

provides internet and cellular services to all of Nunavut (as Qiniq), and even parts of Africa and Indonesia. Now, he's pitching an ambitious, long-term plan to overhaul broadband services in Nunavut.

But he's not stopping there. As he's built towers and networks in remote communities, he's had to grapple with the problems crippling most Northern businesses—finding and keeping reliable workers and just getting by with the world's most expensive power rates.

And that got the wheels turning. When we sat down this winter, Philipp was tripping over himself with ideas—how to reward teens through video game-style incentives to build local workforces; how meticulously monitoring energy usage can ultimately lower power costs.

Data drives his thinking. But so does his understanding of how the Northern marketplace fails smaller communities with less buying power. He remembers what it was like growing up in Fort Prov without luxuries enjoyed by Yellowknifers, a few hours down the road. If things are going to improve in the North, they have to for all Northerners.

You've spent much of your life fighting to improve internet in small communities across the North. What drives you to do this? Before the Apple app store, as a developer, a 12-year-old kid sitting in his underwear in Russia had zero chances of making money because he had to sell through a retailer. You had to find a software publisher that would publish your software, put it in a retail box, get it into distribution and get it onto a shelf. There's no chance.

Apple said, "Download our piece of software for \$50, become a member of our developer community and develop whatever you want—the fart app, push the button and it makes a sound. You click upload, our developers look over your code. If it isn't a piece of crap, we'll put it online to our millions of users and anybody that buys it, you get 70 cents on the dollar. We get 30 cents but we look after all the logistics, delivery, support, website, payment. We just put 70 cents in your bank account for every fart app we sell."

The kid made a million bucks in the first month. Some kid in his underwear in the middle of nowhere. That to me is exciting because I'm that kid. I'm that kid in Fort Providence in his underwear wanting to do nothing but code. The dream is for every kid in the North to be able to do those things that technology could enable.

With equipment and operations in so many Nunavut towns, how did you develop your

workforce? In 2004, the customer device was a single modem that had no moving parts and no software install required. From a service provider perspective, if your computer worked, and you could plug it into this thing, you could get on the internet.

Tech support was easy. My biggest challenge was distribution. How do you get it in the customers' hands? We came up with a model—the community service provider model. We pick one guy. If you're the best guy in town, you get 20 percent of the revenue. We hand you a box of modems—they're our inventory so you don't have to pay for them—you hand them out. As you hand them out, you get a \$50 sign-up and you get 20 percent of the \$60 per month fee. So you get \$12 per month for every one of them, just for taking payments.

We hit our year-three projections in month-eight because thousands of customers wanted it. Customer support was really almost non-existent because it's like me asking you what support do you get out of your Bic pen. How often do you phone Bic? Never. It's a simple device with no moving parts.

"How much are you gonna pay a kid to dig for eight hours in Grise Fiord? As much as you have to, because without getting into that building, you have a problem when things don't work."

But technology isn't so simple now. The problem today is I'm going to have 15 different devices. So about a year ago, we pulled all tech support in-house and we cut the commission from 20 percent down to about 12. We said, "Just give this 1-800 number out to all your customers. You still have to take payments and go to the building and be our hands and eyes." The problem is, how do I get an agent, who is very good at going to the communications shack [to check on a problem], but terrible at customer service to be good at customer service? That's not happening. It's not possible.

So we looked at every job and we broke it into a task. We called it Technical Installation Maintenance and Support—or TIMS. With TIMS, we said we should treat every person in the community as a potential contractor. We should work with them to fill out their WCB paperwork to understand what it means to be a contractor, work with them to fill out their CRA paperwork if they exceed this amount of revenue per year because legitimately they have to pay taxes. And work with them to start at a task so that a Grade-7-educated, non-English-speaking, no self-

confidence-having, 16-year-old kid who has never left his community believes he can do it. Start by teaching that kid a single task: snow-shovelling. I've got a building that gets entirely covered with snow. It takes eight hours to dig the door out.

How much are you gonna pay a kid to dig for eight hours in Grise Fiord? As much as you have to, because without getting into that building, you have a problem when things don't work. So why don't we break it down to an hourly rate? Why don't we make everything an hourly rate and figure out a way that we could teach a kid snow-shovelling and pay him \$30 an hour to go dig the door out. Okay, receiving freight: that's worth something, that's an hour of your time. Go to the airport in your quad, receive something at First Air or Canadian North and take it to the warehouse. Well, there is no warehouse. Okay, warehousing freight? You got a shed? Great! I'm going to also pay you per cubic square-foot to warehouse [equipment]. Take it to the airport? That's delivery. We built all these tasks—tower climbing, dish peaking, site supervision, site maintenance, snow shovelling. We hired a group of people and spent \$150,000 and a year [building this system].

