



## Lab Testing Summary Report

November 2010

Report 101118

Product Category:

**Survivable Branch Appliance**

Vendor Tested:



Products Tested:

**UX2000**



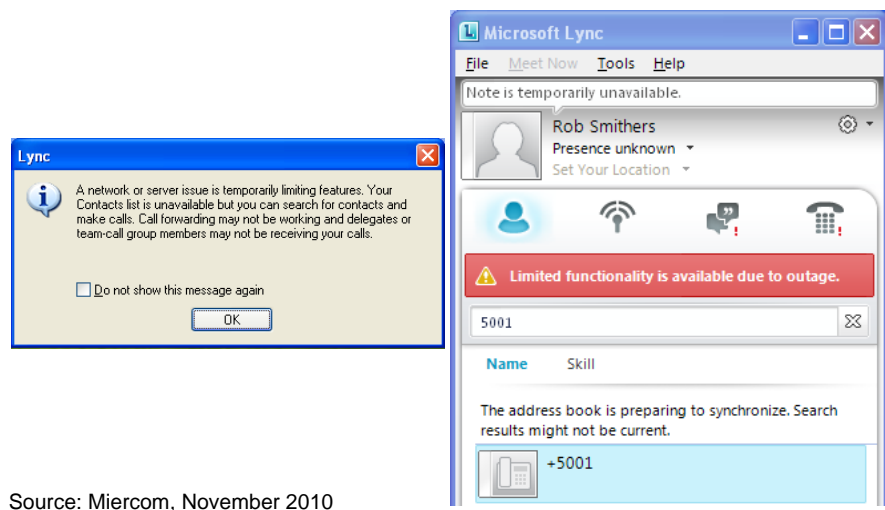
### Key findings and conclusions:

- UX2000 provides branch resiliency and reliability by delivering Lync Client Voice during WAN outages without loss of service for Local Branch and PSTN Voice Services
- NET UX2000 is a highly secure Survivable Branch Appliance (SBA) for Microsoft Lync deployments
- Officially qualified for Lync, the UX2000 can be used as an SBA or Enhanced Gateway (EGW)
- Multifunction platform provides Gateway, SBC, SIP Proxy and Application Server functions, such as SBA, Mediation Server and Third Party Applications
- UX2000 appliance supports call forking, media transcoding and Active Directory integration

**N**ET Unified Exchange 2000 (UX2000) was validated for performance as a redundant survivable gateway by Miercom under the Performance Verified program. The UX2000 is a qualified Survivable Branch Appliance (SBA) for Microsoft Lync 2010 and other next generation VoIP and Unified Communications deployments. The modular UX2000 was built specifically for Unified Communications, session border controller, and business gateway applications. The SBA provides toll quality voice, intelligent call routing, call forking to multiple phones, and thorough PBX interoperability.

Six Digital Signal Processors (DSP), two telecom card slots for 2, 4 and 8 port DS1 cards provide mediation processing for IP solutions.

Figure 1: NET UX2000 T1 Failover to PSTN Test



Source: Miercom, November 2010

*When the WAN outage was simulated at the branch switch, Lync services such as conferencing and user presence were lost, as documented by Microsoft, while all voice services transgressing the UX SBA survived. Once the WAN was restored, the Lync client refreshed as expected to full functionality, approximately 10 minutes in our testing.*

The Survivable Branch Appliance provides a solution for remote sites/branches that have minimal or no IT support. Web-based management interface allows branch offices to be managed remotely. An Application Solution Module (ASM) is an optional high performance server class module that can be added to provide third party application support.

In our testing, the ASM with Windows Server 2008 R2 included an installation of Microsoft Lync 2010 for maximum survivability. UX2000 was easy to configure through a secure HTTPs Web GUI and was accessible from anywhere within the network. See *Figure 2*.

The NET UX2000 passed initial security scans and protocol mutation attacks. We are conducting further extensive security assessments for Miercom Certified Secure.

## Branch Resiliency and Survivability

The UX2000 Survivable Branch Appliance provides Unified Communications Service Integration for branch offices with users in accordance with Microsoft Lync Server Guidelines.

