

Sonus SBC 1000 Session Border Controller

Performance, Features and Ease-of-Setup

vs. AudioCodes Mediant 1000B Survivable Branch Appliance

EXECUTIVE SUMMARY

With voice over IP (VoIP) demand increasing within mid-size enterprises and branch offices, it is important to provide the headroom to support large volumes of concurrent calls. Similarly, improved ease-of-use for setup and management of session border controllers (SBC) makes for an overall improvement in the value proposition.

Sonus Networks commissioned Tolly to evaluate the performance of its Sonus SBC 1000 Session Border Controller and compare that to the AudioCodes Mediant 1000B SBA-ES. Additionally, Tolly was asked to evaluate the setup and select features of the SBCs.

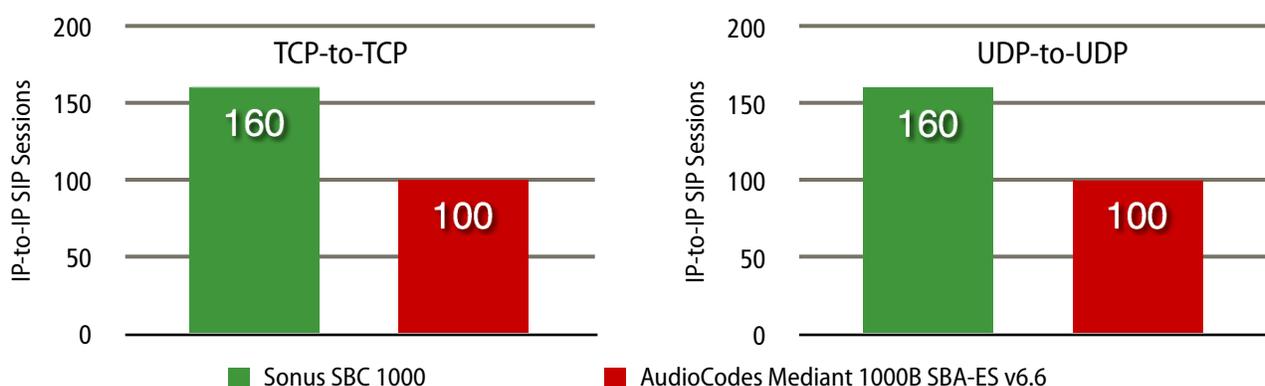
Tolly found that the Sonus SBC 1000 provides higher concurrent SIP sessions than the comparable AudioCodes solution in a number of scenarios and provides easy setup and key connectivity and security features.

THE BOTTOM LINE

The Sonus SBC 1000 Session Border Controller provides:

- 1 2X the concurrent call capacity of the AudioCodes Mediant 1000B for transcoded sessions
- 2 Web GUI tasks to simplify SBC setup and Microsoft Lync integration
- 3 Rich feature set including: Active Directory integration, local registrar for IP phones, SIP message translation, calling and called number blacklist, challenge mode and Action Sets

Session Border Controller Concurrent IP-to-IP SIP Sessions: TCP-to-TCP or UDP-to-UDP
(as reported by Tektronix Spectra2 8.3.0.2.R.3 SP2)



Notes: 1. For the Sonus SBC 1000, 160 calls were connected, maintained as concurrent calls, and then disconnected without any failed call. For AudioCodes Mediant 1000B SBA, 100 concurrent calls were tested without any error. When 106 concurrent calls were tested, 6 calls failed. Engineers repeated the test for 3 iterations on the Sonus SBC without the need to reboot the device. For the AudioCodes Mediant 1000B, the first iteration with 100 concurrent calls completed without error. In the second iteration there were 50 failed calls. In order to complete the test successfully, engineers had to reboot the AudioCodes device before running each iteration. G.711a was used as the codec. 2. AudioCodes documentation for the out-of-box firmware (6.60A.228.001) specified 150 IP-to-IP SIP sessions without transcoding. The AudioCodes appliance used in the test was also licensed for 150 concurrent calls. Tests were run with Tolly engineers' best efforts but without AudioCodes' technical support and latest firmware. Tolly recommends users to run their own tests to verify whether AudioCodes' specification can be met.

