Computer TELEPHONY
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INTERVIEW WITH THE VIRTUAL EMPIRES

Harry touched on it last month. There's a compelling notion to use network-based "Virtual Office" solutions, including the fact that you can "rent" top-shelf world-wide computer telephony communication power without spending a fortune up front and forever hassling with onsite system maintenance.

We're not talking Centrex and base telco services here. Instead, think bigtime CT — automated call processing, multimedia messaging, follow-me switching, voice-activated call control, flexible conferencing and routing and more — all driven by open CT board-level and / or programmable switch platforms (e.g. Excel, Redcom, Summa Four), all nested neatly in the netgess (rather than formal call-center) communication needs.

It's intriguing. It's growing. It's something you need to know about.

by Richard "Zippy" Grigonis
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ADVANCED QUEUING SYSTEMS

The Crosspoint Virtual PBX from Advanced Queuing Systems (San Francisco, CA — 888-825-0800) is a toll-free (i.e. 800 or 888) application that provides PBX-like services to clients without using any client-installed equipment.

Ordinarily, of course, a PBX is plunked down in a business and all the desktop phone extensions are physically connected to it. The PBX provides an in-house switching-service allowing outside phone lines to be dynamically routed to as many inside phone extensions as needed. All extensions can thus share outside phone lines, so every phone doesn't need its own line to the PSTN, which saves money.

CrossPoint provides a similar switching capability, but with a major difference. There are no fixed extensions. That is, there are no extensions that are physically connected from the employee's desk to the PBX.

Instead, CrossPoint uses advanced database and call-routing features to define "virtual extensions" attached to the VirtualPBX. A virtual extension is owned by an employee of a company using the CrossPoint service. Each virtual extension stores contact phone, fax and pager numbers defined by the extension owner and uses them to route a caller to an extension.

When someone calls the company's toll-free 800 or 888 number and requests a transfer to a particular virtual extension, CrossPoint looks the extension up in a database, makes an outbound call on a free line to the phone number the extension owner has designated as the contact phone number and, if the call is connected, it routes the inbound caller to the outbound extension.

Each company (referred to as "the AQS client") that uses the CrossPoint service gets their own private VirtualPBX with their own toll-free 800 or 888 number, auto-attendant greeting, private virtual extensions, options, music-on-hold, ACD queues (Automatic Call Distribution), etc.

CrossPoint has the features of a standard PBX and plenty more, whether it be integrated store-and-forward voice and fax mail, new message paging, deleted message recovery, voice and fax message forwarding, message distribution groups and voice message broadcasting, originating voice and fax message phone number information (ANI) stored for each voice or fax

message, or an Automated Call Distribution (ACD) Call Center with the ACD operator dynamically defined for each queue.

Rates And Billing. A company pays for the service on a per-minute basis and is given a detailed call log with each month's bill, including the originating caller's phone number (ANI), the VirtualPBX phone number (DNIS) and the extension phone number used to transfer the call. When extensions are making outbound calls, the extension owner's phone number and the outbound number dialed are also given.

The duration and cost of each call is included in the bill. If requested, electronic bills can be sent to the companies for internal use in addition to printed bills. Bills detail the type of call including whether the caller left voice or fax mail, whether the extension owner was paged, etc. Bills also include the type of phone of the originating caller, including POTS (plain old telephone service), cellular, payphone, etc.

The one-way cost of a call is: Ten cents a minute in the San Francisco Bay Area (408, 415, 510 or 650 area codes), 11 cents a minute for California State (outside of SF Bay Area), 16 cents per minute for the Continental US (outside of California) and a negotiated charge for outside of the Continental US.

Inbound calls from payphones have an additional 30 cent charge added to the phone call due to new FCC rules. Calls from payphones to a client's VirtualPBX can be blocked or allowed by the client's system administrator.

A telephone call connected to a VirtualPBX extension is a two-way call with inbound and outbound portions each billed at the one-way rate.

There is also an annual maintenance fee that includes creating the VirtualPBX for the client, music-on-hold licensing fees, and technical support, payable in advance. The fee is based on the maximum number of extensions that can be defined in the system. One to 10 extensions costs $100, 10 to 25 extensions costs $250, 25 to 100 extensions is $500, and 100 to 250 extensions costs $1,000.

AQS INTERVIEW: STEPHEN LANGE

Stephen is VP of Engineering.

Zippy Grigonis: You started in this business working for Bob Edgar at Parity software?

