Convergence Potential of Voice Over IP Driving Enterprise Adoption

By Drew Robb

VOICE OVER IP (VoIP) IS NO LONGER JUST A CHEAP WAY TO MAKE OVERSEAS calls. Aging PBX's (phone switches), for example, can be replaced by a cluster of servers. Call control, voice mail, and conferencing services are all done in software on servers or appliances.

"VoIP has evolved into an integral enterprise technology and a medium for technology convergence," says Charles Ciarlo, CEO of Left Bank Solutions Inc. a workforce management (WFM) software vendor based in Los Angeles (www.leftbanksolutions.com).

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According to Harris Interactive, 12 percent of businesses have already deployed VoIP, and another 29 percent are scheduled to do so by the end of 2005. In addition, 87% of business decision makers were aware of VoIP. Those numbers are backed up by recent announcements by the likes of Ford, Bank of America, New York Life, and Merrill Lynch. The conclusion is that VoIP is now mature enough to replace traditional time division multiplexed (TDM) phone systems and converge with other technologies.

CONVERGED APPLICATIONS

There is a whole lot more to VoIP than quirky TV ads by Vonage or cheap calls to your relatives across the planet. IP, for example, can facilitate internal communications. VoIP eliminates the need for separate voice and data cables. Instead, voice traffic just flows over the same network into the data center where it competes for bandwidth and resources. Phones become just another node on the network. It also means that staff only needs to support a single transmission protocol.

"Replacing existing internal phone systems with VoIP networks can cut costs and simplify administration," says Ciarlo. "The real value, however, will be in the area of converged applications which improve collaboration and productivity."

VoIP unites disparate communication systems such as voicemail, e-mail and faxes into one system. Presence management tools can also be utilized more effectively to detect who else is logged onto the network at the time. Instead of escalating calls to people who are away from their desks, call center or help desk staff can see at a glance who is available and forward the message accordingly.

"The big breakthroughs in VoIP are in convergence, not new applications," says Bern Elliot, a communication specialist at Gartner Group. "When you take voice off its own channel, it enables better applications for the enterprise."

Not surprisingly, VoIP vendors have been building a variety of other technologies into their existing products. There has been, for example, a merging of VoIP with additional functionalities such as network monitoring, server management, Automatic Call Distributors (ACDs), predictive dialers and call monitoring. Avaya, Mitel, Nortel, BMC, Nortel, Empirix, NetIQ and others have introduced VOIP tools that offer a wide range of converged services.

In the workforce management (WFM) space, vendors are now coming out with hosted WFM offerings that harness VoIP technology to make contact centers more versatile than ever.

"Hosted solutions make it possible for contact centers to be onshore, nearshore or offshore without heavy investment in infrastructure," says Ciarlo. "As a result, the architecture of the center is highly flexible based on the needs and/or culture of the operation, i.e. they can be centralized, distributed or home based."

Using VoIP and the hosted application model, for instance, the call center can add home-based workers easily, or ramp up existing operations at the drop of a hat. Thus, companies can extend their facilities across multiple time zones and locations and change their structure to fit seasonal loads.

Left Bank Solutions, for example, is offering hosted WFM services as Monet WFM OnDemand. This technology makes it easy and affordable to forecast workloads and schedule call center staff efficiently. The technology has also been adapted for use in the financial services sector.

Orange County Credit Union in California saved big by implementing this approach in its call centers and in various branches to improve service levels via more accurate scheduling of its teller workforce.

"Monet has eliminated the guesswork from our profitability analyses and scheduling, and can help us improve our service levels by at least 5 percent," says Randy Stolp of OCCU. "Although our software costs a fraction of the bigger call center packages, it has every key feature that the large packages offer."

Another company that implemented VoIP in a converged setting is Erlanger Health System of Chattanooga, Tennessee. It has a data center with 163 Windows servers for general departmental applications, a couple of Linux servers for DNS and about 19 UNIX servers for higher

intensity financial and HR applications. Among them are several dedicated Dell servers running Nortel PBX software—an IP-based PBX in effect. The system is based on a series of elements from Nortel Networks—the Nortel Networks Succession 1000 (an IP PBX-based server), the Multimedia Communication Server 5100, and a data backbone based on a Nortel Passport 8600 routing switches and the Baystack Business Policy Switch.