Source: Tolly, August 2014

Figure 1



SIP Performance

Tolly engineers ran a series of tests to evaluate the maximum, failure-free, session initiation protocol (SIP) concurrent session capacity using different common connectivity options. For AudioCodes, the tests used the firmware provided with the device. While supported, this was not the latest firmware available for the device. Users concerned with verifying AudioCodes stated specifications for maximum capacity are advised to run their own benchmarks.

TCP/UDP

The first test was run using the G.711a codec without transcoding or encryption and was run twice, once using TCP/IP and again using UDP/IP.

In both tests, the Sonus SBC 1000 was able to achieve its specified number of 160 concurrent sessions. While the AudioCodes

firmware tested specified 150 concurrent sessions, testers were only able to achieve 100 concurrent sessions without encountering session failures. See Figure 1.

Transcoding

The test was run again, this time transcoding between G.711a/TCP/RTP and G.729/TCP/RTP. The Sonus SBC 1000 achieved 120 concurrent sessions and the AudioCodes Mediant 1000B achieved the 60 sessions specified for the v6.6 firmware tested. (Later AudioCodes firmware, not tested, specifies 96 concurrent transcoded sessions.) See Figure 2.

Encryption - Transport Layer Security

For the final performance test, conducted only on the Sonus SBC 1000, Tolly engineers benchmarked the number of concurrent SIP sessions that could be achieved using