Steve Lange: I worked there for three years. Bob is the overall designer of VOS. He implemented the first versions of VOS, but I wrote pieces of later versions. When we first put in support for the SCbus, I went to Dialogic and implemented the piece in VOS that handles that.

I wrote all of Parity's demo apps when we went to shows. We used to run "shoot-out" applications, which I wrote. I also did tech support for customers using our software. I even wrote a big automated test suite of stuff so that we could test all of the features in VOS.

I got some great experience working with T-1 hardware and things like that. I left Parity just as they were working on CallSuite.

ZG: How did you get involved with the virtual CT concept?

SL: I had started out trying to write a different kind of application, which I won't go into here. But I had this idea where I wanted to automate a call center.

In some call centers you have people sitting in an office where calls are routed to them. Then there are call centers where people work at home in a sort of telecommuting arrangement. Agents call in and log into a standard PBX and sit there with the phone at their ear and then take calls as they come in.

I figured I could put together a call center where I let a person call in, log in and then hang up. This would be the trigger for the system to start routing and connecting calls to this person. That was the genesis of this whole thing.

When I started, I figured I needed a phone system to work with but I didn't want to spend the money on one. Then the PC-based technology got so much better that I realized I didn't need one, I could build and code one myself. Soon the idea of the virtual PBX was pretty clear.

ZG: You run this as your own service or you sell this to telcos so they can re-sell it?

SL: We're running our own business and we're selling the service. We have multiple T-1s with a distributed network of computers answering calls — that's a design set up for fault redundancy reasons, so I can guarantee 24x7 availability.

When I get a client I assign them an 800 number and I'll initially create all of the extensions in what we call their "system forum" — just as a convenience for them so that it's up and running quickly. Within a couple hours of them ordering the service I've got a phone system running for them. Then they can go in and add new extensions and things like that.

ZG: So let's say there's five people in an office and they want this service. Does each person use an analog line to connect to your system?

SL: Typically, the businesses that are buying this service from me aren't five people in an office. They'd be five people working together but not at the same location. They may be five people writing a piece of web software and every one of them is working out of his house.

A customer calls up the number and they want to speak to whoever is in the company. The system routes the calls to all of the different people. To the customer it looks like the people have an office and a standard phone system. But to the employees, they can be anywhere and take the calls at any time. Of course the customer can think he's calling a call center, even though there is no big collection of people in a single room.

The system has integrated voice and fax so that I could be a salesman on the road who hands his cus-

tomer my 800 number to my office. The customer calls me to leave me a message or to get in touch with me or send me a fax, then I go to my hotel at night and check my mail and download my faxes to the hotel fax machine or something similar.

I can therefore operate as if I'm in my office, but I can be anywhere. Right now the service covers North America, but we're planning on going international with it.

ZG: Can you do e-mail with it?

SL: At the moment it's just voice and fax. In the future we're going to have an Internet gateway and some other neat stuff.

ZG: I guess this isn't a system for a one-man band operation such as a consultant.

SL: I'm not selling to individuals. Why do you need a company directory when you've only got one person? Why do you need to route a fax to an extension if there's only one person? Individuals are served by other services that are out there that do one-number calling and stuff.

Basically, we decided that companies wanting to use our service should have at least two employees. But we could deal with a company having 1,000 employees. I actually think our main market consists of companies with two to 10 employees.

Our system provides advantages to newer companies. If the employees are really mobile road warrior types or they're located in different places, then it's really hard to get a conventional phone switch to do some of the advanced call-routing things that we do.

And you've got to have somebody with some expertise just to **buy** the switch and set it up and maintain it.

Another market we're going after are companies with legacy PBXs. As long as they have either Direct Inward Dial (DID) or a dial-through auto attendant, we can give them a virtual PBX as an overlay to their office and add all of the advanced messaging features and follow-me calling and stuff.

For example, let's say we were going to set up an account with you, taking into consideration that you work at your office at *Computer Telephony Magazine*.

The virtual PBX stores four contact phone numbers, two fax numbers and a pager number for you. All of those numbers can be defined as what we call a two-stage dialing number. All that means is that you can define a phone number that means "dial this number, wait for an answer, then dial this other number." One of your contact numbers is your home, one's your cell phone and then your third one is your work number.

On your work number you'd dial whatever number you'd dial to get to the company switch, then the wait for the answer character, and then the digits necessary to transfer it to your extension. When somebody calls the 800 number and says "pass me on to Zippy's extension," they don't see any of the mechanics of the process. They only hear music on hold and the phone on your desk rings and you're notified that a call's coming in through the virtual PBX. You can either take it or send it to voice mail.

