

## Lab Testing Summary Report

February 2007  
Report 070228

Product Category:  
**SMB IP-PBX**

Vendor Tested:  
**Cisco Systems**

Product Tested:  
**Cisco Unified  
Communications  
500 Series**



### Key findings and conclusions:

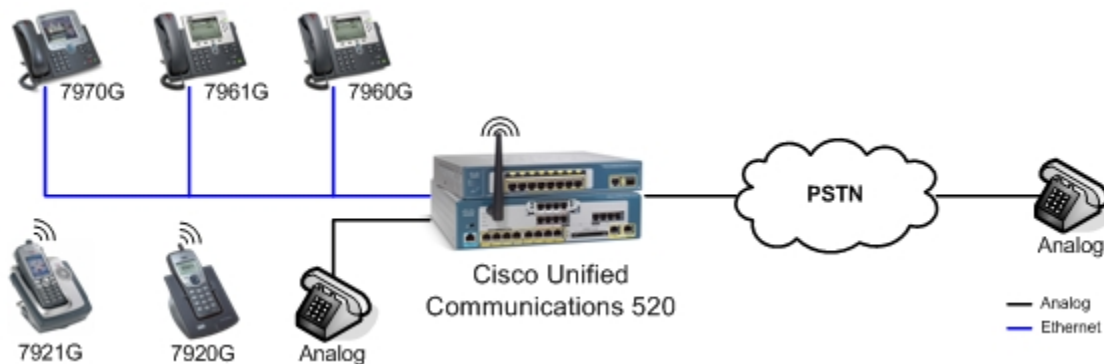
- Complete Unified Communications solution set up and operational in less than 15 minutes with full telephony feature set, QoS and VLANs
- Simplified system modifications and updates via Cisco Configuration Assistant GUI interface
- Supports full array of Cisco IP end points including hard phones, wireless and softphones
- IP-PBX with voice mail, Automated Attendant, Integrated messaging, PSTN gateway, PoE switch, DHCP server, firewall and wireless access point in a single device

Cisco Systems engaged Miercom to examine and review the Cisco Unified Communications 500 Series for Small Business. Targeted at small offices of fifty users or less, it is a full featured IP-based phone system designed for rapid deployment and simplified management.

Miercom evaluated the Cisco Unified Communications 520-16, the sixteen user model consisting of the Cisco Unified Communications 520-8 base unit and Cisco Catalyst Express 520, which demonstrated all of the features expected in a platform targeted at small office and several more usually reserved for higher end PBXs. Contained in a single appliance, the Cisco Unified 500 series boasts a full infrastructure in a box. This configuration and packaging simplifies installation while still providing the back end components required to ensure a high quality voice and data network. When further combined with the Cisco Monitor Manager, Value Added Resellers (VARs) are able to extend their service offerings to include remote management and administration. The Cisco Monitor Director allows VARs to multiply that service offering across up to fifty clients simultaneously.



Cisco Unified Communications 520 and Cisco Catalyst Express 520



**How we tested:** The Cisco Unified Communications 520 was set up on an independent network. Multiple IP phones of five different models were connected to the Unified 520 and Cisco Catalyst Express 520. The wired models used included the Cisco Unified IP Phone 7970G, 7961G and 7960G. The two models of wireless phones used were the Cisco Unified Wireless IP Phone 7921G and 7920G. The PSTN cloud was simulated using a Cisco 2600 series router with FXO and FXS cards. An analog phone was connected to the FXS ports on the Cisco 2600 and a trunk connection was made between the FXO ports. For testing, calls were placed between various combinations of wired, wireless as well as internal and external analog phones. Features and combinations of features were exercised across all connections. Meet Me conferencing was conducted with internal and external connections.

## Overview

Miercom looked at a pre-release version of the Cisco Unified Communications 500 Series and the Cisco Configuration Assistant. Miercom also looked at the Cisco Monitor Manager and Cisco Monitor Director for VARs which will include VoIP and infrastructure monitoring services for the Cisco Unified Communications 500 Series in the next release.

## Physical Configuration

The Cisco Unified Communications 500 Series incorporates a broad range of telephony and network features in a single desktop appliance. To ease setup, it comes with a default configuration pre-loaded. Physically the Cisco Unified 520-8 features eight auto sensing 10/100 Ethernet ports. These ports also supply standards based IEEE 802.3af as well as Cisco Pre-standard PoE. The 220 watt external power supply can support PoE devices simultaneously on all ports. The port will automatically recognize both Cisco and IEEE power standards for any device connected. By utilizing an external power supply, fan noise for the Cisco Unified Communications 500 Series is kept to a minimum since the cooling requirements are greatly reduced.

