



Lab Test Summary Report

June 2008
Report 080711

Product Category:

UC IPPBX

SME Class

Vendor / Product:



VCX™ Connect 100

VCX Connect 200



Rated Best Distributed Survivability – Miercom *

Key findings and conclusions:

- **3Com VCX Connect solutions proved "Best Distributed Survivability" in a comparative, open review of SME class unified communications products**
- **VCX Connect uses an intuitive, Web-based interface that greatly improves installation and simplifies user moves and changes**
- **Native all-SIP call control enables 3rd-party device support and interoperability with a wide range of UC endpoint devices**
- **VCX Connect IP PBX is a solid and full-featured IP-PBX for small and medium enterprises**

3 Com submitted the latest release 8.0 of its VCX Connect 100 and 200 IP telephony systems for Miercom's annual, open competitive review of Unified Communications and IP PBX products. Miercom examined eight UC/IP PBX products that are available for the small and medium enterprise (SME) market.

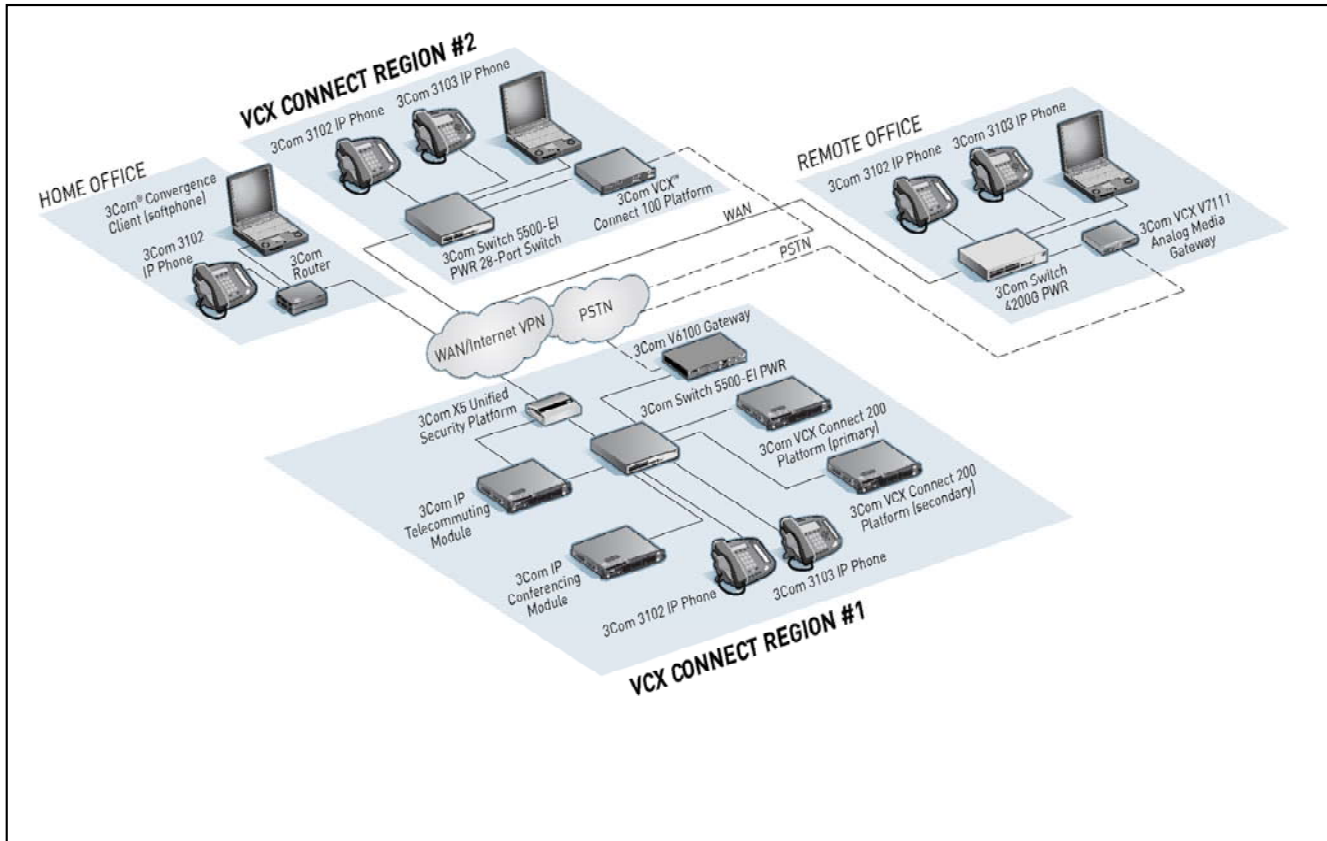
The VCX Connect 100 and 200 IP telephony systems were subjected to full multi-component test methodologies and competitive product review. The VCX solution was recognized two years ago for superior resiliency and has again achieved the unique distinction of Best Distributed Survivability of all UC SME systems tested.

