

Miercom

Lab Test Summary Report

September 2008
Report 080902

Product Category:
**Enterprise Unified
Communications**

Vendor / Product:

NEC

**UNIVERGE Enterprise
Unified
Communications**



**Enterprise Unified
Communications
Mobility Solution**

Key findings and conclusions:

- **Best enterprise unified communications mobility client of six vendors evaluated**
- **Impressive reliability and security of system components and solution overall**
- **UC client interfaces are flexible, with features that better enable remote business users**
- **Passed high overall reliability with full server failover testing**

NEC's UNIVERGE enterprise class unified communications suite was evaluated by Miercom as part of a 2008 Unified Communications Industry Study.

The full complement of UNIVERGE networking components and unified communications software products was observed in configurations representing typical real-world enterprise installations. NEC UNIVERGE is one of the best solutions we tested in terms of features, reliability, ease of integration and scalability.

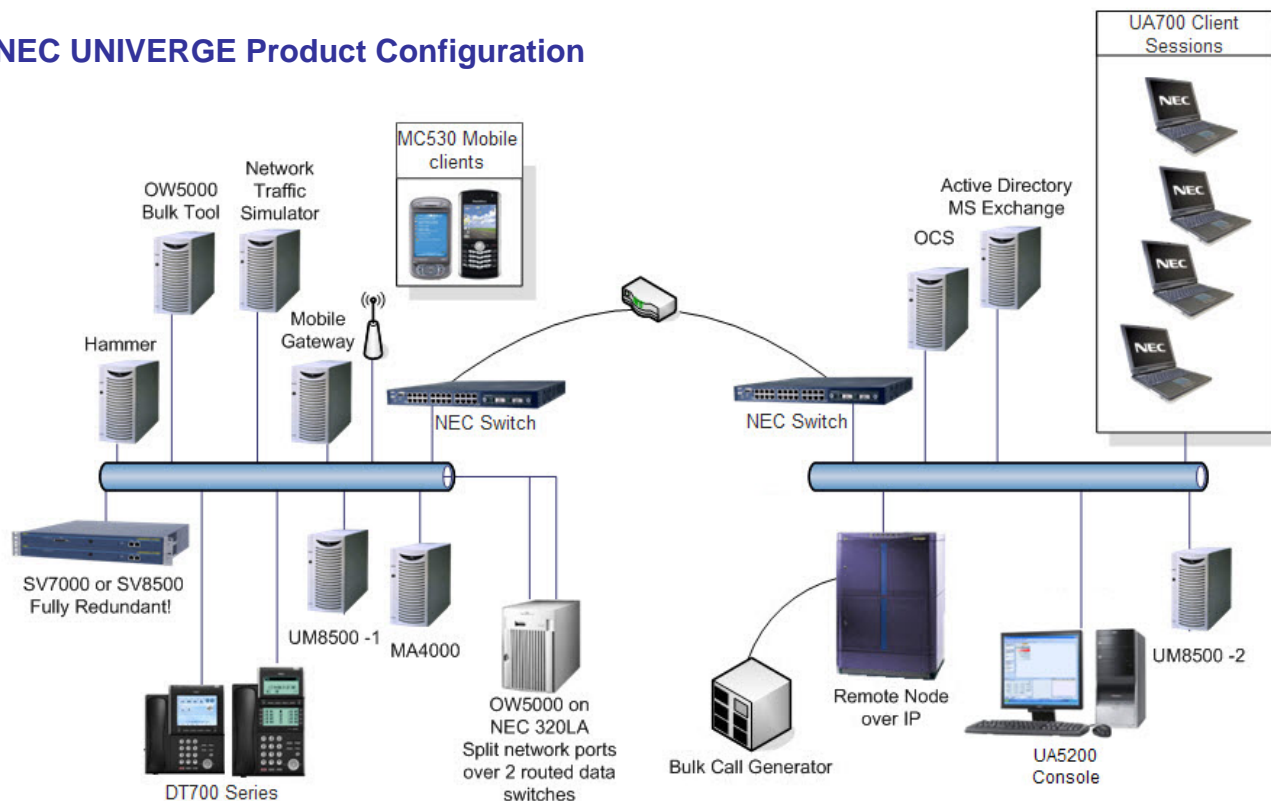
NEC's consistent and intuitive client interfaces impressed Miercom engineers. The interfaces were nearly identical across the suite of user endpoints, including the mobile client. The UNIVERGE products are well designed and resilient, capable of withstanding a comprehensive battery of vulnerability and high-availability tests.



