



# Lab Testing Summary Report

January 2003  
Report 310103

Product Category:  
**IP PBX's**

Vendor Tested:  
**Mitel Networks**

Product(s) Tested:  
**3300 Integrated Communications Platform, v 3.2**



## Key findings and conclusions:

- Won “Best of the Best in Test” citation for its broad array of diverse advanced features
- Supports Desktop Tool, an intuitive, easy-to-use Web-based personal phone manager
- Offers Mitel 6110 Content Center Management interface that is clutter free and supports in-depth, real-time monitoring and many canned reports
- Available at a very competitive price

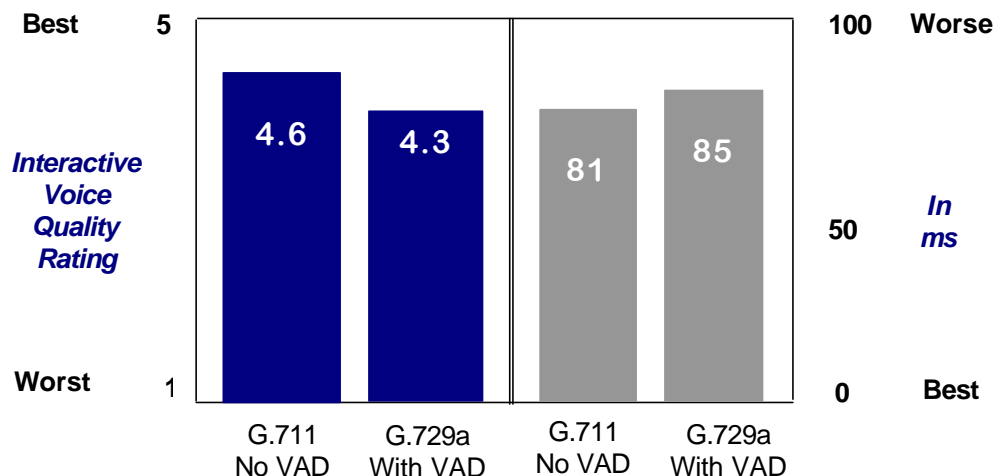
**M**itel Networks entered its Integrated Communications Platform (ICP) in a competitive test of IP-PBX's supporting less than 1,000 stations. Testing was based on a methodology and test-bed that were developed by Miercom. The tests were conducted by Miercom engineers at the company's testing facility in Princeton Junction, NJ. The goal of testing was to evaluate how well the Mitel 3300 ICP fared in four categories: basic features, advanced features, management and performance. Testing was completed with version 3.2 firmware (October 2002).

Among seven IP PBX's supporting <1,000 stations tested recently by Miercom, the 3300 ICP received a “Best of the Best in Test” citation for its advanced features from *Business Communications Review (BCR)*, which co-sponsored the tests. Miercom also noted that the Mitel 5140 Appliance is still the best IP phone tested to date. Full results of the test were published in the February 2003 issue of *BCR* ([www.bcr.com](http://www.bcr.com)).