Sonus Networks

SBC 1000

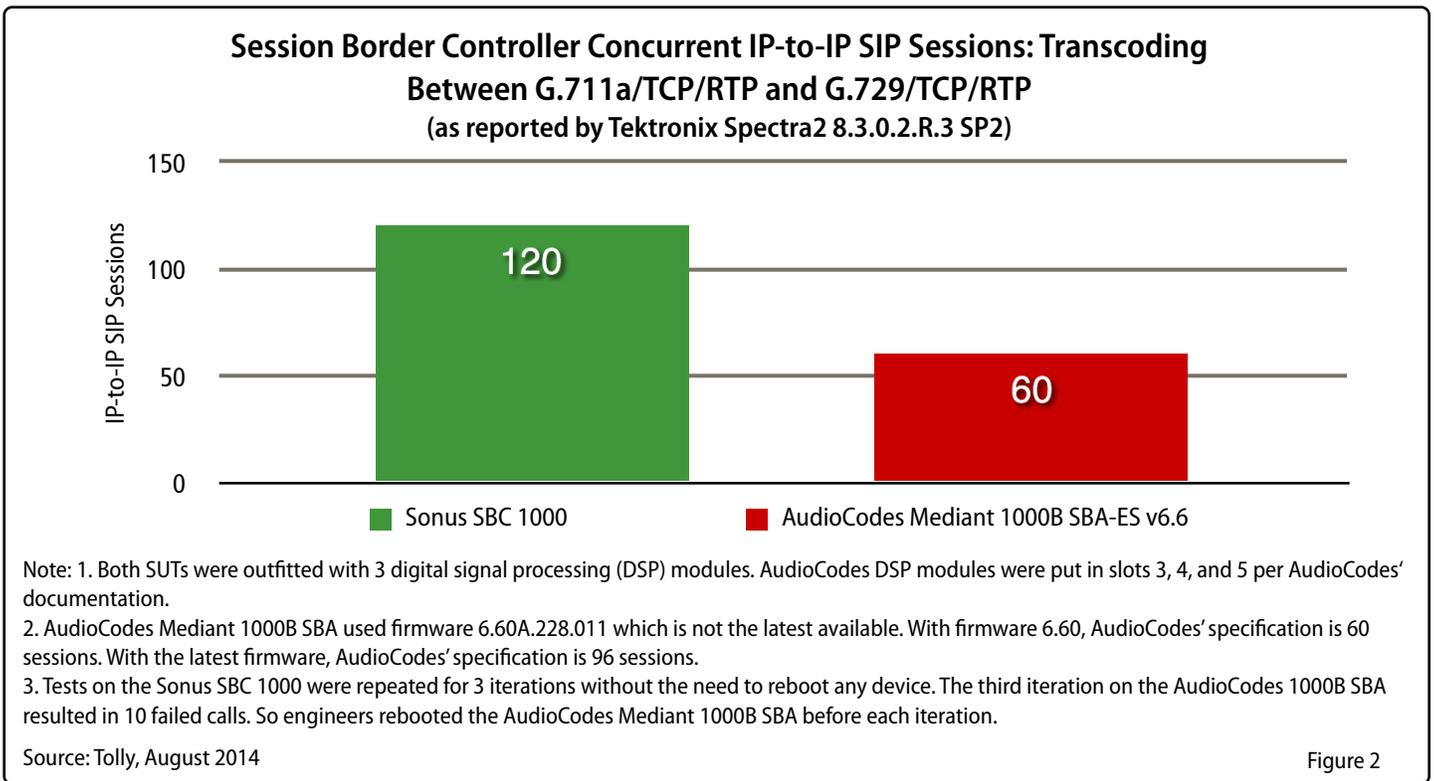
Session Border Controller

Concurrent Calls, Features and Ease-of-Setup



Tested August 2014

transport layer security (TLS) to encrypt the connection. Tolly certified the Sonus SBC 1000 performance as 160 concurrent sessions. This compares to the advertised 120 concurrent sessions for current version AudioCodes firmware. See Figure 3.





Features/Functionality

Setup & Ease-of-Use

In addition to the performance testing, Tolly engineers evaluated the setup steps for Microsoft Lync functionality for both solutions.

For Sonus, a single browser-based wizard is used for setup for both the SBC and SBA components. For AudioCodes, different management interfaces are required for each component.

Where the Sonus setup was straightforward, AudioCodes specifies 10 high-level steps with some two dozen settings that must be specified and applied during setup. See Detailed Results section.

Sonus Features

Finally, Tolly engineers certified several key features provided by the Sonus SBC 1000. See Table 2.

Connectivity is enhanced by support of any-to-any connections across analog, ISDN and Lync clients, Microsoft Active Directory (AD) integration and call forking, which provides for ringing multiple devices simultaneously.

Security is enhanced by being able to block specified inbound or outbound numbers via a blacklist and challenge mode functionality that can authenticate inbound SIP calls.

Flexibility is enhanced by the SIP message manipulation capability that allows messages to be processed on a customized basis by the SBC. "Action Sets", a feature unique to Sonus, provides for users to build custom logic and, thus, their own call applications. See Figure 4.

Features/Functionality

Detailed Results

Tolly engineers evaluated the initial setup process for the Sonus SBC 1000 and the

AudioCodes Mediant 1000B SBA-ES solutions.

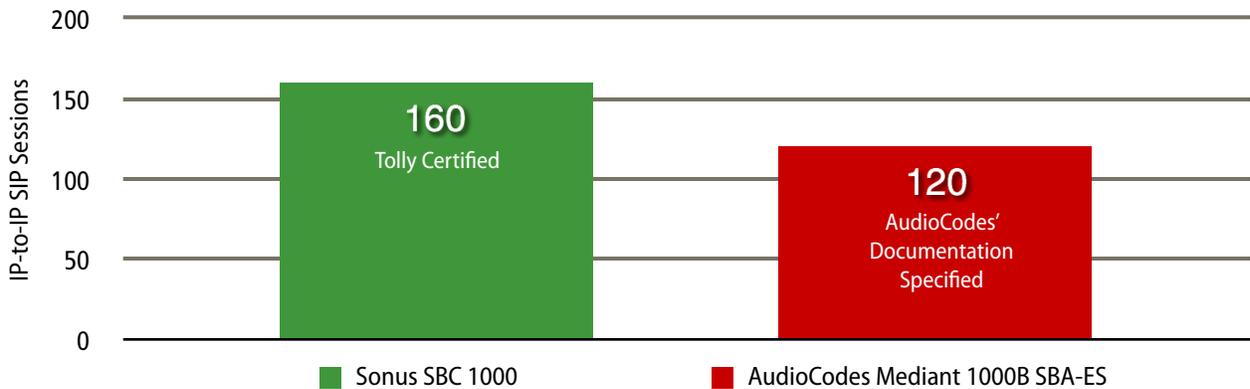
Restore the SBA Image

The AudioCodes Mediant 1000B SBA came with the Microsoft Lync 2010 image on the appliance while the test specified using Microsoft Lync 2013. So Tolly engineers first evaluated the process to restore the SBA image on both the AudioCodes appliance and the Sonus appliance to the Lync 2013 image.