The MC530 mobility client, shown on a Blackberry Curve 8320 and a HTC TyTN smartphone running Windows Mobile 6.0, enables users to propagate and view "presence status" of others.

NEC's UNIVERGE Enterprise Unified Communications Solution is Rated Best Enterprise UC Mobility Solution in the 2008 Miercom Unified Communications Industry Study.

NEC UNIVERGE Product Configuration



How We Did It

All necessary components of a typical NEC UNIVERGE unified communications installation were tested. This included the SV7000 IP-PBX server, the UM8500 release 3.0.1 messaging component, the MA4000 Web-based management application, the OW5000 presence application, the UA5200 attendant console solution, the MC530 cell phone application, the UC700 desktop client, the DT 300-700 series desktop terminals and the Dterm SP30 softphone.

Also tested was the IP Messaging components of the UM8500, including both the Microsoft Exchange and the Active Voice (AV) version 3.0.0.84 UCS12 (active suites version). Both versions were evaluated separately in a redundant server configuration using Microsoft Cluster Server (MSCS) version 1.0 which is included in Microsoft Server 2003. Part of these tests included alternately failing the servers and checking the impact of this shut-down on voicemail availability and its redundancy.

UC client endpoint compatibility between Microsoft's Office Communicator and NEC's own instant messaging application was verified. SIP endpoint tests were conducted and they verified that latency and voice quality were within acceptable standards for voice telephony. MOS 4.0 was our minimum, but the NEC IP phones actually achieved better quality at a 4.4 MOS score. These tests, as well as SIP signaling analysis and verification of traffic encryption, were conducted using the ClearSight Analyzer, a distributed protocol and traffic analyzer from ClearSight Networks (www.clearsightnet.com). Voice quality assessment was evaluated by capturing live traffic from the network and post capture analysis processed through the ClearSight Analyzer.

SIP traffic load tests (which emulated endpoints) were conducted using the Empirix (www.empirix.com) and Touchstone's (www.touchstone-inc.com), WinSIP 3.0. An impressive 32,369 busy hour call attempts with 1,000 concurrent users was achieved in testing. Voice quality assessment for G.711 and G.729A codecs employed by the IP hard phones was evaluated using Touchstone's WinEyeQ product and subjective scoring by our listening panel. A UC client scalability test was undertaken using a scripted version of the real UC700 client and achieved 3,883 concurrent UC sessions that stressed not only call generation, but changes in presence as well.

Security scans including open port scans, protocol interaction with mutated traffic, common vulnerability exploit tests, denial of service and SIP server torture tests were conducted using Miercom's own testing suite combined with a Mu Dynamics (www.MuDynamics.com) Mu-4000 Security Analyzer. The vulnerability scans were run first to provide information that could be used in subsequent compound or complex attacks.

Components Tested

The IP PBX foundation for the NEC UNIVERGE unified communications suite was the SV7000. It came bundled with the SV7000T call telephony server and the SV7000S SIP server.

The SV7000 exhibited exceptional performance in call-load handling, survivability, redundancy, voice and connection quality and security. The server can handle 300 to 6,000 ports and supports SIP trunks, LDAP-compliant databases, Java and XML, WiFi LANs and power over Ethernet (PoE).