[Most] funding programs don't recognize potential trainees unless they've had Grade 10 Math and English. Who cares if you've got Grade 10 Math and English if I'm trying to teach you how to dig snow?



Nunavut's Backbone: Or how a monopoly can do good

The problem: shrinking space
Qiniq is spending \$75 million over the next three years to improve Nunavut's network. But \$50 million of that will go directly to satellite owner Telesat to buy space, and with 4G coming in and bandwidth usage trends only going up, Philipp is worried that money won't last.

The proposal: a backbone
Philipp is pitching governments to look at funding a regulated, monopoly backbone: essentially one big tower with redundant satellite receivers for current and future satellites (new high-throughput birds to be launched in 2018 and, possibly, 2021) in each of Nunavut's 25 communities.

The solution: more competition
Right now, only Qiniq is set up in each town; there's no way other companies can compete. Under the backbone model, competition would occur at the retail level: bandwidth is sold at a regulated rate to any company (as long as it offers services in every town), hopefully meaning cheaper internet.

You're calling this program Service North. Is it working already? We ran a number of pilot projects in Nunavut, in the communities, training people. We came up with, I think, nine modules and we started teaching these modules. Every module, every task, fits a template. The template is rigid: task name, task qualifications, pictures, tools required, this many hours.

But we went further. It doesn't help us if the kid pulls the task at eight in the morning and doesn't do it until seven at night—he's just hoarding the thing. So we said every task is \$35 an hour, the only difference is how long the task takes and whether you're certified for it. If you're a snow shoveller, great, you get the task. It's a two-hour snow-shovelling job—you get a half-hour to get there and a half-hour to get back and close your work order. You can close it from the site with your iPhone or whatever, but if you don't do it in that three-hour window from the time you pull the task, you only get \$25 an hour. Your base hourly rate is \$25 an hour. That extra \$10 an hour for every hour you work through the month is actually accrued as points. One point for every hour and it's worth \$10 a point.

So you added a points system? We built in Game Theory—if a kid's at 80 points and, at 100 points, he gets an extra dollar an hour, that means every point is worth a lot of money. When a work order comes out, he's going to do that work order right now. "I'm not going to take it if I can't do it, and I'm going to take every one I can do in that timeframe, because I can't afford to let the points go. I need the points to get to 100 points—it's not the dollars I'm after right now."

At that point, you could really incentivize people. They can start with snow-shovelling and work their way up. [I could] open this service-order ticketing system up beyond just my own needs, because really, Northwestel, Nav Canada, the RCMP, schools, government, everybody needs this.

Why wouldn't I open this up to Nav Canada and the RCMP? You need something done now? Yes, it's a one-hour job, it's got a one-hour mobilization plus the one-hour job—so two-hour total job window—but it comes with 500 points, which is worth \$500 if nothing else, right? The hourly rate won't change, the hours won't change. We don't want to change their impression of what they're getting paid to do; we want to change what the bonus is for. The bonus is to do this right now. If you don't do it right now, you don't get the 500 points. And don't take the job if you can't do it now.

It sounds like training could cost a lot of money. We have never been at a point like this in the past because, in 60 years, really, we've brought people out of the bush into communities. We've done a poor job of managing the transition to where we've [messed] up generations of aboriginal people and their children, it's going to take generations to [address] that problem—and only if the government's truly willing to engage in that effort. And all the while, we're going to have to stop the brain drain of those kids that are capable of living and contributing to growth

and redevelopment and rebuilding. If we do train the people in the communities to do the job, it means investing in education, investing in housing—it's decades' worth of investment before we're going to see the kinds of returns we need to see.

Ultimately, you have a social requirement for the federal government to manage these communities forever. That's not what the people want, that's not what the federal government wants, but that's where we're headed.

What else are you thinking about? I have a lot that I want to do in energy. I could do a lot in energy in the North because I believe that is part of the sustainability that's going to make these communities have income.

