



Lab Testing Summary Report

May 2006
Report 060503

Product Category:
**IP PBX
High-End Systems**

Vendor Tested:
3Com Corp.

Product Tested:
**VCX IP telephony
system, Release 7.0,
3Com Convergence
Application Suite**



**Best Distributed
Survivability**
High-End IP-PBXs, 2006

Key Findings and Conclusions:

- The 3Com® VCX™ was deemed to deliver the "Best Distributed Survivability" in a comparative, open review that included Avaya, ShoreTel and others
- The VCX architecture employs exceptional fail-over and back-up capabilities, and a modular software structure that maximizes survivability
- Native all-SIP call control enables 3rd-party device support and interoperability
- The 3Com VCX IP telephony system represents a solid and full-featured, mid-range to high-end IP-PBX contender

3 Com submitted the latest release 7 of its VCX IP telephony system for the annual, open, competitive review of high-end IP PBXs sponsored by *Business Communications Review*. Other industry-leading "high-end IP PBXs" – systems supporting over 1,000 IP stations – from Avaya, Alcatel, ShoreTel and Siemens were also included. The results of this testing, conducted by Miercom, were published in *BCR's* January 2006 issue.

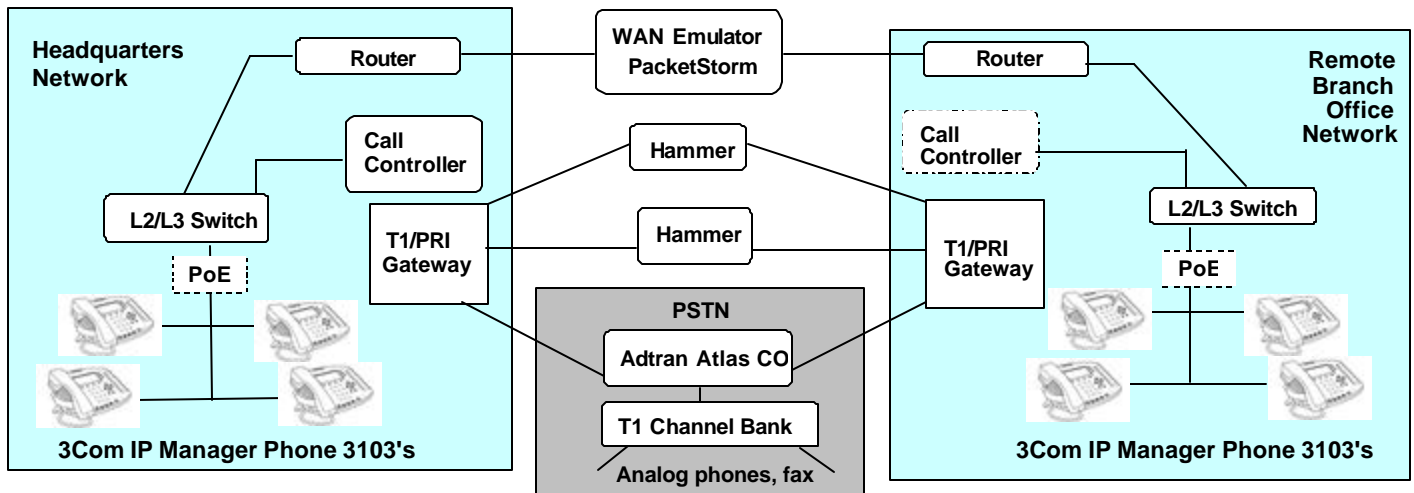
The VCX IP telephony system, a component of the 3Com Convergence Application Suite, emerged with a unique distinction. It was deemed to offer the *Best Distributed Survivability* of the systems tested. The table below details the VCX's key capabilities and features that contributed to this novel award.

