

If voice really does become just an application on IP networks, and a free application at that, what does this mean for the wholesale operators that earn a living delivering minutes of voice traffic around the world? Eli Katz believes his XConnect will transform the business of IP voice services through peering federations

A wholesale transformation



Eli Katz: the only way you're going to get mass market for new IP services is with cross-network connectivity

It started off as a great idea: the world is filling up with VoIP operators. Some are small — operating perhaps in one niche market — and some, Vonage in particular, are large. But there's a danger that they're all operating as islands.

In other words, the technology works brilliantly if you're one Vonage customer calling another Vonage customer; or a VoIP customer of a suburban cable network calling a neighbour down the road: free calling, high-quality audio, and eventually all the other VoIP add-ins the operators talk about, including quality of service guarantees.

But dial a Vonage number on your suburban cable VoIP phone and the cable operator, or its VoIP service provider, has no idea that's what you're doing. By default, off-network calls get routed to the incumbent or another network to sort out.

So the call goes from IP to TDM and back again: it's no longer free, and any of those promised extra benefits get lost at the network boundaries. Back to an audio bandwidth that Alexander Graham Bell would have understood and don't even think about video.

A couple of years ago Eli Katz came up with a great idea: a peering service for VoIP operators, and he set up XConnect to put the project into business.

Since then, the great idea has become huge. He timed it well: broadband is exploding and people are adding VoIP phones to their routers and home hubs. The big operators themselves are going over to IP in their national and local networks. And businesses are starting to see the benefits of converging their internal phone networks into their data networks.

As KPN and BT, plus cable operators and others, move to all-IP services, it makes sense to stay IP all the way. And perhaps even free all the way. The ultimate logic of that could be that the rationale of a large part of the wholesale industry is changed.

Bypass the PSTN

But back to the present. "We now have three main business divisions," says Katz. "The core driver behind all the activity is to provide disintermediation, to enable connectivity between operators and service providers, and essentially to bypass transit or bypass the PSTN."

There are two drivers for that. "The more intermediaries you have, the more the margin loss. By enabling direct relationships you have a more economically viable model."

And, he points out, the whole aim of IP is to allow

the most efficient transmission of packets. "Ultimately that is what all this delivers to you. That underlying philosophy is beginning to take place in the telecoms market."

So a VoIP provider no longer needs interconnects to its top 10 partner carriers; effectively "you can have 1,000 interconnects with other service providers around the world", he says, "which delivers you the economic benefit."

The other key driver — "and in some markets this is more important than the economic driver" — is feature transparency, says Katz.

"In the good old days, when everything was just a voice call, you got your international standards and SS7, the call would go from A to B with no loss of service along the way."

But we're now in the IP world, "and especially the SIP world, with all its different variants, and even within a given variation of SIP you have lots of different vendors putting their nuances of implementation".

If you're trying to make a video call to a friend, "and if you're both using the same service provider, life is nice and happy", he smiles. "No problem whatsoever, but as soon as you try to go outside that network, and you're trying to connect two operators together to make a video call, all hell starts breaking loose."

The more intermediaries there are, "the greater the chance of your new, enhanced service not actually going from end to end", he adds. "So having a more direct relationship between operator and operator enables a much higher chance of success on an IP to IP call. Not a guarantee, but a much higher chance."

Video telephony

In the Netherlands, where XConnect has been working with the cable operators, "one of the key drivers was video telephony". There was an economic argument, too: bypass KPN, which as the incumbent was used as the default carrier for IP calls between a cable customer at one end of the country and one at the other, on another cable network.

"That provided a good element of the business plan, but a key driver is that you have to be able to offer cross-network video calling." So there was a clear attraction in having a sort of federation to handle IP calls between networks.

Compare the situation when SMS was first launched on mobile networks, says Katz. "At first it was only available within the network. There was no cross-network SMS. And the rate of growth in usage was fairly shallow."

But once cross-network services were allowed, so that people could send text messages to any customer of any mobile network, usage exploded.

It will be the same with IP, says Katz. “The only way that you’re going to get mass market for the new services is with cross-network connectivity. As long as I can only do a video call within the Vonage network, or within the BT Broadband network, or the TeliaSonera IP network, it’s interesting but it will never reach mass market level.”