"We have a collapsed architecture with all server services in one central data center under me," said John Haltom, network director at Erlanger. "We have several servers in our computer room that run voice application software and act as proxies for telephone calls."

He reports that voice and data run across the same Ethernet path, although all voice based packets are shuffled to a separate switch. And most importantly, the average user can't tell the difference between the VoIP calls and regular ones.

"Our voice quality has been very good," said Haltom. "Users have not been able to detect any audible difference."

VOIP ARCHITECTURES

IT departments can develop a VoIP architecture in one of three ways:

1. By IP-enabling an existing telephony network
2. By voice-enabling an existing IP or other packet network
3. By building a pure IP telephony network from scratch

"Regardless of how you get to a VoIP architecture, the end result is the same," said Alex Pierson, GM of enterprise multimedia systems at Nortel. "Whether your network is a pure IP network or you use other existing packet infrastructure, the architecture will have several elements in common."

▼ Communication server—also called a "call server" or "soft switch." This element is the brains of the network, providing call control, gateway control, service intelligence, and other centralized functions.
▼ Signaling point—enables the Voice over IP network to communicate with the SS7 (Signaling System 7) network.
▼ Line and trunk gateways—provides connectivity to the public network. (either the local line or long-haul trunking segments, respectively)
▼ Core switches and routers—keeps traffic moving through the core of the IP network.
▼ Application server—provides voice, data, or multimedia services from a central location in the IP network.

Some organizations deploy these elements gradually, while others switch cold turkey from traditional PBX to VoIP. Erlanger Health, for example, prefers the gradual approach. It began the process in 2000 and is organizing its VoIP installation with a campus-wide renovation program. Out of 8000 phones, 1300 currently run on IP. Most of the organization uses an aging local and metropolitan area ATM network based on technology by Newbridge Networks (when Alcatel bought the company, it dropped support) and a Lucent PBX. As the PBX is fully paid and runs fine, Haltom plans to keep it for another couple of years. By that time, though, the entire campus will have VoIP phones.

To date, Erlanger has sunk over a million dollars into VoIP and expects the bill to reach as much as $2.5 million by the time it is done.

SOME VOIP PRODUCTS FOR THE DATACENTER

Far from a complete list, here are some tools you can use to bring VoIP to the data center:

Nortel Networks offers a wide range of VoIP products, including several servers:

▼ **Nortel Communication Server (CS) 1000**—a server-based IP PBX that supports such applications as unified messaging, customer contact center, IVR, wireless VoIP and IP phones.
▼ **Nortel Multimedia Communication Server (MCS) 5100** delivers SIP-based multimedia and collaborative applications to enterprises, including video conferencing and calling, picture caller ID, conferencing, white boarding, file exchange, co-Web browsing, call screening, call logs, call management and routing and instant messaging.
▼ **Nortel Communication Server (CS) 2100**—a carrier-grade, IP soft switch for large campus and geographically dispersed enterprises, scalable from 5,000 to 200,000 ports.

Viola Networks provides management products called **NetAlly VoIP** and **NetAlly RealTime** that smooth deployment, management and troubleshooting of VoIP. NetAlly VoIP and NetAlly RealTime deployments start at $5,000 for small networks.

NetIQ offers several VoIP products:

▼ **Vivinet Assessor** is a product data center managers use before deploying VoIP to determine if their network is ready to handle VoIP traffic. Pricing is $12,000 per console
▼ **AppManager** for VoIP monitors, manages, and reports on applications, servers, and network devices in the VoIP environment as well as the quality of calls being made on the network. Pricing is by server or by phone/mailbox and varies depending on the number of phones.
▼ **Vivinet Diagnostics** is a troubleshooting product that data center managers will use to pinpoint and resolve voice quality issues. Pricing is $5,000 per console.

NetScout's *nGenius* Performance Management System provides a single, integrated view of voice traffic and application layer call setup protocols. *nGenius* starts at around US $75K.