The core platform and underlying brains of NEC's UC effort is the OW5000. Its "presence engine" worked well during our testing, not only enabling users to ascertain users communication availability but also to see what type of devices they prefer to answer.

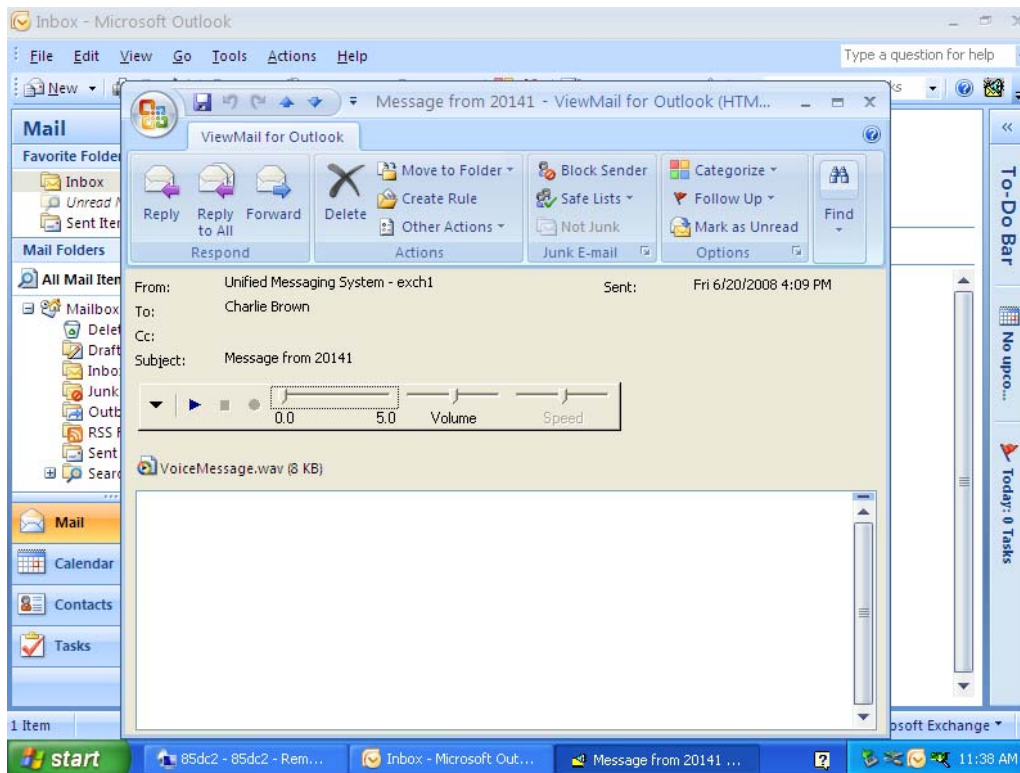
Several tests were performed to determine the UNIVERGE system's presence capability. Test user status was changed (from available to busy) and the system performed as expected, providing availability information whether we were using a mobile phone, a softphone, a desktop terminal, MS Outlook or the UA5200 operator console.

The OW5000 platform also comes with a number of application services and open application programming interfaces (APIs) that can be used by organizations to create custom programs. The OW5000's open API can be used to develop, and integrate with, third-party applications.

The UM8500 served as the tested UNIVERGE system's unified messaging component. It is more advanced than some other messaging systems since it includes videomail, find-me/follow-me and NEC's "ViewCall" for desktop call screening and control.

The UM8500 comes with a dedicated Microsoft Exchange server that forwards voice, video, fax and e-mail messages to Outlook. Although the UM8500 is a Windows-based solution, other messaging solutions can be integrated including Lotus Notes, GroupWise and email applications supporting IMAP protocol.

As expected with modern UC messaging platforms, the UM8500 allows users to get messages no matter what type of device is being used. We tested the UM8500's text-to-speech functionality and found it easy to use and cleanly integrated with Outlook.