Given the arguments, how will it actually happen? “The concept behind the federation allows a scalable interconnection between operators,” says Katz, a British computer scientist who has been working in VoIP since joining Telco Global at its inception in 1996 — the dawn of the VoIP world. He became managing director in 1999 and saw it grow until it

The technology enables a new business model for the industry: bill and keep, settlement free

reached £250 million annual revenue.

Centrica, which then operated the One.Tel brand in the UK, bought it in 2004 for £43 million; Carphone Warehouse bought Centrica’s telecoms business the following year.

Mass interconnection

“If you’re only trying to interconnect five, 10, 15, 20, 30 operators, in the TDM world you can probably do it yourself. You do it yourself. But mass interconnection is much harder, especially in the IP world.”

And now, sorry, it’s time to talk about ENUM. This is an electronic IP-friendly directory of telephone numbers, directly comparable to the DNS or domain name system used by the internet — the system which translates www.globaltelecomsbusiness.com into an electronic address which provides the right web page.

With phone numbers, as with web addresses, your service provider needs to know where to connect you — or, rather, it needs to know which other service provider it should connect you to, the service provider that actually links up to the number you’re calling or the web page you’re trying to read.

“How do you identify that this number is provided by service provider A, not service providers B, C or D?” asks Katz.

In the old, traditional days you dialled +33 and the number to call somebody in France and your operator just handed the call over to France Telecom: they could sort it out. It might go through a few other operators on the way: if you were calling from an IP phone in Australia, say, it might start on the Optus network, then go through a wholesale carrier or two to Europe, which might vary from day to day depending on current prices, before it got to France Telecom, which might then realise the number was operated by Neuf Cegetel — so, very quickly, your call would route through a number of operators.

Instead, look up the number in an ENUM directory right at the start and deliver it to the end carrier.

The trouble with ENUM is that, almost before it started, it split into two ways of doing things.

Katz pauses. “I don’t often use the word ‘hippy’, but there was a slightly utopian view of life.” The original idea was to run ENUM pretty much like DNS works on the internet: every phone number would be equivalent to a personal domain and individuals would associate their phone service with that number.

This was public ENUM or end-user ENUM. “Number portability on a global scale. Nice idea, never worked, never got off the ground,” says Katz. “It would require all the end users in the world to opt in. That wasn’t going to happen. Not a chance in hell.”

The alternative view started emerging in late 2006, “the idea we had from day one”, he smiles: “This is private ENUM.” It’s also called federated ENUM. “When ENUM is used between a group of operators, which somehow agree, they share data.”

Sensitive information

A registry maintains the data, “typically a neutral registry, because we are talking about sensitive data at the end of the day”. The registry is a database of a company’s customers at any point: every time a new customer signs up, or an existing customer churns off, the registry is updated. “That’s fairly sensitive information.”

It’s turned out to be more sensitive than even Katz and his colleagues in XConnect expected. He imagined that smaller companies would be most resistant to putting data into a registry, with incumbents and other large operators — which already quote customer numbers in their financial reports — more open about it.

But, no, the big operators have been hard to persuade that there are virtues in sharing, “even with any other PTT at tier one level”, says Katz. “More in the EU than the US,” because of “some combination of culture, data privacy and ‘I don’t trust anyone’: somewhere between those three”.

There’s another category of ENUM, internal to operators. A telco with 60 switches with 30 million customers needs to route calls round its own network as efficiently as possible. BT is investing in ENUM for its 21st Century Network, using systems from NetNumber, a competitor to Nominum.

XConnect focuses on the federated ENUM concept. “We run registries: a global registry and we run private registries, populated with information from service providers.” The information is distributed, synchronised, accessed and queried “according to the peering policy defined by the owner of that data”.

So a service provider will determine which other service providers can have access to the information in its registry, which means have access to the raw data, and which service providers can query the data but not have access to it — so a company can do the routing but no more.

The registry is not all: Katz earlier mentioned the diversity with which operators use different variants of SIP standards. “Fortunately or unfortunately, depending on which side of the table you’re on, life isn’t going to get easier.”

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The reason is that SIP allows new services to be created and rolled out quickly. There is a constant evolution, which means it's impossible — in fact, undesirable — to call a halt to the development of new variants. "The world is moving too fast, and who's going to draw the line? You're caught between the drive for new services and the challenge of interconnectivity."

One of the important roles that a federation provider would play is this "signalling interoperability", he notes.

