

Lab Testing Summary Report

December 2002
Report 041202

Product Category:
**9-1-1 Emergency
Response**

Vendor Tested:
Cisco Systems

Product Tested:
**Cisco Emergency
Responder, v1.1,
with Cisco
CallManager**

MIER.
Communications



Performance Verified

Key findings and conclusions:

- Cisco Emergency Responder enables dynamic, automatic updating of physical IP phone locations
- Provides multiple mechanisms for internal alerting of 9-1-1 calls, including a Web-alert tool
- Proved compliance with E9-1-1 standards in allowing call backs to specific locations
- Supports multiple levels of failover, including redundant servers

Cisco Systems engaged Miercom to conduct analysis and performance validation tests of its Cisco Emergency Responder application, which works in conjunction with the Cisco CallManager IP PBX. A key benefit of Cisco's IP-based 9-1-1 emergency-response system is that it automatically tracks and updates equipment moves and changes, removing this burden from the administrative staff and providing cost savings. Through a real-time, location-tracking database, the Cisco Emergency Responder (CER) also allows emergency personnel to identify locations of 9-1-1 callers, which is a critical aspect of new E9-1-1 services. We tested the Cisco Emergency Responder's ability to perform these tasks and others using version 1.1(3) software. The Cisco CallManager supported version 3.2(2c) software.

Testing was conducted at Miercom's networking test laboratory in Princeton, Junction, NJ in October 2002.

Cisco Emergency Responder Call Log

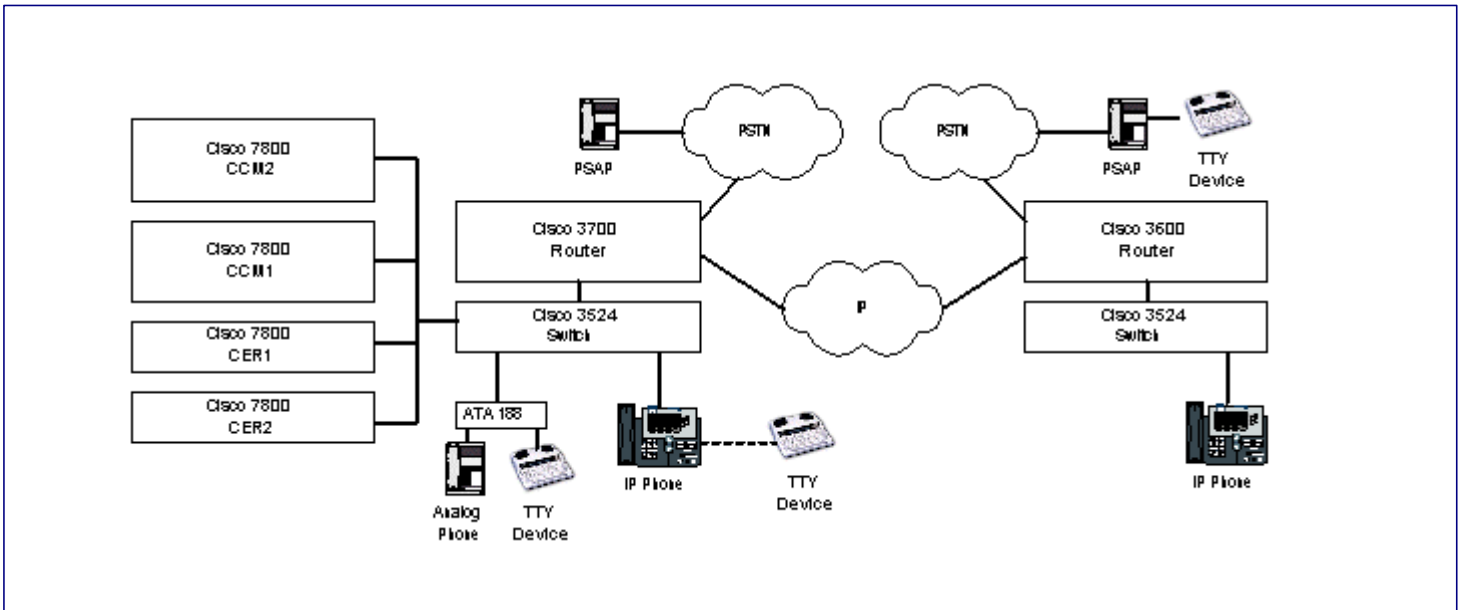
The screenshot shows the Cisco Emergency Responder Administration web interface. The main window displays a 'Call History' table with columns for EPL Name, Caller's Extension, and Time. A 'Call Details' panel is open on the right, showing information for a specific call.