AudioCodes and Sonus both provide one USB drive with the Lync 2013 image. According to AudioCodes' guide, engineers restored the SBA image with four high-level manual steps which include manually modifying the configuration files, connecting the serial cable, starting the recovery by the command line and configuring the IP address for the SBA module.

For the Sonus solution, engineers could manage the SBA module using the SBC's Web interface. After connecting the USB

Session Border Controller Concurrent IP-to-IP SIP Sessions: Encrypted Connection
Between G.711a/TLS/SRTP and G.711/TCP/RTP
(as reported by Tektronix Spectra2 8.3.0.2.R.3 SP2)



Note: AudioCodes' specification is from the official AudioCodes website.

Source: Tolly, August 2014

Figure 3



drive to the appliance, engineers restored the SBA image with two mouse clicks. See Table 1 for the detailed steps.

SBA Initial Setup

Both AudioCodes and Sonus provide one browser-based wizard to setup the SBA module initially.

AudioCodes' SBC appliance and the SBA module are two separate components while Sonus' are integrated. Engineers noted that Sonus simplifies setup by

providing a single web interface to manage both the SBC and SBA components. By contrast, to configure the AudioCodes solution, engineers were required to configure each of the components separately at different IP addresses. Furthermore, the web interfaces differed between the two AudioCodes components, potentially making the configuration more complicated.

SBC Setup for the SBA

After setting up the SBA module, engineers needed to setup the SBC appliance to allow the Lync users on the SBA to be able to call other users.

According to AudioCodes' guide, there are 10 high level steps and 26 different pages of settings. It also requires 3 reboots of the SBC.

Sonus provides a task wizard "Lync Setup" to configure the bulk of the initial SBC

Session Border Controller Feature and Setup Overview

Task	Solution	
	Sonus SBC 1000	AudioCodes Mediant 1000B SBA-ES
Restore the SBA Image	Automatic 1. Connect the USB drive 2. Click "Update ASM Recovery Partition" in the Web interface 3. "Click" "Reinitialize the SBA"	Manual 1. Modify the RecoveryUtil.ini file 2. Connect the serial cable and the USB drive 3. Manually kick off the recovery 4. Assign the IP address
SBA Initial Setup	One Web interface to manage both the SBC and the SBA with consistent user experience	Two different Web interfaces with different layouts (One to the IP of the SBA server, one to the IP of the SBC)
SBC Setup for the SBA	Web GUI wizard + minor setting changes without rebooting	Manual Configuration (10 high level steps, 26 different pages of settings, submit/apply the configuration 23 times, write the settings to the flash memory 19 times, reset (restart) the device 3 times)

Note: 1. Sonus SBC 1000 included one SBA module in the test. AudioCodes Mediant 1000B SBA supports Enterprise SBC (E-SBC) functionality. Each solution includes one chassis and modules to provide both the SBC and the SBA functionalities.
 2. AudioCodes' steps are according to the "LTRT-40106 Mediant 1000B SBA for Microsoft Lync Server 2010 and 2013 Installation and Maintenance Manual".
 3. AudioCodes is developing the "Mediant SBC Configuration Wizard" which is one separate product in beta stage. Sonus' configuration wizard is built in the SBC Web interface.

Source: Tolly, July 2014

Table 1



setup to interface with the SBA and the SIP trunking. Engineers needed to change very few settings. There was also no need to reboot the Sonus SBC 1000 during the setup. See Table 1.

Sonus SBC Functionality

Engineers also validated several key features provided by the Sonus SBC 1000. These features and their definitions can be found in Table 2.

Test Methodology

Performance

Both the Sonus and AudioCodes SBCs under test were configured with the maximum 3 digital signal processors (DSPs). AudioCodes DSP modules were placed in slot 3, 4 and 5 according to AudioCodes' documentation. The Spectra2 test tool was used to originate and terminate calls. Please see Figure 5 for the test bed setup.

Two calls per second was used to ramp up and the concurrent calls were maintained for 5 minutes in each test. Every test was run for 3 iterations.