### Performance

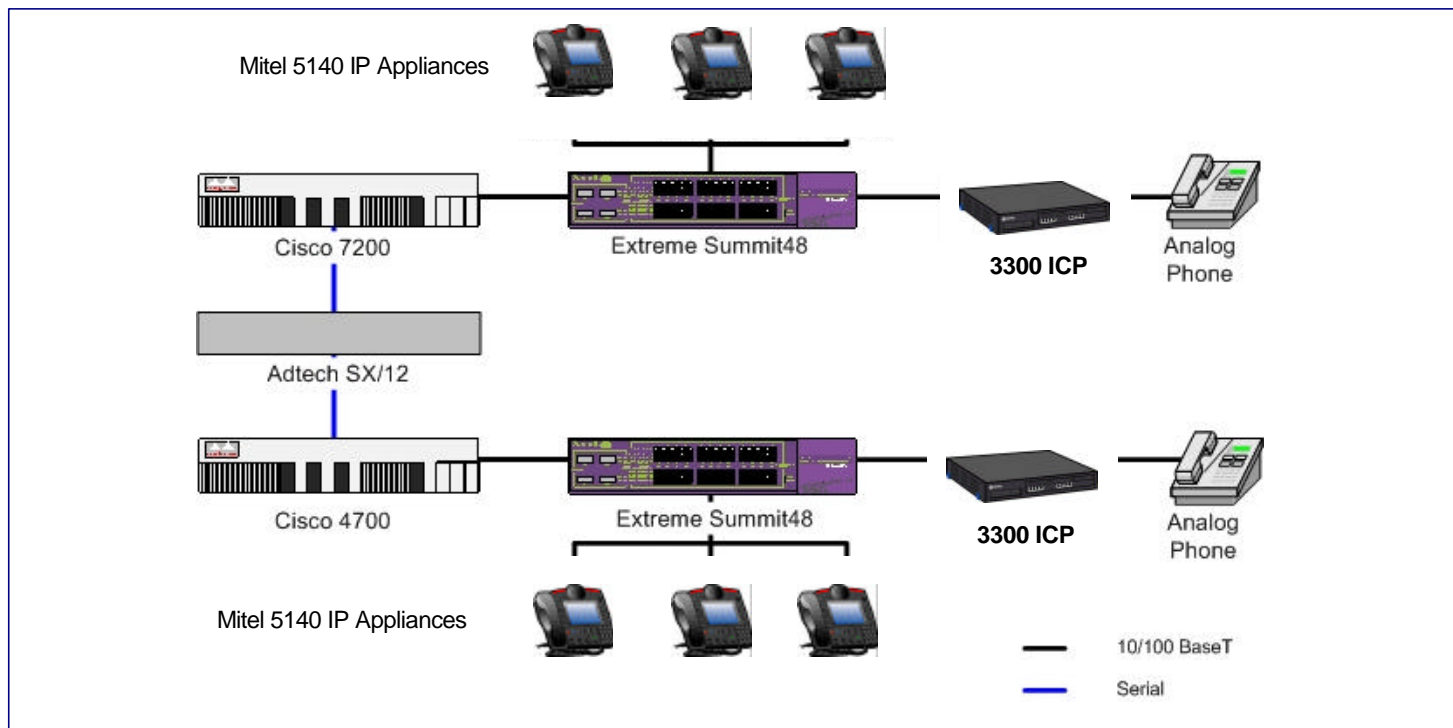
The Mitel 3300 ICP delivered “toll-quality” interactive voice quality and acceptable one-way latency in performance tests. (See chart below.)

### Interactive Voice Quality Ratings vs. Latency



\*We measured latency in milliseconds one way on both a LAN and a WAN. Miercom rates “toll-quality” voice as a 4.0 and above.

## Test-bed Setup



**About the testing...** Mitel provided two 3300 Integrated Communications Platforms for testing. To test call reliability of the system we used the Empirix Hammer LoadBlaster, which we configured to deliver three calls per minute over 12 DS-O's to the system under test (SUT). The SUT was configured to route the calls to a second, remote IP-connected PBX of the vendor's choice. This test ran for 12 hours.

In the Interactive voice-quality tests three engineers, in rotation, conducted real-time, two-way conversations over separate connections. We ran three tests: (1) IP phone-to-IP phone same LAN (G.711); (2) IP phone-to-IP phone over a WAN using a low bit-rate vocoder; and (3) from an IP phone to an analog phone on the same PBX. We conducted countdown tests to measure the effects of latency and alphabet tests to examine bi-directionality. We noted any echoes, clipping, background noises, or other impairments that affected clarity. Scores were given on a five-point scale with a score of 4.0 and above rated as "toll quality," suitable for all telephony applications.

To test latency, after placing a VoIP call between two phones, we employed a THAT-2 adapter (Telephone Handset Audio Tap-2) to inject a laptop-generated .wav file from the Line Out 1/8 stereo-jack connector of the laptop into the handset connection of the first phone. The left channel of the .wav file was diverted back into the "Line In" stereo-jack connector on the laptop, and the right channel of the .wav file was transmitted across the phone connection to another THAT-2 box where the right channel was diverted back to the "Line In" jack. On the laptop, we ran Syntrillium Software Corp.'s Cool Edit 2000 audio recording, editing and mixing application for capturing and displaying both the left and right channels. We then measured the change between the two signals. We measured latency three times for each connection environment and averaged the results. Our connection environments consisted of: (1) IP phone-to-IP phone, same 10/100 LAN, G.711; (2) IP phone-to-IP phone, over a WAN, G.729 or other low-bit-rate vocoder; and (3) IP phone (G.711) to an analog phone on the same PBX.