3Com VCX IP Telephony "Best Distributed Survivability"

Key findings contributing to this unique award

Modular Software Architecture	Key software functions – including call control and voicemail/messaging – can run together on the same, or on different, distributed servers. Unlike some competitors, a VCX site loses no functionality if a network link or remote call processor goes down
Server Reliability	VCX ships on one or more highly reliable and redundant, Linux-based IBM servers, and is now also offered by IBM on its System i platform
Fail-over Capabilities	A controller can manage its own IP telephony network, and concurrently back-up one or more remote call controllers. Call control can fail-over in any direction: from distributed site to headquarters, or vice versa
Back-up Mechanisms	Back-up configuration files are extremely efficient, entailing less than 10 Mbytes, can be replicated on controllers anywhere, and are all automatically updated whenever there's a configuration change

High End IP PBX Test bed Set-up



About the testing... Miercom's High-End IP-PBX test bed consists of two "simulated" sites, a company headquarters and a "remote" branch office, connected by an IP-WAN link. At "headquarters" the network infrastructure included Extreme Summit 48 switches. The same network structure was deployed at the remote site. The two sites were also connected by T1 links through an Adtran Atlas 800 central-office switch simulator, this to test failover and re-routing scenarios. Fax support and other analog connectivity were also tested via a Carrier Access Corporation Access Bank II channel bank. Vendors provided their own PoE (Power over Ethernet) source to power their IP hard phones. A PacketStorm Hurricane 1800E Network Emulator was used to simulate a typical IP LAN or "campus" environment, as well as a simulated IP WAN link over the Internet. For VoIP connection-quality tests this device applied latency, packet loss and jitter to simulate various call scenario environments.

All vendors' IP softphones were run on the same Compaq Presario 2500 laptop, and employing a Plantronics DSP-400 USB headset. Two Empirix Hammer Systems – a Hammer FX and a Hammer LoadBlaster 500 were used to generate the call loads required in the Performance tests. Various monitoring systems, including Ethereal, were used during the testing to verify network traffic and other VoIP operational characteristics.

Highlights: Among the most notable and laudable, competitive aspects of the 3Com VCX system, we believe, are:

- Powerful distributed survivability – not just of telephony, but voicemail, messaging and conferencing as well
- Solid, native SIP support
- Convergence Center Client software
- Telecommuter Module
- Rapid deployment to branches.

Redundancy/failover/distributed survivability.

Testing found that fail-over from a primary to a hot-standby call controller occurs in 17 seconds. During and after the fail-over, established calls remain connected, and features including speed-dial and last-number redial also are retained.

Architecturally, a VCX site loses no functionality if a network link or remote call processor goes down. Key to the survivability are Linux-based

IBM x-series servers and modular, distributed 3Com VCX software. A pair of IBM 346 servers provide excellent redundancy. These feature redundant hot-swappable power supplies and RAID disk redundancy. The low-cost 3Com V6000 platform, a distributed and survivable branch call controller, offers similar redundancies.

System software consists of separate modules for telephony control and IP messaging, which provides voicemail and similar functions. These can run on the same server (subject to overall system size and server performance, of course) or on separate servers. Either module can run locally or remotely, and back-up copies can run on one or more servers.

In testing fail-over of the VCX system, we were frankly astonished that we could keep disconnecting back-up controllers, and phone service continued without skipping a beat.

Solid, native SIP support. The VCX system is based on SIP, and does not employ any proprietary call-control protocol. As a result, the system supports many 3rd-party endpoints, of all types. We verified interoperability with IP phones from Avaya Cisco and others, running those vendors' SIP firmware, with wireless SIP phones from RIM/BlackBerry and the Hitachi IP 5000, and with various 3rd-party SIP softphones.

These endpoints are in addition to the full-featured 3Com IP phones, including a new, lightweight, long-battery-life wireless model.

Convergence Center Client. Earning special recognition in the Miercom review was the 3Com Convergence Center Client, a PC application that provides a full-featured SIP softphone, video support, SIMPLE-based presence, conferencing, and a host of other productivity-enhancing capabilities.