The NEC UNIVERGE UM8500 provided a well-designed and feature-packed integration with third party products for accessing messages. Shown is the voicemail for Outlook interface.

Although there are a number of standalone applications that can be used to manage individual components, everything in the UC system can be managed from a centralized location with the MA4000 Web-based management application. It resides on its own server.

The MA4000 is accessible not only by network administrators but also by individual users (who can manage only the components with which they work). NEC put a lot of effort into the visual design and intuitive layout of the management application. It presents clean and easy-to-use drop-down menus.

NEC offers a wide variety of user interfaces and endpoints. We looked at the top-of-the-line desktop terminals, the DT300 and DT700 series. We also tested the UC700 desktop client, the Dterm SP30 softphone, the UA5200 attendant console client and the MC530 client for mobile devices.

User Interfaces and Endpoints

If the goal of a state-of-the-art UC suite is, as the name suggests, unifying the myriad forms of business communication, it is imperative that the various endpoints present as uniform an interface as possible. In this regard, we found the NEC offering to be exemplary.

Users of the UNIVERGE endpoints are likely to feel comfortable and capable whether working on the UC700 series desktop clients, the SP30 softphone or with the MC530 mobile client on their favorite cell phone or PDA. With few exceptions, the operations menus on all these interfaces are nearly identical. Keeping interface designs similar goes a long way toward enabling quick and effective communication.

The excellence of the displays was not just skin deep. Most of today's enterprise UC systems provide access to the major communication components, but some fall short when it comes to displaying user presence. However, NEC shines at this. Even its mobile client provided accurate, reliable presence information.

Importantly, the mobility client reacted almost instantly to changes in presence. When one member of our team picked up a deskphone,

another person— using a PDA with MC530 installed — saw in 1.5 seconds that his colleagues' status had changed from "out-of-the-office" to "available."

We also liked the way the NEC's system's components interoperated. When we deleted a voicemail using a mobile device, it was also removed from the message box on the desktop terminals and clients. There was no need to duplicate effort.

In general, we found the XML integration and other functions of the DT750 unit were excellent. The unit has a modular design that, according to NEC, means the device can be configured in 8,000 combinations.

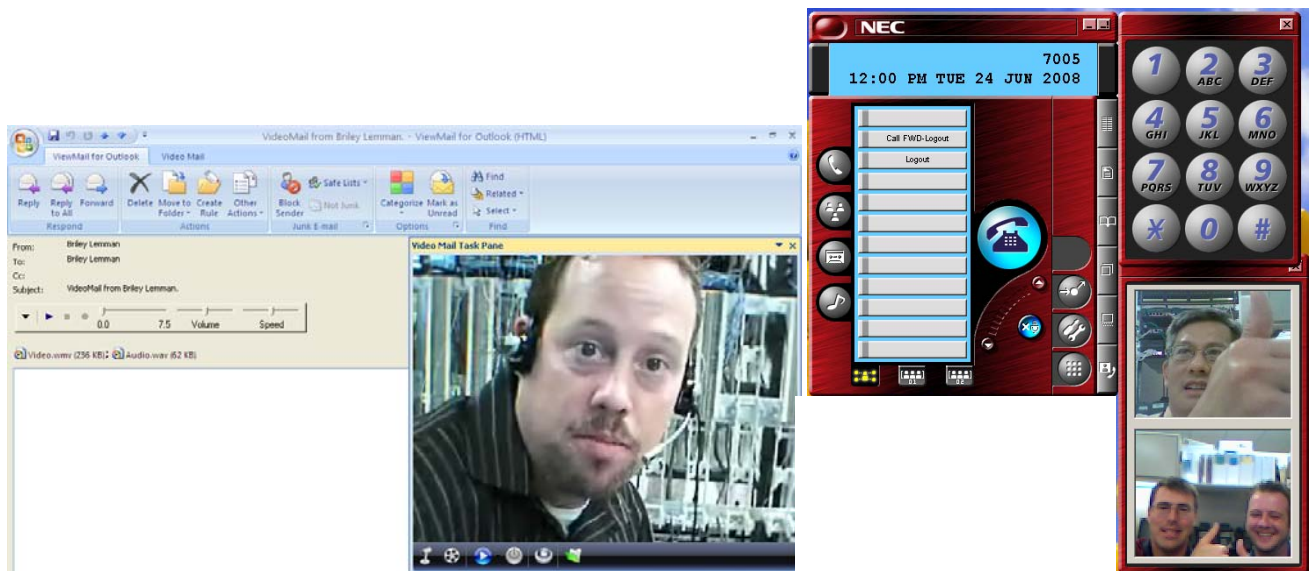
No glitches were observed when testing its touchscreen, click-to-dial function and clipboard dialing. Web and voice conferencing were seamless and easy. NEC did a great job designing the consolidated message center interface; it clearly showed all voice messages, e-mails, instant messages and faxes.