For AudioCodes, the number of Media Channels was set to 240. In the number of UDP ports to use on both the IP interfaces, engineers put in 150 on each interface which per the manual would then configure about 10 times this number on the appliance.

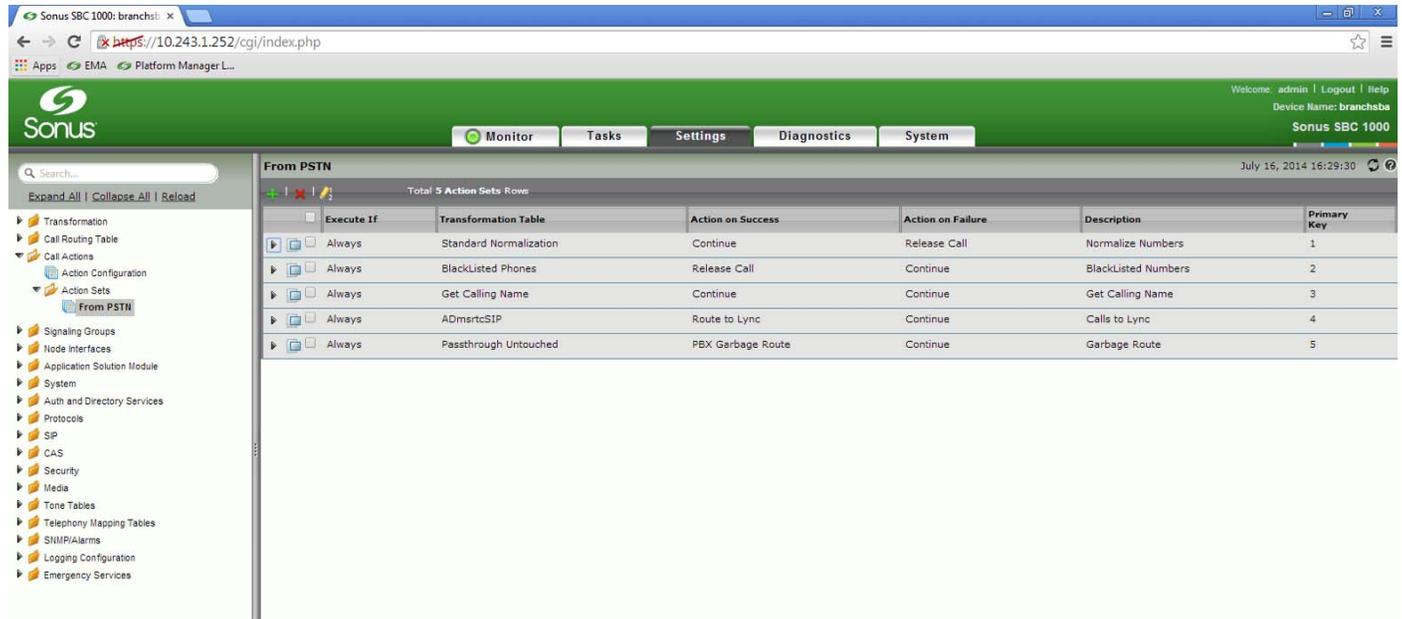
Sonus Session Border Controller - Tolly Certified Features

Feature	Description
Any-to-any Connection	SIP phones registered to the built-in local registrar, Lync clients registered to the SBA, analog phones connected to the legacy PBX system, public phones from the ISDN Trunk can all call each other.
Challenge Mode	For each incoming calls from the SIP phones, verify the username and password of the SIP phone to the Local/Pass-through Authentication Table.
Blacklist	Block certain Calling Numbers, Called Numbers, etc. Use the transformation tables to match.
Call Forking	Ring multiple devices at the same time.
AD Integration	When the SBC receives a call, it uses the Called Number to look for other attributes of the user with AD lookup. Then one can use the user information to fork calls. The SBC can cache the user attributes from the domain controller.
SIP Message Manipulation	Modify the SIP message before or after the message being processed by the SBC.
Action Sets (AudioCodes does not support)	Action Sets provides workflow logic. Users can use Action Sets to build their own call applications.