The table below details the VCX Connect systems' key capabilities and features that contributed to this distinction.

3Com VCX Connect IP PBX "Rated Best Distributed Survivability"	
Software Resiliency	IP Telephony call control and IP Messaging (voicemail) coexist and are replicated on a redundant server. Sites lose no functionality if a network link or other single site failure occurs
Server Reliability	VCX Connect platforms ship complete on a hardware appliance or Linux-based IBM server which are both easily configurable for redundancy
Fail-over Capabilities	Redundant VCX Connect platforms with resilient client support allow UC endpoints to always find an available server and call route for communications
Back-up Mechanisms	Full system back-up and restoration is easily conducted using the web based GUI. The replication mechanism can also be used to facilitate initial installation by installers

**3Com VCX Connect 100 & 200 IP PBX products are Rated Best Distributed Survivability for SME Class Unified Communications Solutions in the 2008 Miercom Unified Communications Industry Study*

VCX Connect Product Configuration as Reviewed



How We Did It

Failover testing, ease of deployment, security assessment and SIP interoperability testing were conducted using the 3Com components illustrated in the diagram above. A full-featured unified communications solution, with the VCX Connect 100 and VCX Connect 200 platforms serving as the IP PBX, was configured for a multi-regional environment to include two regional offices, a remote/branch office, a home office and telecommuter components. We configured the VCX Connect 100 shipped directly from the factory and modified with default settings using an intuitive Web interface to import profiles for dialing plans and voicemail setups. We set up a new region with a 3Com VCX Connect 100 IP PBX in less than 30 minutes.

SIP interoperability was verified using Touchtone's WinSIP and ClearSight Analyzer tools and third party phones from Polycom (650, 550, 430 and 330), Grandstream, and Snom. Hitachi and Nokia (E61) dual mode phones were included in the testing. Empirix Hammer Systems – a Hammer FX and a Hammer LoadBlaster 500 – were used to generate the call loads required in the performance tests.

The VCX Connect platforms passed all aspects of a high-end IP PBX review conducted previously by Miercom. The review included a rigid battery of performance tests for load and attrition. We utilized two “simulated” sites, a company headquarters and a “remote” branch office, connected by an IP -WAN link. Extreme Summit 48 switches were used and, to test failover and re-routing scenarios, the two sites were also connected by T1 links through an Adtran Atlas 800 central-office switch simulator.

Fax support and other analog connectivity were tested via a Carrier Access Corporation Access Bank II channel bank. A PacketStorm Hurricane 1800E Network Emulator simulated 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.

IP soft phones were run on a Compaq Presario 2500 laptop, and we used a Plantronics DSP-400 USB headset. Various monitoring systems, including ClearSight Analyzer and TouchStone WinIQ, were used during the testing to verify network traffic and other VoIP operational characteristics.