Empirix offers **Hammer VoIP Test Solution** for Enterprises, which allows enterprises to reduce risk and speed the rollout of VoIP services and IP telephony applications (such as messaging, speech self-service, conferencing and CTI) by accurately assessing how their infrastructure and applications will perform as a live, enhanced IP service.

Asterisk (www.asterisk.org) is a complete PBX in software. It runs on Linux and provides all of the features you would expect from a PBX and more. Asterisk does voice over IP in three protocols, and can interoperate with almost all standards-based telephony equipment using relatively inexpensive hardware. For interconnection with digital and analog telephony equipment, Left Bank Solutions (www.leftbanksolutions.com) offers **Monet WFM OnDemand**, a hosted workforce management service that enables companies to forecast and schedule call center and other workloads with accuracy.

Licensing, says Haltom, is the biggest cost as each IP device that talks to a switch has to have a license. But the benefits are many.

"Older phones have little or no intelligence," said Haltom. "Using SNMP, I can monitor VoIP phones and everything else under one seamless management umbrella. As issues are reported long before users notice it, our SLA's are overwhelmingly better."

Though the company is investing heavily in VoIP, it is also saving money as it goes. Haltom cites savings of $40 per phone due to eliminating the need for separate data and IP lines in each facility. In addition, it brings substantial cost savings over traditional long distance telephone calls.

MONITORING THE NETWORK

Obviously, VoIP demands effective monitoring of the network. Cable & Wireless (CW), a major global telecommunications business, has a data center in Swindon, England. This 130,000 square foot facility is directly connected to the CW IP backbone. The site has a bandwidth capability of 9.6 G/bps, an on-site power station (capable of running the centre on diesel for 20 days).

The company has seen a surge in requests from its large enterprise customers for Voice over IP services. It offers a service known as Intelligent Voice as a way for them to reduce telephony spending by implementing an infrastructure that can carry both voice and data without any impact on existing systems.

To keep voice quality high at all times, and stay abreast of network issues, the company uses NetIQ App Manager (www.netiq.com) to monitor customer sites as well as its own data centers.

"App Manager monitors the customer servers so we can manage more with fewer staff," said James Cox, systems management architect for CW.

When situations arise, the resulting alerts give Network Operations Centre (NOC) staff a good idea of where the problem lies. This allows them to target their diagnostic efforts more effectively, and reduces the mean time to repair. Cox says the alerting and reporting facilities allow CW to be proactive in its monitoring efforts.

"We set the monitoring thresholds so that our NOC is alerted before a particular problem becomes service affecting," said Cox. "In many cases, we receive an alert, and we are able to solve the problem before it has any impact on the service we offer."

Before you get as far as monitoring, though, there is an earlier and more basic step—testing. Yes, the network may well need to be beefed up. But many VoIP issues, it turns out, are related to applications. So test thoroughly before any VoIP project. Comprehensive testing takes the uncertainty out of VoIP deployments by enabling data centers to determine how much traffic their network can handle without degrading voice quality. Such testing will also locate configuration errors in networks and VoIP equipment, detect and troubleshoot interoperability issues, isolate performance bottlenecks, and tune speech applications for best performance.

Go to great lengths to find and fix problems in pre-deployment testing than to discover them in production. And don't forget to test the system before every upgrade. Most large organizations will find that they need to install patches or upgrades at least monthly, and sometimes those changes can affect performance. Regression testing will help ensure that performance remains the same or improves, rather than degrades. You don't want a patch to take your whole system down.

NO HURRY

So should you be rushing—right now—to implement VoIP? Probably not. If you have already invested a large sum into your existing phone system, it is functioning efficiently and not seriously out of date, it might be best to leave it until age finally calls a halt. That's the right time to adopt VoIP. Or like Health System Erlanger, coordinate your gradual roll-out around a renovation or construction program.

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"In those enterprises with current telecom investments, why bother with VOIP," says Gartner's Elliot. "It is very difficult to make a case for replacement. They need to have faith that the applications will be there in the future."

NaSPA member Drew Robb is a Los Angeles based writer who focuses on technology issues.