Because the Survivable Branch Appliance runs at a remote site that may not have IT personnel, it is designed for easy deployment and remote management. A remote Survivable Branch Appliance can also be set up and maintained from

the central site without having to travel to and from branch sites.

The SBA is an integrated server and a PSTN gateway, and can be used at branch sites that do not have a local unified communications server. The SBA can provide basic phone services to users at the branch site when the WAN link to the data center is disrupted.

In the event a branch office WAN connection to a data center fails, the UX2000 SBA provides voice services to users in that branch office, such as PSTN in- and out-bound calling and intra- and inter-site calls.

To verify the ability for NET UX2000 to provide branch resiliency, the Miercom engineers put the SBA to task in a Microsoft Lync 2010 Unified Communications deployment. We conducted tests for resiliency, failover scenarios, survivability, high availability and interoperability. The results of some of these tests are described in detail on the following pages.

**WAN Failover to SBA.** Survivability of the branch site with NET SBA deployed was tested by physically removing the WAN link while calls were up. We established intra-branch calls between multiple clients, and then disconnected the WAN cable at the SBA. We observed that intra-branch calls remained up, and that Lync clients did not drop any calls during failover. The Lync system

*The NET UX2000 secure Web interface displays its Microsoft Lync integration with available configuration.*

**Figure 2: NET UX2000 Interface with Microsoft Lync 2010**

The screenshot shows the NET UX2000 web interface. The top navigation bar includes 'Monitor', 'Tasks', 'Settings', 'Logs', and 'System'. The left sidebar contains a tree view with categories: System (Firmware Upgrade, Reboot UX), Application Solution Module, Lync Survivable Branch Appliance (Operational Status, Setup SBA, Import SBA Certificate, Start/Stop Services, Test Lync Call), SIP Setup (Import Local/Passthrough Auth Table), and Microsoft® UC Setup (OCS 2007 Setup, Lync 2010 Setup). The main content area shows 'Next Steps' with instructions to import a certificate for the Trusted Certificate Authority (CA). Below this is a 'Trusted CA Certificate Table' with a table containing one row for 'FabrikamCA'.

Common Name	Issuer	Start Validity	Expiration	Key Length
FabrikamCA	FabrikamCA	10/14/10	10/14/15	1024

Source: Miercom, November 2010

remained functional during the outage. Conferencing dropped, and Microsoft Exchange connectivity and user presence were lost. When the WAN link was replaced, presence and Exchange connectivity was restored after several minutes. The NET SBA was able to provide basic calling functionality and communications when the WAN link failed.

**Dual Power Supply.** The hot swappable power supply was tested to verify the survivability of the SBA. We removed one of the hot swappable power supplies to simulate a failure and see whether calls could be maintained during a power failure without interruptions.

The redundant power supply provided necessary continuity for the UX2000. During the hot swappable failover, all calls stayed active. No interruptions were observed. *Figure 3* is a screen shot taken while the test was ongoing.

**Failover from Primary to Secondary UX2000.** Will the secondary UX2000 appliance take control in case of a failure of the primary appliance at the branch site? This test would verify whether registered SIP phones would failover from the primary to the secondary in order to maintain high availability at the branch site.

The Snom 320 SIP phone at the branch site did failover and maintain all call functionality to the PSTN, SIP trunking, Lync clients and SIP branch