Best Distributed Survivability

Miercom's testing of VCX Connect resiliency features proved the product has impressive survivability. In fact, the system turned in some stunning performance, instantly reacting to our purposeful disconnects of VCX Connect servers, end points, power supplies and server internal processes.

For IP telephony redundancy, the VCX Connect system architecture replicates data on the fly, in real-time between controllers. Miercom engineers observed transparent failover not only for phones but also for media gateways and other system applications including messaging.

VCX Connect remote office survivability includes inbound and outbound PSTN failover, as well as LAN and WAN failover abilities. Power fail transfer service (PFTS) allows port failover mapping to available FX0 port upon power failure.

We used a test set-up, as shown, from the "Region 1" section of the test bed diagram with redundant VCX Connect 200 platforms as further illustrated below. Calls remained intact, and IP Messaging (voicemail) was resilient and always accessible despite interruption or disconnect of either VCX Connect server. Disconnecting both VCX Connect servers in the regional office or simulated WAN or Internet outage still allowed

branch / remote offices to dial out through local telephony using the built-in gateway functionality of the VCX Connect 200. The endpoints (IP Phones) were also resilient and were multi-homed by IP address to an alternate secondary call controller in the VCX Connect region.

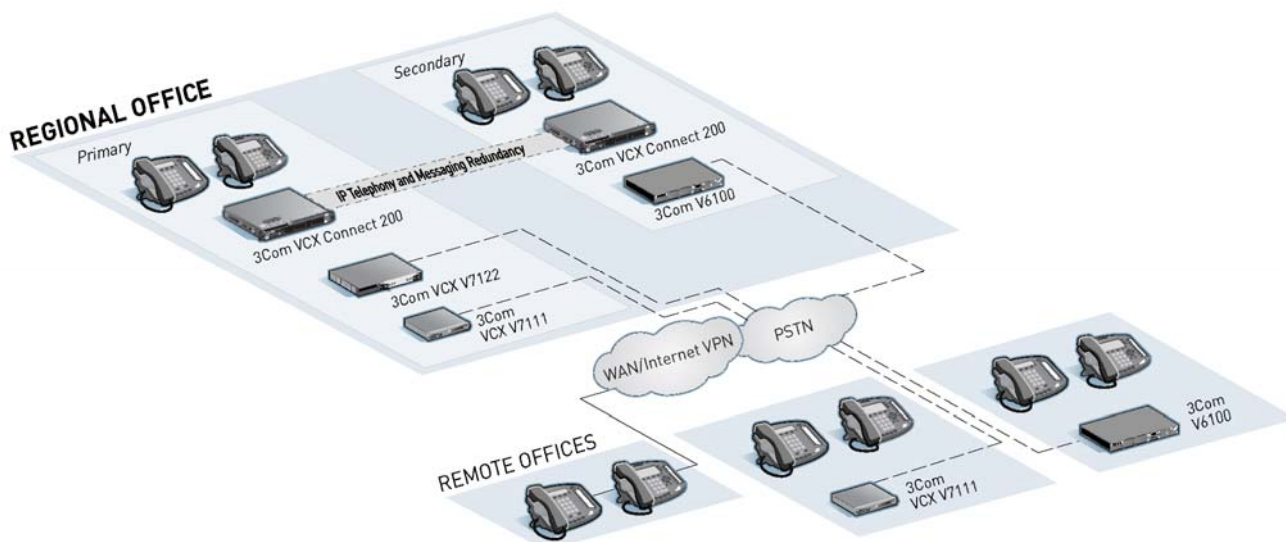
The VCX Connect 200 server seamlessly failed-over to the alternate controller when we forced a failed process SIP Call Control. Not only was this failover instantaneous and transparent to the users, but we were also alerted by the 3Com's Enterprise Management Suite (EMS) of the failure.

Multiple "backup" configurations can be made which allow a quick undo in case of a misconfiguration or need to restore a previous configuration.