Of course, we can handle the needs of even more sophisticated companies. If you have offices in three locations, how do you have a single phone system route calls to any of the employees? Only big companies have that ability, since they can afford to have dedicated tie-lines between big phone switches at each site to allow them to route calls across across a wide area voice network forum.

Yet I can give anybody who wants to "unify" an organization of four offices a single set of extension numbers and a single 800 number where they can reach any employee. They have a company directory of all the employees, everything.

ZG: You said your system had redundancy and high availability. Are you using 19 inch rackmounts with dual drives and redundant load sharing power supplies?

SL: I'm not using redundant PCs at all. I've solved the redundancy problem by using multiple T-1s. If I have a PC crash, that PC no longer handles calls — so obviously I go in and fix it. But the calls roll over to the other PCs, all of which are still up and taking calls.

ZG: Are all the computers connected by an SCbus cable?

SL: No, I'm not using an external bus. I've got multiple T-1s coming into the PCs and I can take an inbound call on one PC and I can route it to an outbound channel on the same PC.

I don't route across my PCs in my network, but I do have inbound and outbound T-1 timeslots on every voice machine — so if a T-1 fails or a PC fails my network capacity goes down according to however many timeslots I've got on that PC, but the system as a whole is still up and running.

The way my system is architected, I can handle a call to any of my clients' 800 numbers on any T-1. I have a sort of global trunk group.

ZG: Sounds like a sort of "T-1 hunt group."

SL: Kind of. The phone company sells me a trunk group that has timeslots for multiple T-1s in it. It tries to send a call down the least recently used timeslot and any time a T-1 goes off the network their switch can see it and it quits trying to send calls to that T-1 and it just sends the calls to the T-1s that are still live.

ZG: You have multiple instances of your application running on each one of these PCs?

SL: Actually I have a sort of monitor program that sits on the timeslot and waits for calls. When the call comes down the system collects the digits from the telco switch and the system looks them up in the database and it tells me which application to run.

The system is not dedicated to run only a virtual PBX. We have got some ideas for some other neat applications that we're going to do, but this is the one we're doing first. I can run multiple applications and I can run multiple copies of the PBX for different parts of my clients all at the same time on the same hardware.

ZG: Are you using NT or UNIX as your operating system to get the multitasking?

SL: I'm using VOS. It multitasks voice programs, even on DOS machines. My network isn't a DOS network, of course. I'm running NT servers. I just happen to have DOS-based VOS voice machines on it in a distributed call

network that I've written.

Besides having multiple computers with multiple T-1s, any one of which can take any phone call, we also have backup power supplies (a four hour UPS capacity) and a backup generator behind that.

ZG: You're using digital voice and fax cards?

SL: I'm using Dialogic hardware, such as single T-1s, but I'll probably go with the duals. I like their SCbus and their switching capabilities. It made it really easy for me to write this distributed switch.

Some customers call up to talk to me about the virtual PBX and they ask me "What switch are you using?" and I reply "well, I wrote my own." It gives me a lot of flexibility and it's made it possible for me to add a lot of features to our system that would be harder to add to a different kind of system.

ZG: The customer can select their own music on hold?

SL: If they send me a CD, I'll record that and put it on the system for them. We're now setting up a music jukebox arrangement where, say, a system administrator for XYZ corporation gets a virtual PBX. One or more of the extensions is for the administrator who dials in and he'll be able to change the music on hold in his sales queue or whatever and then he'll be able to select a music category, such as Symphony, Easy Listening, Rock, Folk and other instrumental selections.

There about 50 to 75 pieces of music in it. The administrator will be able to listen to the songs then select one of them by hitting the pound key. You can have separate music on hold selections for your PBX and each of your ACD queues.

If you don't want music, you can have a custom information message. Say you set it up for a sales queue, a tech support queue and a customer service queue or something, then you can send us the text of the messages you want played to people on hold waiting to speak to the next available agent and we'll put it on your virtual PBX.

ZG: You don't do any debit card stuff?

SL: No, but we have features like that. An extension owner can dial in, log in then do outbound dialing. So you could be at your hotel and call our 800 number once, so you only get socked with a single hotel access charge, then make multiple outbound calls while you're connected to our system.

The nice thing is that your company will get a full record of all the calls you've made for tax and accounting purposes.

ZG: We'll see you at CT Expo?

SL: I'm going to set up a CT Expo demo virtual PBX. We'll have people in our booth who will set up interested visitors with an extension on the system and let them call each other and check out the system and demonstrate how it works. ❖