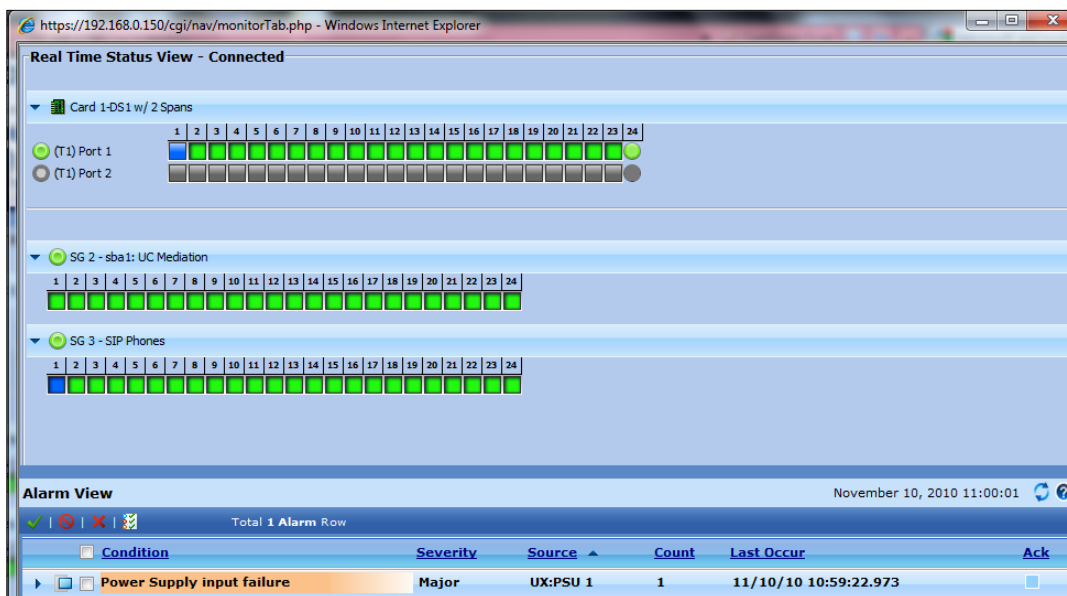
endpoints. Having this capability provides high availability and full redundancy at branch sites.

**Call Forking.** Call forking allows phones to ring simultaneously at several locations. A phone call can ring at home, on a cellular unit, remote office or base office – wherever you may be. UX2000 can send calls to up to eight different phone numbers per user. With the Microsoft Lync 2010 solution, the NET SBA uses the integrated Active Directory to locate other phone numbers specified for the caller. We observed that incoming calls to Lync clients were forked to users at the branch site and over the PSTN. If a person is not at their primary location to receive a call, the UX2000 will automatically fork the call to other phone numbers specified for this person in Active Directory.

**UX2000 Security.** The security capabilities of the SBA were tested with deliberate attacks during call testing of the appliance. We used Mu Dynamics to run an ICMPv4 Protocol Mutation attack on the UX2000. The SBA was analyzed using 42,981 protocol mutations which were generated from 298 variants. Various types of ICMPv4 echo requests and timestamp requests were included in testing.

All attacks were handled successfully by the UX2000 and no faults were found. The system dropped all mutated ICMPv4 echo requests, fragmented echo requests and timestamp requests as appropriate.

**Figure 3: Power Supply Failure Observed**



*A power supply input failure message appears in the Real Time Status View window.*

Source: Miercom, November 2010

**Figure 4: NET UX2000 Media Transcoding  
Media Transcoding Settings**

Channel Details		Outbound Channel Properties	
Channel	<b>1.1.1</b>	<b>Called Number Information</b>	
Signaling Group	<b>(ISDN) sba1: ISDN UC SG</b>	Called Number	<b>5001</b>
Transfer Mode	<b>Packet</b>	Number Plan	<b>Unknown</b>
Per Rate	<b>64k</b>	Number Type	<b>Unknown</b>
Per Rate	<b>20</b>	Outgoing Number	
		Outgoing Number Plan	
		Outgoing Number Type	
		<b>Calling Number Information</b>	
		Calling Number	<b>5009</b>
		Number Plan	<b>Unknown</b>
		Number Type	<b>Subscriber Operator Requested</b>
		Presentation Indicator	<b>Allowed</b>
		Screening Indicator	<b>Up Not Screened</b>
		Calling Name	

Source: Miercom, November 2010

**The media transcoding settings are shown for an outgoing ISDN channel using 64k bandwidth (G.711 Voice).**

The NET UX2000 passed the above initial vulnerabilities test. NET continues to work with Miercom on full security testing of the NET UX2000 SBA.

**Media Transcoding.** The UX2000 Unified Exchange appliance also supports transcoding of multiple media codecs. Using Intel's high-end Core i7 processor, the NET SBA can transcode Microsoft msRTA voice media codec coming from Microsoft Lync to the standard G.729 codec. The UX2000 can also transcode the G.711 A-Law, G.711 U-Law, G.723.1 and G.726 voice media codecs. This includes calls to and from the SIP trunk and Microsoft Lync.