EPL Name	Caller's Extension	Time
Branch1	1010	9:02:07
Branch1	2002	9:01:10
Default	2002	9:01:40
Default	2002	9:59:14 AM EST
Default	2002	9:52:12 AM EST
Branch1	2002	9:49:52 AM EST
Default	2002	9:35:49 AM EST
Branch1	2000	9:32:30 AM EST

The 'Call Details' panel shows the following information:

- EPL Name: Branch1
- Caller's extension: 1010
- Time: 9:02:07 AM EST
- Date: November 5, 2002
- Route pattern--ELIN used: 11.911--8015551601
- Comments about the call: [Empty field]

Test Bed Set-up and Methodology



About the testing... We tested the Cisco Emergency Responder, v1.1(3) with the Cisco CallManager , v3.2(2c). Other hardware used in the test bed included the following: Cisco 3600 router; Cisco 3700 router, Cisco 3524 switch, Cisco ATA 188 analog telephone adapter, and Cisco Media Convergence Servers (MCS) 7835 for Cisco CallManager (CCM) and the Cisco Emergency Responder (CER). Miercom conducted four series of tests, which are described below.

Test Series I—Discovery and Routing. We ran a series of 14 separate tests to certify the CER's various routing and discovery functions. Using the test bed shown above, we connected the CER into the network in various configurations to determine whether it could successfully perform the following functions: discover IP phones registered to a CCM; track phones that move across a WAN to a different switch served by a different Public Safety Answering Point (PSAP) with the same CCM cluster; and track a station location down to the switch port level. We then verified that 9-1-1 calls were routed based on physical location, rather than extension; that the CER could track soft phones that register to a different switch across a WAN; could discover and track analog phones connected via ATA devices and also discover and track users who log into a different phone using Extension Mobility. We then verified that the CER functioned properly when 9-9-1-1 was dialed (the extra nine often used in corporations to dial an outside line). We verified that CER supports TTY devices (text telephones used for the hearing impaired) for 9-1-1 calls, ensuring that the call was handled the same as a standard 9-1-1 call in terms of routing and notification, and that all TTY tones were successfully passed. TTY devices were tested by directly connecting them to analog ports and also by connecting the IP phone handsets to the TTYs' acoustic couplers.

Test Series II—Administration Functionality. We ran a series of four separate tests to assess the CER's administrative capabilities. First we verified that using the CER administrative tools we could export the main database in CSV (Comma Separated Value) format, make changes to CER records and then import the CSV-formatted information and verify that old records had been successfully restored. Using the CER administrative interface, we determined the scope of available pre-configured reports (Call History and Zone Audit Trail) and verified the accuracy of information in generated reports. We then verified the CER's multiple search options, ensuring that each returned the correct information for all present phones. We performed two searches: one for all phones in a zone and another for all phones connected to a particular switch. In our last test in this series, we used the Cisco ALI Formatting Tool to create a text file that met regional 9-1-1 requirements (based on SBC Southwestern Bell NENA 2.0 format).

Test Series III—Internal Notification. We placed several 9-1-1 calls from different phones (IP, analog, soft phones and TTY devices), zones and locations to verify that the correct internal phone received a call identifying the extension that dialed the 9-1-1 call. We also verified that the appropriate Web alert was received with proper identification and call information

Test Series IV—Redundancy and Failover. We configured a network with primary and secondary CER servers. We shut down the primary server and verified that all 9-1-1 services were maintained. We then shut down the secondary server and verified that 9-1-1 calls could still be placed. We verified that the CER was unaffected by CCM failover. All IP phones were verified as registered to a CCM and assigned a local 9-1-1 ANI by the CER. The primary CCM was then shut down, forcing all phones to register with the secondary CCM. Once the phones were operational, we placed 9-1-1 calls to verify that they could be successfully routed to the proper trunk and assigned proper ANI based on physical location.