NEC's top-end DT750 IP Desktop Phone features a rich-feature touch screen that can be used for one-touch access to IM, voicemail, contacts, Bluetooth and other UC functions including a touchpad lock.

Beyond the uniformity and functionality of the displays, we noticed the general fit, finish and function of the NEC hard phones. There was high-quality sleekness to every NEC endpoint that made using them fun to use and aesthetically pleasing.

Additionally, the top-of-the-line hard phones had excellent voice quality confirmed by testing with ClearSight's Analyzer and Touchstone Technologies' WinSIP.



For both video e-mail, shown on the left above, and live video conferencing, shown on the right, there was good quality with no reduction of crispness and overall clarity using 800 X 600 resolution. Audio was always synchronized properly with video. The e-mail video was tightly integrated into Microsoft Outlook. The Dterm SP30 video display is shown on the right.

NEC's two softphone clients – the Dterm SP30 and the UC700 – offer even more features than the DT750 hard phone, particularly their ability to serve as video terminals.

The Dterm SP30 is a lightweight, client-based softphone that offers most UC functions with the exception of presence information. The UC700 is an enterprise-class client/server-based softphone with full presence availability and VIP call routing.

One of the key features of the UC700 was its close integration with the MC530 mobile client. Our tests of this integration demonstrated that a mobile user had virtually complete access to all the UC features available when in the office and using the UC700.

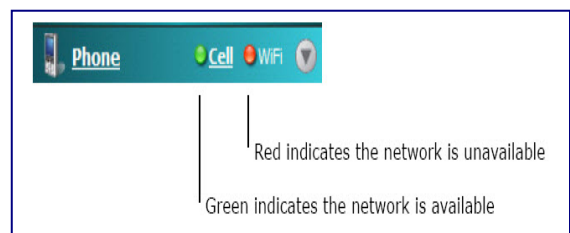
This integration was tested using several different mobile units loaded with the MC530 client, including a Blackberry 8700, Blackberry Curve 8300 and a Windows Mobile-based HTC TyTN smart phone.

What immediately caught our eyes were the MC530's displays for presence status and wireless network availability.

As do the other presence-capable endpoints in NEC's portfolio, the MC530 GUI presents three icons – in red, yellow and green – describing presence status (see image on Page One). A red light means the person is unavailable, green means available and yellow means possibly available.

Reaction speed of the presence function was evaluated by placing a call from the mobile device to the UC700 using the AT&T wireless network. We checked the time it took for the presence status light to change. In most cases, the indicator accurately switched color within 1.5 seconds of when we began dialing or otherwise altered our status.

As shown below, similar red and green "lights," displayed at the top of the MC530 GUI, tell the mobile user whether the device is connected to the cellular network or to a Wi-Fi network.



Another important function provided by the MC530 is instant messaging support. NEC has its own IM application embedded within the mobile client.