We thought the application's H.234-based video support was particularly well done, with good audio and video set-up controls. The client works well with the 3Com convergence suite, which embodies unified messaging, conferencing and presence. All client actions, from placing calls to sorting call logs to launching video to retrieving voicemail, are well laid out and intuitive to use.

Telecommuter Module. Another noteworthy option we reviewed as part of the 3Com VCX package was the 3Com Telecommuter Module, a separate appliance that is designed to work in conjunction with an enterprise's existing firewall and facilitate many secure, concurrent VoIP calls.

This kind of device will be crucial for enterprises as VoIP systems and networks expand and interconnect. The 3Com unit largely off-loads VoIP handling from the existing "data" firewall, handling NAT and firewall processing for VoIP, as well as remote-user (i.e. telecommuter) registration.

Rapid deployment to branches. 3Com has also given considerable thought to the process of deploying VCX call controllers to

IP-PBX at A Glance

IP-PBX, version tested:	3Com Convergence Application Suite / VCX IP telephony system, R7.x
Call controllers:	Software is pre-installed on IBM 306 (up to 1,500 users) or 346 (up to 10,000 telephony users) Linux-based servers; plus the 3Com V6000 platform, a low-cost, modular call controller for distributed locations with up to 100 users
Capacity	Up to 10,000 IP hard or softphones. 75,000 BHCA (assumes 60 percent via gateways). Up to 50,000 users can be interconnected across multiple systems, via hierarchical, SIP-based call routing
Endpoints	Various IP phone models (including the latest 3101, 3102, 3103) were reviewed, plus softphone and new 3Com wireless (802.11 WiFi) IP phone
Protocol Support	Native SIP. Over a dozen 3 rd -party SIP-based products and endpoints (hard, softphone and wireless) supported, including: Cisco, Avaya, BlackBerry, Grandstream, Philips, Polycom, Unidata and more
Featured application	3Com Convergence Center Client, features intuitive softphone, video support, presence and conferencing; integrated with the 3Com Convergence Center server package.

many remote branches. Essentially, a server is sent out to a branch. Then, with minimal set-up at the branch (such as DHCP configuration for basic IP connectivity), the branch server then auto-downloads its complete telephony-control software image from headquarters.

Deemed to Deliver the "Best Distributed Survivability"

Based on Miercom's thorough workout of this system, and detailed review of its capabilities, operation, and performance, as described herein, Miercom presents 3Com with the "**Miercom Rated Best**" Distributed Survivability award for the VCX IP telephony system. Notable among the features and capabilities verified:

- The system employs exceptional fail-over and back-up capabilities, and a modular software structure that maximizes survivability.
- Native all-SIP call control is standards-based, enables 3rd. party SIP device support and interoperability.
- The VCX package is full-featured, with options ranging from IP Contact Center module to the special Telecommuter Module for secure remote connectivity, to the Convergence Center Client, a well-laid-out PC application with intuitive softphone and many communications utilities.



3Com VCX
IP telephony
system, showing
V6000 and V7000
servers, and 3101
through 3105 IP
phone models



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About Miercom's Product Testing Services...

With hundreds of its product-comparison analyses published over the years in such leading network trade periodicals as *Business Communications Review* and *Network World*, Miercom's reputation as the leading, independent product test center is unquestioned. Founded in 1988, the company has pioneered the comparative assessment of networking hardware and software, having developed methodologies for testing products from SAN switches to VoIP gateways and IP PBX's. Miercom's private test services include competitive product analyses, as well as individual product evaluations. Products submitted for review are typically evaluated under the "NetWORKS As Advertised™" program, in which networking-related products must endure a comprehensive, independent assessment of the products' usability and performance. Products that meet the appropriate criteria and performance levels receive the "NetWORKS As Advertised™" award and Miercom Labs' testimonial endorsement.



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