Performance Results

The Cisco Emergency Responder (CER) coupled with the Cisco CallManager automatically locates phones and users, dynamically routes emergency calls and provides real-time location and alerts. These features are critical to new E9-1-1 services, which add the stringent requirements to provide location information and a call-back phone number, neither of which are standard on traditional 9-1-1 services. (E9-1-1 is an optional telco service that customers must order.)

We recently conducted a series of tests to determine how well the CER delivered on its advertised claims. A summary of our findings shows that the CER, coupled with the Cisco CallManager, can successfully discover and route calls in a variety of situations. The product also successfully demonstrated internal phone notification and Web alerts, as well as proving itself in redundancy and failover tests. Highlights in each area tested are presented below.

Test Series I—Discovery and Routing: We determined that the CER works with CCM to quickly establish an initial listing of all active hard and soft phones. For each phone, the CER provided MAC address, IP address, phone extension, switch IP address, switch slot/port number and CCM IP address.

In CCM deployments with multiple locations serviced by different Public Safety Answering Points (PSAP's), the CER successfully tracked and automatically reprogrammed the CER database so that the station (IP phone, analog phone or soft phone) used the correct trunk and ANI for its current location—all accomplished without administrative intervention. Also, CER is powerful enough to track phones down to a single port on a switch. This allows the switch to service multiple floors, support different port groups associated with different floors and provide separate ANI numbers for 9-1-1 calls. The CER tracks phones by their physical location, regardless of the assigned extension.

Extension mobility—a key feature IP telephony offers—can make tracking 9-1-1 calls difficult. However, CER demonstrated that it can track and provide proper support for mobile extensions. We proved this by placing a 9-1-1 call from a moved extension and tracking its egress through the proper trunk with a correct ANI to the PSAP.

Cisco Emergency Responder: Key Features/Specifications

Platform	Cisco Media Convergence Server
System components	Cisco CallManager (for call routing and forwarding to and from CER); Cisco Emergency Responder (system administration interface, LAN administration interface; Emergency Response Location administration interface)
Capacity	One CER supports CCM cluster of 10,000 phones and 1,000 LAN switches with attached phones in one PS-ALI database reporting area
Phones supported via CDP	Cisco IP Phone models 7960, 7940, 7910; Cisco IP Conference Station 7935; all other skinny phones with Cisco Discovery Protocol (CDP) support
Phones supported via CAM	Cisco IP SoftPhone 1.2 or later; Cisco IP Phone models 12 SP+, VIP 30; all skinny-based phones without CDP supported via Centralized Automated Message (CAM) on Cisco Catalyst switches
Redundancy	Second CER recommended
Price (US list)	\$5,995 (with 100 user licenses) Part No. SW-ER1.1-SVR; \$10 per license Part No. SW-KEY-ER1.1-USER=

Test Series II—Administration Functionality: Mandatory data for the CER is easily exported and imported via supported tools, ensuring that services are quickly restored in the event of a server crash. Also, the CSV-formatted file can be edited directly, allowing for quick bulk changes that are easily imported. CER supports Call History and Zone Audit Trail reports, which allow administrators to review 9-1-1 calls and track configuration changes. These reports can be customized, viewed and printed. Search functions allow quick location of specific phones and the ability to make notes for future reference and documentation.

Test Series III—Internal Notification: The CER successfully generated an internal call to a security desk for each 9-1-1 call. It also supports mechanisms for alerting, including a Web-based alert tool that sends out emails or pages.

Test Series IV—Redundancy and Failover: CER provides multiple levels of failover. Redundant servers are supported; in the event of failure in CER servers, a default route is established for 9-1-1 calls. The CER is not affected by CCM failovers.

Conclusions

Performance testing conducted by Miercom demonstrated that the Cisco Emergency Responder application, tested with Cisco CallManager, successfully delivers the features and functions to facilitate automatic and dynamic tracking of equipment moves and changes in a variety of E9-1-1 applications. Tests showed that the CER supports automatic updating of physical phone locations, provides multiple mechanisms for internal alerting of 9-1-1 calls and complies with E9-1-1 standards, allowing call back to specific stations.



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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*, *Network World*, and *Internet Week*, 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 PBXs. 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's testimonial endorsement.



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