Two additional 10/100 Ethernet ports are provided for WAN uplink and expansion. The WAN port is designed to be connected directly to the data infrastructure or broadband modem. It has a built in firewall as well as the ability to do NAT. Both the firewall and NAT can be configured and the settings can be customized using the Cisco Configuration Assistant. The expansion port is used to connect to additional UC client switches for added phone ports.

Analog devices, such as fax machines, can be connected via four integrated FXS ports. Once a device is connected, it is automatically assigned an extension. Calls were successfully placed between the analog phone and IP phones on the without any additional configuration to accommodate the analog trunk.

PSTN connectivity is provided by four built in analog FXO ports. Should a power failure occur; the fourth FXS port is connected by an internal fail-to-close switch to the first FXO port. Several calls were placed between analog and IP phones to the PSTN line. Again, minimal configuration was required for the PSTN connection. Calls were also placed successfully with the analog phone with the Cisco Unified 520 powered off.

Four additional analog ports (FXO or FXS) can be added via the built in WIC card slot on the front of the box. System does offer a BRI port option for PSTN connectivity for International market. A flash slot is also provided for storage of configuration.

On the front left there are three additional connections; console, music on hold, and wireless. Full CLI access to the IOS can be obtained through the console port for any configuration settings not covered in the GUI interface.

Music on hold can be provided by an internal or external source. If no source is plugged into the 1/8" audio jack on the front of the Cisco Unified Communications 500 Series, the system will default to an internal .AU file. Additional .AU files can be loaded through the Cisco Configuration Assistant.

The integrated wireless access point is optional. It must be specified at time of ordering and factory installed. It supports several security settings including WEP, EAP, WPA, WPA-PSK, WPA2 and WPA2-PSK. Authentication can also be tied to an internal or external RADIUS. The wireless was configured and two wireless handsets were used to place calls.

Connecting the Cisco Catalyst Express 520 expansion switch will add eight additional auto sensing 10/100 PoE Ethernet ports to the system. The licensing for the endpoints is embedded in the switch, simplifying upgrading. The switch is shipped with a smart-assist feature which enables plug-n-play expansion. Once the switch was connected, the configuration was adjusted automatically and new phones plugged into the switch were automatically configured and ready to use

## Cisco Configuration Assistant

The Cisco Configuration Assistant provides an interactive GUI interface for configuration and modification of the Cisco Unified Communications 500 Series. All of the main features and functionality of the device can be configured and maintained from this application. The tool effectively lowers the bar to enable

rapid setup and deployment of even complex environments. A system with all of the phone features enabled and four endpoints was setup and operational in under 15 minutes.

There are several visual feedback mechanisms within the application which aid users in configuration. The first area that was configured was the telephony settings. Several of the fields within the dialog boxes were outlined in red indicating a problem with the values listed in the fields. The text in some of the tabs across the top was also in red indicating fields on those pages also needed correction. If a specific field was correct or the data was changed with a field, it was outlined in green. The text on the tab for that page also changed to green indicating unsaved changes. All of these visual cues decrease the learning curve on the required parameters and help to eliminate configuration errors. Since the application is interactive, as changes are applied, the configuration on the Cisco Unified Communications 500 Series is updated immediately. There is no need to reboot or re-start the process to make additional changes. The application will not allow changes to be saved if there are errors indicated by fields outlined in red.

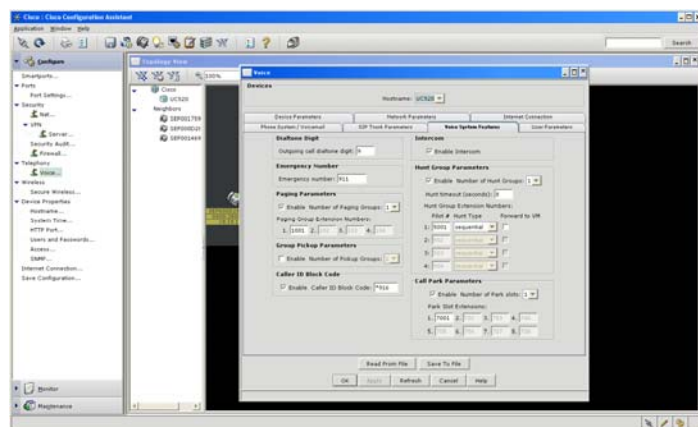


Figure 1: Configuration Interface

The application is divided into two panes. The left pane provides a navigation tree for the configuration, monitoring and maintenance options that are available. The option presented will be dependent upon the hardware found in the initial discover process. The right pane displays dialog boxes for setting the specific details of each of the options as well as a

topology view of the environment. Upon connecting, the Cisco Configuration Assistant will auto-discover the hardware within the Cisco Unified Communications 500 Series as well as network devices attached to it.