Transcoding to G.729 minimizes bandwidth utilization since only 24 kbps is used per call - 8 kbps voice and 16 kbps overhead. The G.711 codec uses 80 kbps bandwidth - 64 kbps voice and 16 kbps overhead. See [Figure 4](#).

We saw that the UX2000 successfully transcoded all calls while maintaining toll quality voice, using lower bandwidth on the WAN/LAN. The transcoding is done on the SBA optimizing WAN/LAN bandwidth and eliminating the need for separate transcoding hardware/software. The UX2000 can scale high capacities while transcoding because of the high end CPU and DSP architecture.

The NET UX2000 transcodes other codecs used by SIP trunking providers and SIP endpoints,

thereby providing interoperability with other manufacturers using different codecs.

**Active Directory.** The UX2000 is programmable to integrate with Active Directory. This allows the SBA to cache data from the Active Directory, such as routing information, names and phone numbers. In the case of an outage, searching for names and sending phone calls to the correct location are achieved through the cached data.

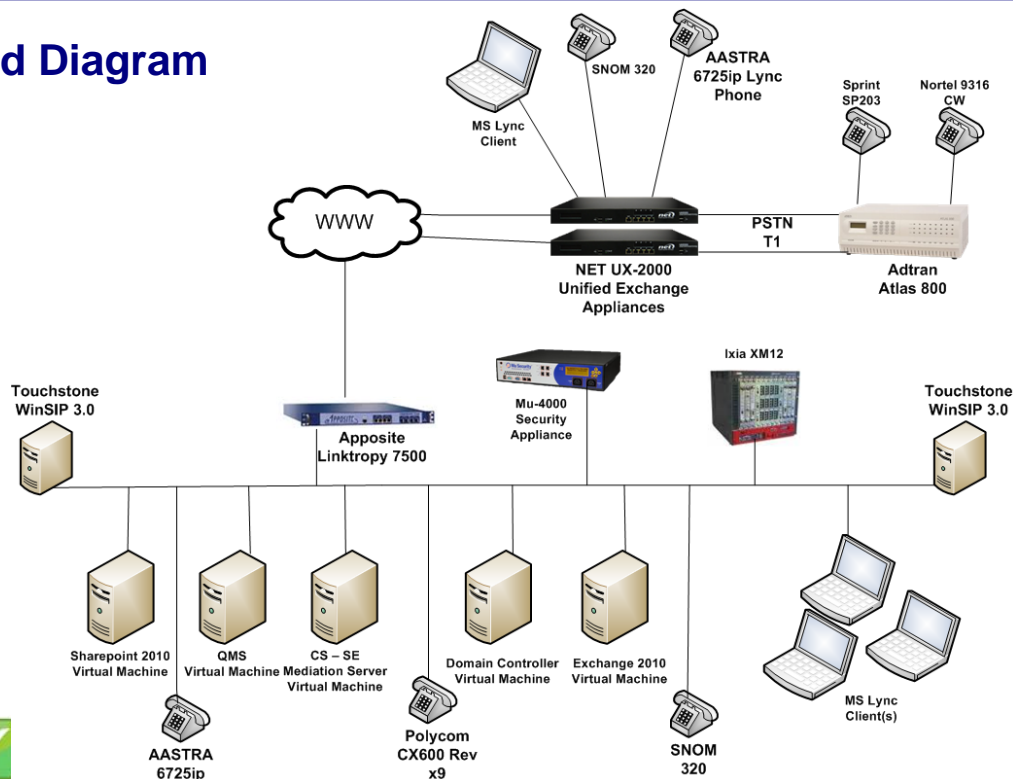
## Bottom Line

The NET UX2000 is capable of providing branch site resiliency and reliability by delivering high availability and interoperability. The UX2000 is easily integrated with Microsoft Lync 2010 for high availability at branch sites. The appliance affords efficient bandwidth usage with its multiple media transcoding feature. Survivability and high availability at branch sites using the NET appliance during outages proved to be reliable without any loss of service while maintaining toll quality voice.

