigned to second class service. Or they're subject to lengthy engineering studies and other barriers that keep them off the market. In other words, in my nightmare, all but the most mundane innovation dies

In my nightmare, the telephone company and its henchmen log every Internet transaction that reveals what I buy, what I search for, where I am, what I'm doing, what I want to do tomorrow, what I can afford, what my medical condition is, who my heros are, and who I aspire to be. Then commercial entities

use these aggregated clues to assess the surplus value of that transaction to me and charge accordingly.

In my nightmare, the post-Google search company is NOT guided by a pole star that says, "Don't be evil." The temptation to steer by a star of profit or power will be irresistible.

In my nightmare, I discover that the ruling party is monitoring my aggregated Internet activity to find out if I like its war, if I agree with its energy policy, if I've detected that its cronies are on the take, and if I accept its version of the truth.

(You Kiwis need not be smug because you've got a good ruling party.
The Internet is global. Any ruling party that wants to reach out and abridge your rights threatens us all.)

In my nightmare, I break into a cold sweat because they've discovered exactly when I'll be at the record store or the supermarket or the airport. A car pulls up, and there's a man holding each of my elbows . . . "come with us, sir, just a few routine questions" . . .
I step into the car, I feel a prick in my arm and the world goes dark . . . and I wake up in an orange jumpsuit in a windowless room that is completely disconnected from the Internet, from geography, from information, from law, from time, from my wife, from everything that makes me human. I break into a cold sweat, I try to scream, I struggle to wake up . . .

Then my wife is shaking me, asking "Darling are you having that Internet nightmare again?

So? Which will it be, the dream or the nightmare?
We have a choice. That the choice is now.

Now let's talk about our reality.

In our **reality**, the Internet came into being as a network of networks. It exists because we needed a network that would just
deliver the bits. It arrived because DECnet wouldn't talk to HP,
and Starlan would not understand ATM features like "constant bitrate", and call waiting/callerID were just a pain in the ass when we dialed an on-line service. Network specific features, even features that added value to a specific network, lost their value when networks were Inter-networked. Intelligence in the middle of the network became impossible -- the entire value creation process migrated to the edge.

So today, we have an Internet protocol that makes specific features of any proprietary subnet irrelevant. Today, the Internet delivers the bits wrapped in stone-simple Internet packets. Today, the Internet is a stupid network.

It is this property that makes the Internet the huge success -- and the daily necessity -- that it is today. It is not digitization -- else other digital networks like ATM and X.25 and GPRS would be as prevalent. It it the fact that anybody can connect into the cloud, and reach anybody or any service or any content without barriers. It is this fact -- intelligence at the edge -- that let one individual in a physics lab in Switzerland create The Web. It is this fact that let a Pez dispenser collector create eBay. It is this fact that let a couple of Stanford undergrads create Google.

I know you know all this. But it is important to re-iterate it, because the telephone companies are now proposing to change the very essence of the open Internet.

It was the open nature of the Internet -- and value creation at the edge -- that made it possible for three programmers in Estonia to invent Skype, which now threatens to disrupt the trillion-dollar-a- year global telecommunications industry.

By accident, this trillion-dollar global industry is the same industry that supplies our Internet connections. No wonder they want to radically alter the very nature of how our Internet works.

And now, suddenly, they have the technology to do it. Suddenly they have deep packet inspection that works at up to OC-48, and probably faster. Suddenly they have IMS, which would re-establish an application's dependence on underlying network services, and IP- Sphere, which would put machinery into the network to coordinate inter-carrier services. Suddenly, all around the world, telephone companies and their equipment suppliers are furiously creating machinery to put the value creation process back into the middle of the network.

They can do this because what was once an Inter Network of heterogeneous, diverse networks has become "The Internet." Beware of homogeneity. Beware of optimization. Beware of telephone companies bearing new, centralized capabilities that would manage scarce capacity.

Here's another fact that they don't want us to know: Capacity is not scarce. We have the technology -- the affordable technology -- to never be bandwidth-limited again. New Zealand has to abandon its talk about the copper loop.

Let me illustrate:

This cable has 864 fibers.

Each fiber can carry up to 160 different wavelengths, each wavelength can carry 10 Gigabits.
The technology to do this has been in the marketplace for at least five years. This 1.6 terabit signal can go from Russell to Dunedin, (and perhaps, if you'll allow an ignorant extrapolation, even from Auckland to Sydney) without active regeneration.

How big is a gigabit? One gigabit can carry the entire conventional telephony load of a city of 100,000 people. In other words, four wavelengths on one fiber could carry New Zealand's entire conventional telephone traffic. No wonder the telephone companies are worried.

Here's another way to see this cable. If all 6.5 billion people on earth had a telephone, and if they were all off-hook, generating 64 kilobits a second, and all those conversations were routed to this cable, there would be 100 fibers still dark.

Now imagine this running down your street. Imagine that each house could have two or three fibers, more bandwidth than a telco in each house.

So I've done a back-of-the-envelope study of what it would cost for New Zealand to lose its scarcity and retain its open network.

A friend of mine is building rural fiber build for a consortium of 20 towns in rural Vermont. The largest town is 10,000 people. He figures his business case on about 12 homes per mile of road and a 50% take rate. He figures it will cost about $6000 per home. If he pays this off over 20 years, debt service is about $500 a year. OP-EX is another 5 or 6 hundred. So for 1200 a year, or $100 a month, the most rural Vermont farmer can get the full triple play -- TV, Telephone Service and screaming, uncapped 100 Megabit Symmetrical Internet service. This includes initial build, initial startup (where take rate is temporarily way below 50%), truck rolls for installation and early maintenance, TV programs, telephone interconnection, the works.

In town, it costs a lot less. I visited Lafayette LA two weeks ago.
Lafayette is a city of 110,000, or about 40,000 households. They're building a municipal fiber network to every house in the city, rich and poor, black and white, for about 300 million, or about $2000 a house at a 50% take-rate. If you factor in OPEX and everything else, their cost will be about $50 a month. They plan to charge $70, for TV, telephone and 100 Mbit/s Internet.

So if you take New Zealand's 1.3 million homes, let's say that 30% are rural. That's 400,000 homes at $6000 == $2.4 Billion. The other 70%, 900,000 homes at $2000 == 1.8 Billion.

So for about $4.2 Billion, you can fiber up every house in the entire country.

But with 4 million Kiwis uploading at 100 megabits a second, Southern Cross, at 256 kbit/s per Kiwi, won't do. I guesstimate that Southern Cross cost around $1 Billion, and the technology is probably a decade old. So I'd guess that for another $2 Billion, you could get 1000 times the capacity.

There's no reason New Zealand can't build this network in five years. Japan did it. Amsterdam did it. Stockholm did it a decade ago.

Originally, when Sarah Putt asked me for a title, I told her it would be "Four Paths to Kiwi Internet Leadership."

I was going to discuss various scenarios for functional separation and local loop unbundling. But in my studies -- and in my conversations over the last day -- I've become convinced that the current policy initiatives are like "lite" cigarettes for smokers who want to quit. Objectively, smokers who switch to "lites" aren't actually improving their health, but they are admitting they have a problem, and changing their behavior. So perhaps the current policy initiatives are a way of opening the door.

Meanwhile, I've got a better guess at what the "Four Paths to Kiwi Internet Leadership" actually are -- Open Fiber, Open Fiber, Open Fiber, Open Fiber.

One more thing. You should ban two words from polite conversation.
Kilobit. And Copper.

Thank you!