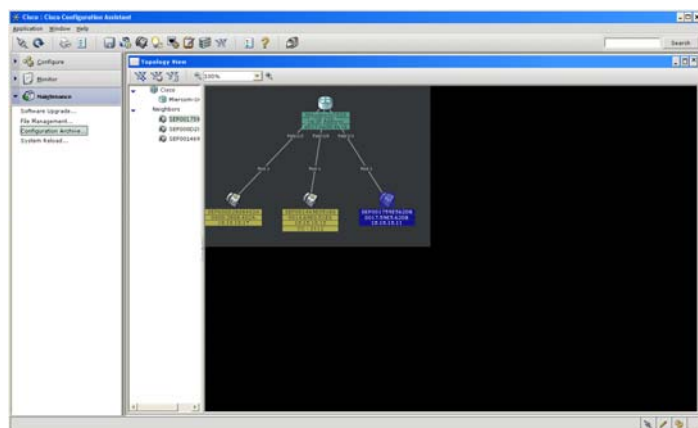


Figure 2: Topology Screen Shot

**Telephony Configuration:** From the telephony option in the configuration menu, all of the parameters of the Cisco Unified Communications 500 Series as a phone system can be set. Settings for voice mail, SIP trunks, voice system features as well as user information, network and Internet parameters are all configured here. It can be programmed to operate as a key system or a traditional PBX.

SIP trunking default settings are available for two major providers or custom information can be configured for other ISPs.

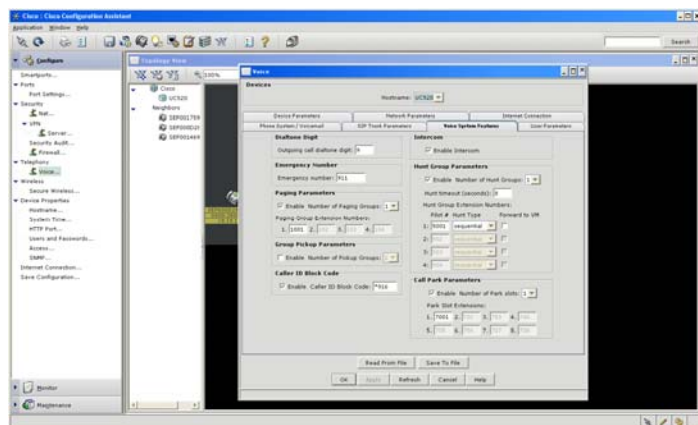


Figure 3: Voice system features

Intercom, dialtone digit, emergency number are all set within the voice system features. Hunt groups of up to four lines, up to four paging

groups and as many as eight call park numbers can also be configured.

For each user, extension, paging group, display name and access code (for voice mail) are configured. The information can be entered individually or imported from a CSV file.

The additional device, network and Internet define the basic network environment.

Music on hold files can easily be added to the system. While on the topology screen, AU files can be dragged and dropped onto the Cisco Unified Communications 500 Series icon. The new file will be uploaded and available to be selected from the drop down menu on the phone system tab within the telephony options.

**Security Configuration:** The Cisco Unified Communications 500 Series is designed to be at the core of a small office network. It can be directly connected to the Internet circuit. There are several security features integrated into the platform that can also be configured with the Cisco Configuration Assistant.

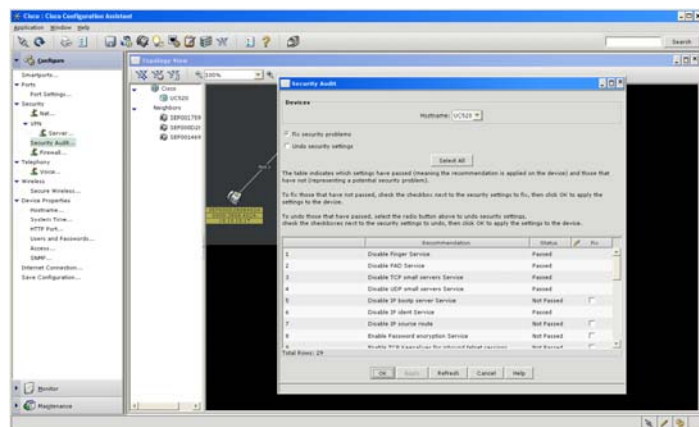


Figure 4: Security Audit

Basic Network Address Translation (NAT) and Firewall services are included and were quickly configured. The Cisco Unified Communications 500 Series can also operate as an Easy VPN server. Easy VPN clients will be terminated on the platform using a local database for authentication.