Why are you interested in energy? Costs in these communities are going up. The cost of power is at a minimum 60 cents [per kilowatt hour], growing to \$1. In Qikiqtarjuaq, we're over \$1 a kWh. I would be bankrupt in Fort Providence—the Snowshoe Inn, 50 years in business, would be out of business and would have been 40 years ago had we not put in our own power, because today our load is 100 kilowatts on average. The town's load is 700kW.

In Fort Providence, it costs me 24 cents a kWh. My cost is a quarter of a million dollars a year roughly to operate my power plant. That's fuel, lubes, maintenance, capital amortization and I have three generator sets. Triple redundancy: two of them in one building and one in another building. Fully automated. You can flick a switch and switch power plants. It's all computer controlled, it's all computer monitored.

"If we truly had data, we would know per square foot and per occupant, what every house costs us per hot-water tank, per laundry machine. This is technology that is dead simple. I've had it in my house for years. I can pull it up on my iPhone, what it costs me per minute, per day, per month, what my projected expense this month is."

What are you monitoring? The computers tell me exactly what's going on: how much energy I'm conserving, how much I'm saving, how much heat I'm recovering, what the heat into every building and out of every building is so that if there's a problem, I can catch it before it freezes up.

What if we took that same technology to the community level, meaning that every building in town would have a little meter in the panel that reports back the top sixteen circuits in that house. How much is the furnace, fridge, water pump, stove consuming? What is the total load for the house? What is the square-footage of the house? How many people are in that house?

Using social media, how do we get houses to compete with houses to reduce their energy consumption? And blocks to compete with blocks? How do we monetarily incentivize them? How do we make it a cash-back game, frankly? The government is paying for every kilowatt of power, which means that we're paying for every litre of fuel and we're paying for every little spark of heat in these houses. If we truly had data, we would know per square foot and per occupant, what every house costs us per hot-water tank, per laundry machine. This is technology that is dead simple.

I've had it in my house for years. I can pull it up on my iPhone, what it costs me per minute, per day, per month, what my projected expense this month is. It will keep five years' worth of data in a little wee box in my house. Why not put a 50-cent chip in a power meter and have it report all the data back? Why wouldn't we fly a drone around with a thermal imaging camera and pick up, in winter, the heat-loss of every rooftop and bring that data into the equation?

What would you do with all that info? If you have the ability to collect all the data first of all, what you can do with it is amazing. For good and bad. If you got all that data and provided that to the government to say this is how you could replace the insulation on the roofs of these houses to reduce your operating costs, these are the stoves you could replace, and the hot-water tanks that you could replace because they're low-income housing anyways. Intelligently make the decisions.

Why wouldn't we show the consumer what their power bill is in real-time? I show my kids. I say, "Look, on this webpage right here, this is the cost of running my house on the low-side. Go turn off all the lights in the house now and come back and look at it," because it's also projecting not just for the hour, for the day, for the month, for the year—it forecasts it. I can show them in real dollars what that just meant for the year to turn off those five light switches.

That is the most powerful method we have of reducing energy consumption in Nunavut. And if it is not reduced on a per consumer basis as we build the housing required to meet the housing shortfalls, it's going to drive energy consumption through the roof, which is going to drive heat consumption through the roof, which is going to drive the requirement for fuel storage through

the roof because both heat and energy production require fuel storage. And because you have to store it for the whole year round, you need to sealift in more than one sealift's worth of fuel and you need to build bigger containment for it and the environmental risk just becomes dramatically bigger.

And you've done nothing if you've done nothing to reduce the consumer's awareness of cost, because the consumer doesn't pay today. The consumer's in low-income housing, they're not aware. The consumers that are paying their own power bill are teachers whose wages you have to jack through the roof to get them interested in the job in the first place, because cost of living is so high.

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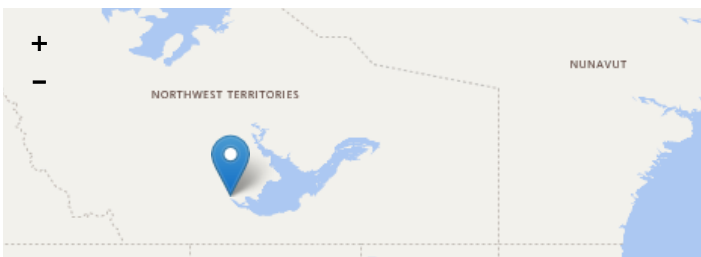
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