VCX Connect 100 and VCX 200 can be configured with optional redundant RAID hard disk drives and the VCX Connect 100 also offers a redundant power supply. Primary and secondary servers can be deployed, either at the same site or geographically separated, for better resiliency.

The redundant RAID-1 disks have write-both, read-either functionality and we were impressed by the way the secondary server maintained synchronization through replication and mirroring while using minimal bandwidth.

Failover Configuration as Tested



The VCX Connect's remote office survivability includes inbound and outbound PSTN failover. Calls stayed intact and IP Messaging was always accessible during interruption or disconnect of either VCX server.

Scalability

VCX Connect systems allow as many as six regions to be connected. The solution is modular, meaning it enables expansion of additional offices by adding additional VCX Connect servers to the same IP PBX system.

Multiple configuration templates can be easily saved and re-used to quickly allow for roll out of IP telephony to new branch offices.

The system's use of Global Directory and Global Voicemail ensures that the product aesthetics and functionality remain uniform for all users.

Beyond that, the product is designed to retain the look and feel for customers who use either the VCX Connect 100 or VCX Connect 200 systems.

The VCX Connect 100 platform scales up to 100 users per server (up to 600) while the VCX Connect 200 platform scales up to 250 users per server (up to 1,500).

We easily added a VCX Connect 100 server as a new region to an existing IP PBX system. Using the intuitive Web interface and import capability from CSV / Excel files -- for stored dialing plan, voice mail, and subscriber set up preference templates -- we were able to install and bring up the new VCX Connect 100 server into a new region in less than 30 minutes.

The VCX Connect system also allows for additional VCX gateways to be added to a region to provide load sharing or call overflow handling and they can be dedicated to either inbound or outbound messaging.

Native SIP Interoperable

The VCX Connect architecture including applications is based totally on SIP and does not employ any proprietary call-control protocol. It is designed to be easily integrated with third-party applications and devices.

We verified interoperability with IP phones from Polycom (650, 550, 430 & 330), Grandstream, and Snom.

Hitachi and Nokia (E61) dual mode phones were also evaluated. Competitors' SIP compliant IP phones, such as those sold by Avaya and Cisco, will also work with the VCX platform.

Wireless SIP phones from RIM/BlackBerry and the Hitachi IP 5000, were tested and worked well.

IP-PBX version tested:	3Com VCX Connect Release 8.0
Architecture of the call controller:	VCX Connect 100 is pre-installed on a custom 1U appliance. VCX Connect 200 is pre-installed on IBM System x3250 server
Capacity:	<u>VCX Connect 100</u> 100 users /server, 600 users/system, 25-user license included <u>VCX Connect 200</u> 250 users/server, 1,500 users/system, 25-user license included
UC Endpoints (SIP):	IP phone models (including the latest 3Com 3101, 3102, 3103), softphone and Hitachi IP5000 wireless (802.11 WiFi) IP phone
Protocol Support:	Native SIP. Over a dozen 3rd-party SIP-based products and endpoints (hard, softphone and wireless) supported, including: Avaya, BlackBerry, Cisco, 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.

In addition to verification with the real SIP endpoints, SIP interoperability was verified using Touchtone's WinSIP and ClearSight Analyzer tools and Mu Dynamics SIP testing suite.

IP Telecommuting

The VCX Connect IP Telecommuting module enabled secure remote telephony and messaging. This module requires the use of a separate IBM X Series server and is designed to work in conjunction with an enterprise's existing firewall to facilitate secure, enterprise volumes of concurrent VoIP calls.

This component 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.

Unified Communications

We tested the 3Com VCX Connect UC features and overall unified messaging capabilities and found them well designed and comprehensive.

The platform supports email and voicemail messaging, fax delivery to email, multiple phone appearances on an extension and both hardware and software endpoints.