To further enhance security an automated audit tool, Security Audit, is included. Security Audit



will scan the configuration and report back on potential security problems based on best practices. The tool can also fix any security problems found by checking the checkbox next to the item in question. The Security Audit tool will then apply the fix to the configuration. The audit tool successfully corrected several items on the test system without corrupting the current configuration.

Upon completion of setup with the Cisco Configuration Assistant, the running configuration had over 980 lines. The total setup time for security audits, firewall, VPN, telephony wireless, Internet and user information for eight stations took less than hour.

**Monitor:** With the monitoring options users can create standard reports for VPN usage and inventory of devices directly connected to the Cisco Unified Communications 500 Series. A visual representation of the front panel is also available to quickly see the current status of ports. Active ports are outlined in green. As phones were moved, the front panel would update to reflect the changes.

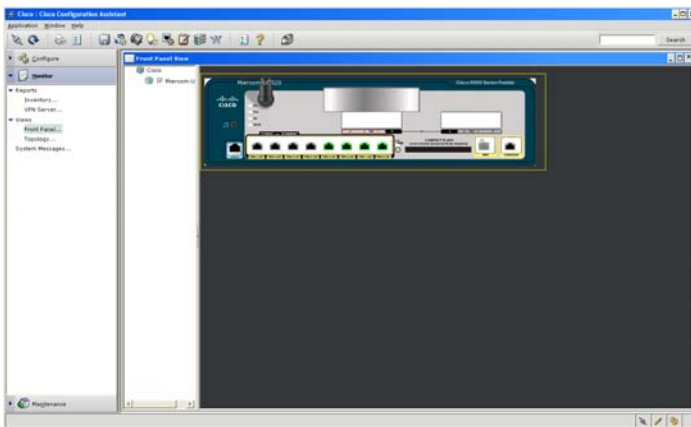


Figure 5: Front panel

**Maintenance:** File management, software upgrades, configuration archiving and system reloads can all be done through the maintenance options. The GUI allows for Cisco IOS software upgrades to be performed by simply dragging and dropping a .bin file on the Cisco Unified Communications 500 Series icon in the topology view.

## Features

The Cisco Unified Communications 520-16 performed solidly as calls were placed, transferred, put on hold, conferenced and parked between multiple endpoints. All features exercised performed without issue. The Cisco Unified Communications 500 Series supports all Cisco handsets and was tested with the 7970, 7961 and 7960 wired phones and the 7921 and 7920 wireless phones. Cisco's softphone, the IP Communicator, is also support as an endpoint. In all cases the quality was excellent with latency less than 90 ms.

Users can also add unified communications functionality to their environment with the Cisco Unified Communications 500 Series. Configuring an SMTP server address in the voice mail setup will allow for messages to be delivered as .wav files to a client's email.

## Partner Tools

The Cisco Monitor Manager is an application designed for VARs to setup at the customer site for monitoring of the Cisco Unified Communications 500 Series and managed devices connected to it. It provides detailed information on historical bandwidth, CPU and memory utilization as well as inventory details on managed devices. Thresholds can be set for sending alarms.

The Cisco Monitor Director is designed for the VAR's location and aggregates the information from multiple Cisco Monitor Managers. The consolidated view of events and alerts allows VAR to effectively offer remote monitoring services to their clients.

## Summary

The Cisco Unified Communications 500 Series is a full featured, small office, IP based PBX with unified communication and voice mail. Its hardware and software design allow for rapid deployment with simplified setup and management. It contains all the components required for a full featured network including a VPN server, firewall and wireless access point.

## Miercom Performance Verified

Based on Miercom's examination and testing of the Cisco Unified Communications 500 Series for Small Business platform in terms of the systems' configuration, operation and features, as described herein, Miercom hereby issues the Performance Verified certification for the product in this report. Miercom certifies the following key observations made during this review:



- **Complete Unified Communications solution set up and operational in less than 15 minutes with full telephony feature set, QoS and VLANs**
- **Simplified system modifications and updates via Cisco Configuration Assistant GUI interface**
- **Supports full array of Cisco IP end points including hard phones, wireless and softphones**
- **IP-PBX with voice mail, Automated Attendant, Integrated messaging, PSTN gateway, PoE switch, DHCP server, firewall and wireless access point in a single device**



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