We could send and receive instant messages without having to exit the MC530 application and the screen showed the same menu as found on the NEC desk phone and PC-based softphone.

The UNIVERGE UA5200 can be best described as a next-generation attendant console. It takes to a new level the ability of console operators or groups of operators to manage call redirection. The user at the console not only has the incoming call information, but a full description of presence for the party to be reached.

With two clicks, a call can be forwarded to either the recipient or any of the alternate numbers for the recipient. An email can be sent to the recipient or the call can be transferred to voicemail.

The UA5200 has the ability to record threat calls with one click, recording not only sound, but capturing detailed call information such as caller ID, time and length of call. If used to keep customer records, private information for each customer can be sorted and identified with color coding and confidentiality access rules.

Reliability, Security and Load Testing

Using a Mu-4000 Security Analyzer from Mu Dynamics and the ClearSight Analyzer, we conducted a series of security tests on the NEC product suite.

More than 2.7 million anomalies and permutations on protocols such as UDP, ARP, DHCP, IPV4 and SIP were sent to the SV7000. The server resisted these attacks and remained operational during the testing.

Clearsight Analyzer and WinSIP 3.0 from Touchstone Technologies were used in an attempt to intercept and modify traffic as a means of tapping into the network. These attempts failed, likely due to the thick encryption employed on the server and other UC components.

Also unsuccessful were our attempts to disable the DT750 hard phones by Denial of Service

(DOS) overloads and other practices. In prior tests, we have been successful in disabling similar IP phones from other vendors but we could not cause the NEC endpoints to malfunction.

The system, as tested, had two SV7000 IP PBX servers which were tested for failover resiliency. This was done by physically disconnecting the active server while placing calls. We noticed there were no calls dropped during this test and the system availability remained intact.

Additionally, we conducted failover tests on the OW5000 dual presence server. Access to the SQL database that controls presence status remained fully available even after alternately unplugging power to each of the two servers.

A combination of call generation tools was used to test the UNIVERGE system's load capabilities. An Empirix Hammer generated calls directly to the SV7000.

A modified, multi-session version of the UC700 application was run on several workstations and servers and, using an UA5200 console, random calls were made to each of the UC700 sessions. This test stressed not only call load at the IP PBX server, but also pushed presence status changes onto the OW5000 server.

Since the virtual UC700 client sessions on each workstation and server were limited to the amount of memory on each computer, a safe number of sessions were established for this test. A maximum of 300 virtual client sessions were generated on each test server and a maximum of 150 were generated on each workstation.

To reach a reasonable number of sessions that would use 75 percent of the SQL database server's processing power, five test servers and 17 test workstations were used. The number of sessions obtained during this test was 3,883, which consumed 81 percent of CPU utilization and over 2GB of memory. No server performance abnormalities were detected.

The UNIVERGE system was robust enough to protect against costly communication downtime due to power or network interruption. It also is capable of warding off potentially devastating security breaches and can handle very heavy call loads.

Miercom Rated Best

Based on our testing of the NEC UNIVERGE Enterprise Unified Communications suite, Miercom attests the product's mobility performance capabilities are superior to that of comparable products on the market. The NEC MC530 mobility client offered seamless connectivity, including presence status and a simple interface. The MC530 brings to mobile users virtually all the communication features available while in the office and it does so with an interface that is easy to use.

As a whole, NEC's UNIVERGE system proved to be well-designed. It was feature-packed, resilient and secure. The various UNIVERGE endpoints and client interfaces presented identical menus and features and had an overall sleekness in their design. It was apparent NEC spent a significant amount of time ensuring the aesthetics of its equipment matched the units' high level of functionality.



**Enterprise UC
Mobility Solution**



NEC Unified Solutions, Inc.
6535 N. State Highway 161
Irving, TX 75039-2402
www.necunifiedsolutions.com

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609-490-0200 • fax 609-490-0610 • www.miercom.com

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