Quality of experience for voice and video was superb for using SIP-based video phones. The UC endpoints tested with the VCX Connect system included the Nokia GSM/Wifi PDAs,

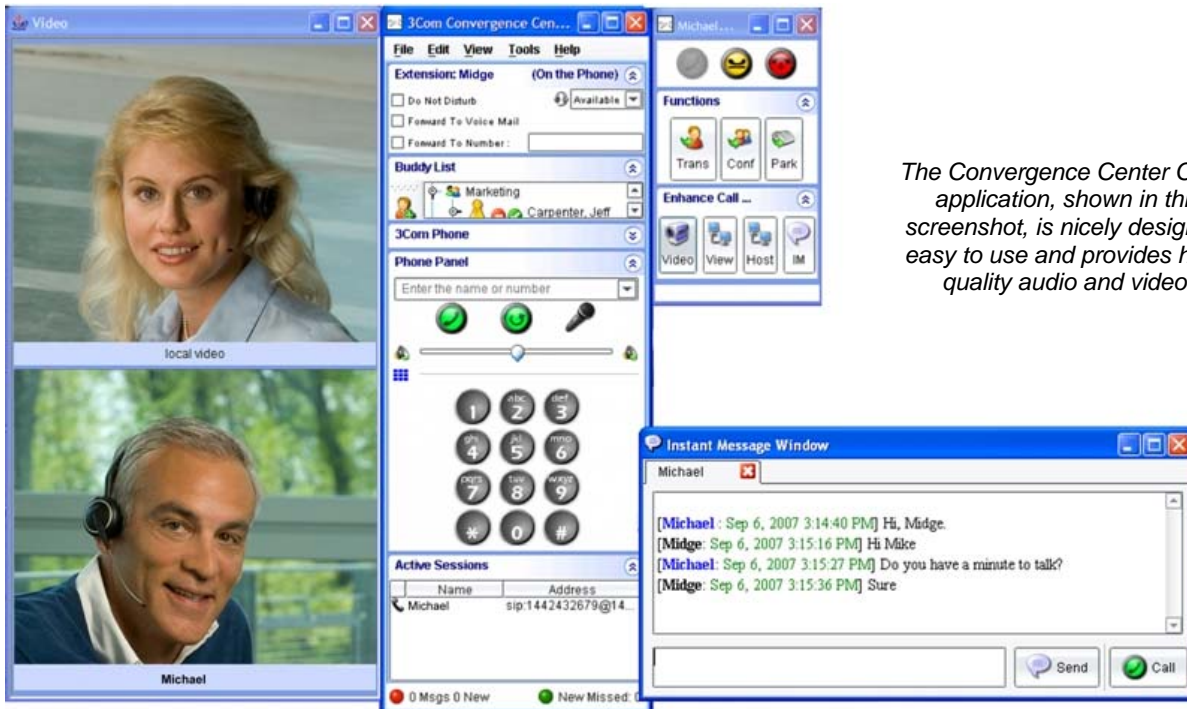
3Com "Convergence Client" softphone, 3Com 3100-series deskphones and the Hitachi IP5000 portable WiFi handset. UC capabilities, including instant messaging and desktop sharing, were tested. The 3Com VCX IP conferencing and presence modules were demonstrated to provide high-quality, remote collaboration for voice, video and desktop.

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.263-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.



The Convergence Center Client application, shown in this screenshot, is nicely designed, easy to use and provides high-quality audio and video.

Management and Administration

The 3Com VCX Connect Web GUI, shown below, offers an effective look and feel that is consistent with all 3Com voice products. This is a significant improvement to the previous interface we evaluated for 3Com.

It provides easy, graphical access to many system event tasks that were once available only through command-line input. These include system modification and component activity.

Additionally, the Web interface affords relatively easy system backups and restores. Ascertaining provisioning information and operating system data was also a breeze with the interface, and we found that first-time configuration of the VCX Connect server was painless.

Users can configure their own settings using the same intuitive Web-based interface for local administration and setup for their telephony preferences. The interface includes a much-welcomed feature that allowed us to import pre-configured provisioning data, such as phone extensions, using a set of comma-separated-value (CSV) files.