The third level of activity for a peering provider is security: "Am I sure that calls are going to the right places, and coming from the right places? Am I confident that calls are being represented as originating from that end user and the caller ID is not being faked?"

One of the emerging industry's big concerns is spam — the unappealing abbreviation for "spam over internet telephony". It doesn't require a lot of code for someone to make a computer connected to the internet generate thousands of voice over IP calls: a pretty rubbish way to sell life insurance or medication, but given what already fills our email in-boxes, a genuine worry for the VoIP business.

"All this needs to be addressed in contractual methodology and the systems: the security layer."

Bill and keep

And then there's the financial layer. "There are two worlds out there. One is settlement — that's \$1 trillion worth of global telecoms revenue, all based on you paying me for every minute you send to my network."

Or there is the emergence of what Katz sees as the new model: bill and keep, or settlement-free.

"Why is that feasible? The technology enables this. It doesn't demand it, just enables it. Ultimately it has to be a decision by the service providers and operators what route they want to follow."

If there's no transit, and one service provider just connects its own customers, "a settlement-free model can make a lot of sense". The EU is already thinking of the possibility that a bill-and-keep model might be a sensible strategy, he says.

It is, in fact a strategy that dates back a long way. It's standard among internet operators: no one thinks of charging for all the emails that go from, say, AOL to Tiscali addresses or Tiscali to AOL addresses. AOL charges its customers; Tiscali charges its customers; and the traffic and the data more or less balance out.

Further back, the an operator such as the French PTT normally found that it was sending as much telephone traffic to the German Bundespost as it was receiving back. There were periodic reviews, with any serious disparity refunded in gold francs, but there wasn't today's second-by-second billing for calls.

In the UK, the General Post Office — the predecessor of BT — and the city of Hull's telephone department — now Kingston Communications — certainly didn't bill one another for calls between their networks.

Is a settlement-free system fair? "It's very counter-intuitive," agrees Katz. But if one company has a million customers and another has 100,000, the first won't send 10 times as many calls to the smaller one. They'll balance out.

Unmetered calls

"The retail side is moving to unmetered calls," says Katz. "That puts a greater rationale behind the bill-and-keep model. Do the economic costings of billing, accounting, settlement, credit control, and add that all up, and that's not an insignificant cost."

Katz expects companies to try out bill-and-keep models in a carefully managed way — and companies such as XConnect will be there to assist the process, he says. "We enable the policy to be defined by the service provider, settlement services or settlement-free."

XConnect is one of a number of companies in this emerging sector. Others are Neustar and Telcordia, both focussing on the registry component, as well as VeriSign, the company which manages .com and .net internet addresses.

"XConnect is the only company providing all four services today — registry, signalling, security and commercial," says Katz.

Some companies are still finding it problematic to accept the logic of peering, he says, though he hopes they will recognise that the SMS story is a good precedent. He sees tier two and tier three companies peering together as a way of challenging a dominant incumbent. But some incumbents are also seeing that they might have a role in connecting the different operators together. "There are all sorts of different plays."

XConnect has two federation operations. One is a global alliance, to which any operator can sign up, and this is settlement-free. "One relationship with us and we will handle all your ENUM components, all your signalling components, the security and the commercial."

Which operators are in the global alliance? "We have 95 operators around the world," says Katz: "a good selection of tier twos and tier threes around the world."

Do the end users know about this and take advantage of it? Probably not, but as the system rolls out "the end users will become aware that it is occurring", says Katz.

But XConnect also runs private federations, "a group of operators that decide they want to peer among themselves", he said. "They're not against global peering, but they're not at that stage yet. Their typical requirements are in-country, and that's the vast majority of traffic."

XConnect has two so far: the Netherlands operation, announced in 2006, with UPC Netherlands, Casema, MultiKabel, Essent and CaiW; and a Brazilian operation announced in early 2007 with Tell-free, iVoz.net, GlobalNova, Conceito Telecom and Easytone, and working with Terremark Worldwide, which provides private ethernet connectivity and collocation services. Neither of these have yet reached a commercial launch, however.

"We reckon by the end of this year there'll be seven more announced around the world," says Katz.

Incumbent federation

And the company is already live today, he says, with a large incumbent which is doing a federation service. "I can't disclose which," he says, pauses, and chuckles. "We're enabling that."

Look at a company that's pioneering IP transforma-

tion and is also working closely, through its wholesale arm, with altnet rivals of its retail service and you might get a clue. But Katz certainly didn't say so. "Without announcing anything, we've got that contract."