### Performance – continued

The Mitel 3300 ICP scored a 4.6 for voice quality when tested IP phone-to-IP phone on a LAN using G.711 vocoding. (See "About the testing" above for a complete description of interactive voice-quality testing.) When tested IP phone-to-IP phone over a WAN using a G.729a vocoder, the 3300 ICP achieved a 4.3 voice-quality rating. Both scores are rated "toll-quality," which indicates that the voice quality is acceptable for

all telephony applications and a suitable replacement for TDM. Tests using G.729a vocoding were conducted using voice activity detection (VAD).

Latency measurements on the 3300 ICP were well within acceptable ranges for good voice quality. (Voice quality begins to degrade slightly at latencies above 100 milliseconds.) An average one-way latency, conducted IP phone-to-IP phone on the same LAN with G.711 vocoding, was 81

## Performance & Availability – continued

milliseconds (ms). One-way latency, IP phone-to-IP phone over a WAN using G.729a vocoding, was 85 ms. Neither latency had any negative effect on interactive voice quality.

## Features

The Mitel 3300 ICP had the highest score for basic features, a “90”, which was shared with two other vendors—all of whom supported 88 percent of 38 basic station features tested for, ranging from call hold and call forwarding to whisper page. While it may seem axiomatic that IP-PBX’s support basic station features that end users have come to expect on business telephones, that is not always the case. Support for 88 percent of them is notable.

Mitel led the competition in the advanced features category in which its 5140 IP Appliance was judged the best IP phone Miercom has reviewed to date. Testers cited the 5140’s ability to send and receive text messages to other Mitel system clients, its ability to display HTML pages and GIF images on its large, 320 x 240-pixel display and its infrared port for PDA integration.

Also noted was the 5700 Voice First Application that combines a Mitel IP phone, a 5750 Desktop Video Appliance and a desktop application to deliver video conferencing to the station.

Another noteworthy feature is the IP Console 5550, an application that effectively “morphs” a PC into an attendant console. A specialized attendant phone handles the voice path, while call-handling tasks are completed through the application on a PC monitor.

Mitel also demonstrated its Symbol MiNet Wireless Phone, developed in partnership with Symbol Technologies. Using any wireless access point, a Mitel-branded Symbol Spectrum24 wireless phone can be used for IEEE 802.11(b)-based access to the Mitel 3300 ICP.

The Mitel 3300 ICP was among the most competitively priced IP-PBX’s tested.

## Mitel Networks 3300 ICP: Key Features

<b>Maximum stations per system</b>	1,536
<b>Call control</b>	Controller servers call processing and management
<b>Call control OS and processor</b>	VxWorks, Motorola
<b>Station interfaces</b>	Analog, digital, IP, wireless
<b>VoIP support</b>	H.323, v2
<b>Vocoders supported</b>	G.711, G.726, G.729, G.729a
<b>VoIP prioritization</b>	TOS field, DiffServ CodePoint, IEEE 802.1p/q
<b>Advanced features</b>	Automated attendant, call center, conference bridge, PDA integration, TAPI interface, text messaging, unified messaging, video conferencing, voicemail, 5700 Voice First Application, IP Console 5550
<b>Redundancy</b>	Automatic fail over of trunk routing from IP trunks to PSTN trunks; redundant IP interfaces and IP-control boards
<b>Management</b>	3300 System Administrator
<b>Price per station (US list)</b>	\$395 with local phone power

## Management and Administration

The Mitel Networks 3300 ICP is managed through the 3300 System Administrator (we tested version 3.2), a Java-based Web interface served by GoAhead directly from the 3300 ICP. The frames-based Web interface is clean and well organized in an intuitive tree structure. Management strengths include useful real-time statistics, which are available through a command-line interface and manually refreshed.

The OPS Manager, which is provided on a separate server with Java-based interface, supports a powerful moves, adds and changes function and allows administrators to manage a single site, cluster and/or network of 3300 ICP’s, and SX-2000 TDM PBX’s in a cohesive network.

## Meets Expectations

Based on comparative tests of leading IP-PBX systems recently conducted by Miercom, Mitel Networks' 3300 Integrated Communications Platform (ICP) led the competition in advanced features and received a "Best of the Best in Test" citation for its 5140 IP Appliance—still the best IP phone we've seen to date. Mitel's array of advanced features was notably diverse, offering product combinations, for example, that deliver video conferencing to a Mitel IP-phone. The 3300 ICP also supported 88 percent of basic features, which is comparatively very good.



In the unanimous opinion of the testers, the Mitel Networks 3300 Integrated Communications Platform IP-PBX fully meets the expectations and requirements of the target user community for which it was designed and is hereby presented the "NetWORKS As Advertised™" award.



Mitel Networks 3300 ICP



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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 ATM 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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