Source: Tolly, July 2014

Table 2

Sonus Session Border Controller Action Sets Example



Source: Tolly, July 2014

Figure 4

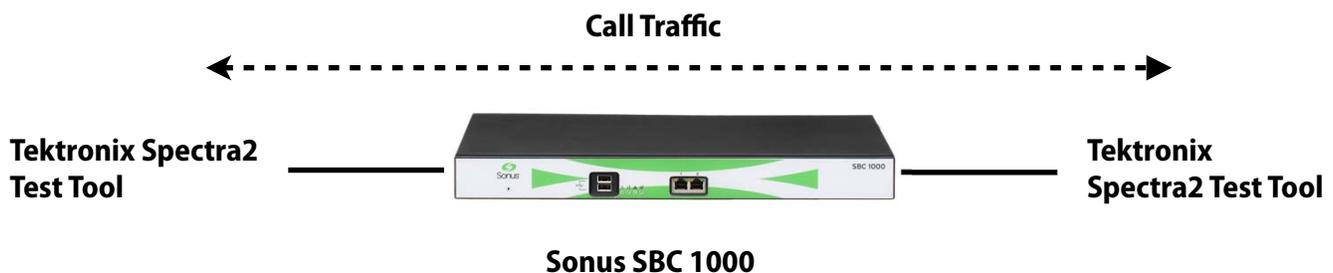
After each run, in the SIP Signaling test, engineers observed that there were BYE events that the AudioCodes Mediant 1000B SBA answered with a 200 OK and then sent the BYE to the other side which was also answered with a 200 OK. At that point the calls should have been completely cleared

on the AudioCodes Mediant 1000B SBA. Engineers waited for all the calls to gracefully terminate on the test equipment before starting a second run so there were no calls still active before starting a second test.

Concurrent IP-to-IP SIP Sessions

Tests were run with TCP to TCP and then UDP to UDP. The same results were obtained. Bidirectional RTP traffic was used as the audio traffic with the G.711a codec.

Test Bed Topology: IP-to-IP SIP Session Capacity



Note: Devices were connected with switches which are not shown in the graphic. Sonus SBC 1000 is shown here as the device under test. AudioCodes tests used the same test bed.

Source: Tolly, August 2014

Figure 5



Concurrent IP-to-IP SIP

Transcoding

Tests were run with G.711a/TCP/RTP on one side and G.729/TCP/RTP on the other side.

Concurrent IP-to-IP SIP Sessions with Transport Layer Security (TLS Encryption)

Tests were run with G.711a/TLS/SRTP on one side and G.711a/TCP/RTP on the other side.

Tolly engineers were not able to configure the AudioCodes appliance under test to work with TLS. So the specification on AudioCodes' official Website is used here to report.

Ease-of-Use

All reported initial setup steps were verified via hands-on tests for the Sonus SBC 1000.

Tolly engineers used AudioCodes SBA's Web GUI wizard to conduct the initial configuration. For the "SBC setup for the SBA" section, Tolly referenced the AudioCodes documentation for the AudioCodes Mediant 1000B SBA - "LTRT-40106 Mediant 1000B SBA for Microsoft Lync Server 2010 and 2013 Installation and Maintenance Manual".

Sonus SBC Functionality

All reported features were verified via hands-on tests on the Sonus SBC 1000.

Systems Under Test	
Vendor/Solution	Firmware Version
Sonus SBC 1000 (and SBA module) Three DSPs	3.2.1 build 315
AudioCodes Mediant 1000B SBA-ES (with E-SBC functionality) Three DSPs	SBC Version 6.60A.228.011 SBA with Lync 2013

Source: Tolly, August 2014 Table 3

Test Equipment Summary		
The Tolly Group gratefully acknowledges the providers of test equipment/software used in this project.		
Vendor	Product	Web
Tektronix	Spectra2 Software: 8.3.0.2.R.3 SP2	http://www.tek.com



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Interaction with Competitors

In accordance with Tolly's Fair Testing Charter, Tolly personnel invited representatives from AudioCodes to participate. After initial interaction with an AudioCodes technical resource, AudioCodes did not respond to further technical inquiries.

For more information on the Tolly Fair Testing Charter, visit:

<http://www.tolly.com/FTC.aspx>



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