And now, as operators move towards the IP world and away from legacy, it is starting to make sense in many parts of the world, he says.

There are some holding back: "He who perceives himself to be number one in a country will say: 'I'm not peering with anybody. I'm not having it,'" says Katz.

As with SMS, before mobile operators enabled cross-network messaging, they believe they have a commercial

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advantage in isolation. "Ultimately it is to the benefit of service providers to peer, because that is the only way you'll see the new services being delivered."

Some service providers are offering high-quality audio, using a standard called G.722: BT, for example, on its broadband voice service. If people use it, they experience better quality and they make longer phone calls. But it's only available inside the network.

"Only by enabling more interconnectivity will you start seeing more utilisation of that service," says Katz. "The classic answer by a service provider is: 'Buy one, get another free, and give it to your mum.' It will all help but the bigger plan is service provider interconnection."

There are some other powerful bodies starting to think about IP interconnection, he says. The GSM Association, for example, is seeing some benefits: IPX, or IP exchange, evolving from GRX or GPRS roaming exchange, the GPRS data hubs.

Just for the GSM member companies? "Ah," says Katz. That's where the politics comes in. Maybe the GSM Association will open it to all. "It's a very big play."

And there are some emerging "industry verticals", he says. For example, the car industry or the airline industry, or the finance world, might see a lot of benefit of having IP interconnection for member companies. "In our terminology this is what we call private federations."

Microsoft communications

But one of the big innovations at the moment seems to involve Microsoft, which is doing all sorts of interesting things with what was LCS, Live Communications Server, and is now evolved into OCS, or Office Communications Server.

This looks as though it will be a PBX-type replacement, with office workers able to set up calls via Microsoft Outlook: clearly, when such calls are to people outside the building, or outside the company, some sort of registry will enable the call to stay IP throughout whenever that is possible.

Jim Kinsella, CEO of Interoute, the European enterprise-focussed operator, has already indicated in an interview with Global Telecoms Business (November/December 2006) that he is working with XConnect and Motorola on an OCS service. Intrigu-

ingly, Kinsella's predecessor as CEO of Interoute, Ohad Finkelstein, is on the board of XConnect.

This sort of operation could represent "the next generation of activity", says Katz.

But XConnect is not going to be alone in the market. It is backed by venture capital from Accel Partners, Venrock Associates and others, and its aim is to be a commercial organisation; it will have competitors.

Does that mean there will be other federations that will have to interconnect with XConnect's? Katz feels there will not be a huge number of federations: he's been doing his bit to keep down the number by taking over two others, a German company called E164.info and then IPeerX, a US operation backed by VoIP pioneer Jeff Pulver — a deal which resulted in Pulver's becoming a member of the XConnect advisory board.

There are two approaches to interconnecting federations: a bilateral approach, where each federation exchanges information with each other, or — if the number of federations gets too large — a federation of federations.

It is all entangled with number portability, because the organisation that has the registry of numbers for a particular country has much of the information that an IP peering operation needs.

Some countries already have a central number database: in the US, it is operated by Neustar. The UK and others are planning to move towards one, either just for mobile or for mobile and fixed services.

XConnect has recognised the power that running a number database can give it: the company has launched a routing service called DirectRoute that will help operators send calls to the right place. Few operators have consented to being identified as customers: Bezeq and Interoute were named when the service was announced in January 2007, but Katz says that "40 or 50 carriers are signed up, mainly tier ones and tier twos".

Venture capital funding

The company is at a very early stage, but after just a few years it has 200 million numbers in its central registry — though that's a small fraction of the phone numbers in use in the world. It received \$12 million in venture capital funding in April 2007 to expand its points of presence from the US to Europe and Asia, and to expand sales and marketing.

Meanwhile, however, XConnect and some of its customers are going to be working hard on regulatory matters. For example, if there is a settlement-free federation, can it be limited to a certain number of operators, or should there be a way for other operators, including incumbents, to join? Different countries will handle this differently. "It will be a non-trivial transition."

And where will it all lead? In his heart, Katz is looking forward to the day when service providers work on a subscription basis. Calls — as others say — will be an application on an IP network and charging by the minute or the second will end, even for long-distance and international calls.

"That will be the complete demise of \$1 trillion," he smiles. Transit operators, look to your business models: "That's what IP does." ■