Rapid deployment of VCX Connect servers-

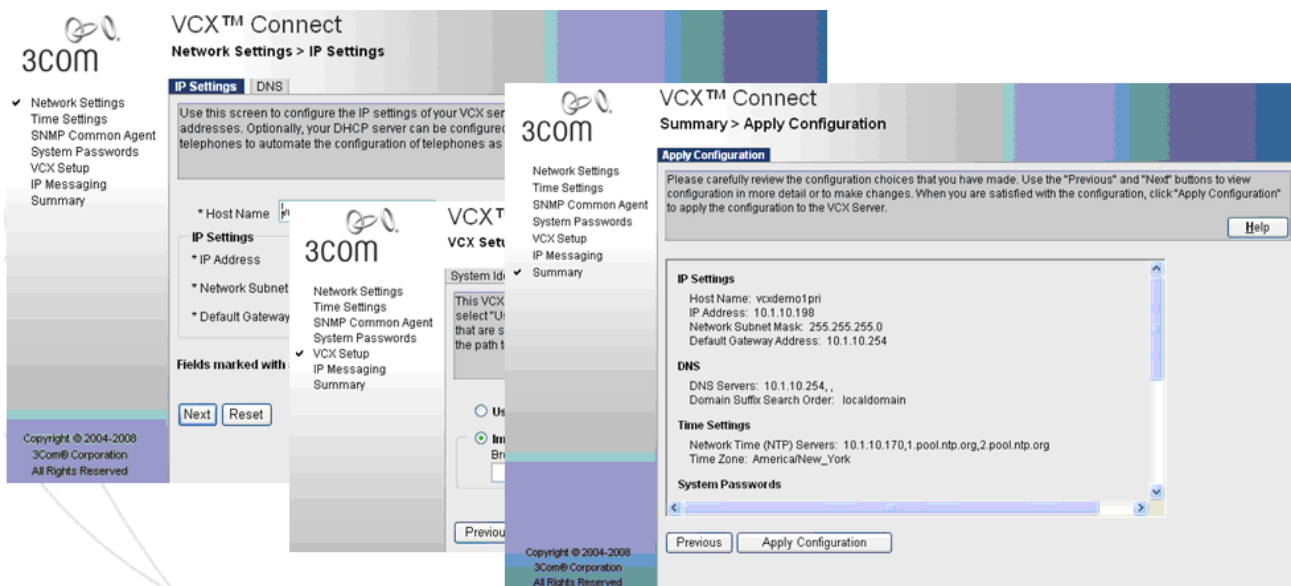
3Com has also given considerable thought to the process of deploying VCX call controllers in customer networks.

Essentially, a secondary server is sent to a location. With minimal set-up (such as DHCP configuration for basic IP connectivity), the secondary server connects and auto-downloads its complete telephony-control software image from headquarters.

3Com Enterprise Management Suite - (EMS)

EMS is a powerful device management application included with the VCX Connect 100 and 200 platforms. We worked with EMS and VCX Connect and found it enabled easy configuration and rapid troubleshooting of security policies. This was accomplished through the use of a number of graphical tools and wizards.

EMS should retain value as a troubleshooting tool while multi-device configuration management and reporting functions migrate as companies grow.



The 3Com VCX Connect's First Time Configuration Wizard uses a Web browser interface and is pre-configured with an IP address. It was easy to either import existing telephony data or start fresh with the system's standard configuration

Miercom Rated Best

Based on Miercom's testing of the 3Com VCX Connect 100 and 200 Unified Communications solutions, Miercom attests that the product's performance capabilities are superior to that of comparable products on the market.

Based on a Miercom comparison with comparably equipped products, the 3Com VCX Connect 100 & 200 IP PBX's are Rated Best Distributed Survivability for SME Class Unified Communications Solutions in the 2008 Miercom Unified Communications Industry Study.



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