We saw that the NET UX2000 passed initial security scans and protocol mutation attacks without fault. Miercom will be conducting further extensive security assessments for Miercom Certified Secure.

The architecture of the NET Survivable Branch Appliance is designed to support future Unified Communication enhancements.

## Test Bed Diagram



## How We Did It

The network infrastructure at the branch site consisted of two Snom 320 SIP phones, each registered to its own UX2000, an Adtran Atlas 800 used to simulate the PSTN connection, two Nortel phones located across the PSTN, two Lync clients registered to the SBA and a Netgear Dual Speed Hub connecting to the WAN. The network at the Microsoft Lync site was linked to the branch site via a WAN using a Cisco Catalyst 3750G series switch. The servers in the Lync environment included a Microsoft Lync Mediation server, Domain Controller, SharePoint and Exchange. Microsoft Lync softphones and Aastra 6725ip Lync phones were used on the Microsoft Lync side for calling across the WAN.

Specific tests including redundancy, call forking, media transcoding, survivability and integration of the NET UX2000 with Microsoft's Lync server were performed by Miercom engineers. The test bed consisted of two NET Unified Exchange UX2000 appliances, each connected to an Adtran Atlas 800 via a PSTN T1 connection for simulated outside calls. A WAN connection was simulated between the two UX2000 appliances and the Microsoft Lync server. Other included devices and software contributed in Microsoft Lync server 2010 testing included the Aastra 6725ip Lync phones, Microsoft HD webcams and Microsoft Lync client software.

Failover of a SIP client from the primary UX2000 to the secondary UX2000 located at one branch site was performed to test its high availability. Failover survivability of the Survivability Branch Appliance was verified by actively viewing status messages of Microsoft Lync clients registered at the branch site. Failover of a registered Snom 320 SIP phone from the primary UX2000 to the secondary UX2000 was tested by removing the power from the primary NET appliance.

The call forking feature of the SBA was evaluated from inside the branch over the simulated WAN to a Lync client and over the PSTN to a client's mobile device or home phone. In addition, we tested the UX2000 on its ability to transcode multiple media codecs for interoperability with other manufacturers.

Touchstone WinSIP [www.touchstone-inc.com](http://www.touchstone-inc.com) is a high-performance software-based SIP bulk call generator. The WinSIP suite was used to generate calls through the Lync mediation server to test its ability of being able to handle thousands of simultaneous SIP calls.

The Apposite Linktropy 7500 Pro [www.apposite-tech.com](http://www.apposite-tech.com) was used to simulate the WAN link between the Microsoft Lync environment and the NET UX2000 branch site. HD video conferencing calls were initiated across the WAN link while simulating a 1.5 mbps T1 link.

The Adtran Atlas 800 [www.adtran.com](http://www.adtran.com) simulated a local PSTN which was connected with the UX2000 branch site with a T1 connection.

We used an Ixia XM12 chassis [www.ixiacom.com](http://www.ixiacom.com) using IxLoad to apply IMIX background traffic while generating SIP calls for analysis. Real-world traffic was also used in testing as generated by Ixia's test platform and test applications, principally IxNetwork for Layer 2-3 routing and switching traffic and IxLoad for Layer 4-7 application traffic.

The tests in this report are intended to be reproducible for customers who wish to recreate them with the appropriate test and measurement equipment. Contact [reviews@miercom.com](mailto:reviews@miercom.com) for details on the configurations applied to the System Under Test and test tools used in this evaluation. Miercom recommends customers conduct their own needs analysis study and test specifically for the expected environment for product deployment before making a product selection.

## Miercom Performance Verified

Based on our hands-on testing, Miercom confirms that the NET UX2000 has Performance Verified status as a resilient and reliable unified communications gateway.

With its survivability capabilities, this SBA delivers high availability during outages without loss of service.

The UX2000 is highly secure, maintaining its toll quality voice processing and functionality while being assaulted with protocol mutation attacks. The Survivable Branch Appliance is Qualified for Microsoft Lync 2010.



**UX2000**



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