



# Abacus™ 5000 – IP Telephony Signaling and Media Traffic Generator

## SBC AND SBG TESTING

Spirent Communications' Abacus 5000 IP Telephony Migration Test System is the most advanced Session Border Controller (SBC) test solution that simulates hundreds of thousands of SIP endpoints with SIP signaling and media traffic generation.

### HIGHLIGHTS

- Provides the highest IP Telephony signaling and media generation in the industry
- Emulates up to 512,000 SIP signaling endpoints
- Simulates over 130,000 concurrent RTP streams and 845,000 total unique RTP streams on a single chassis
- Measures voice quality on thousands of RTP streams using E-Model – R-Factor (G.107)
- Executes up to 845,000 simultaneous registered SIP users per chassis
- Generates and terminates over 23,000 calls per second (CPS) without RTP and over 7,500 CPS with RTP per chassis
- Executes up to 845,000 H.323 end-point registrations per chassis
- Provides seamless test interoperability between SIP, IMS, H.323, H.248/Megaco, MGCP, Skinny, SIP-T, SIP-I, SIGTRAN, BICC, SS7, Analog, TDM
- Measure the quality of voice, video, and data traffic across fixed to mobile, VoIP and IMS networks

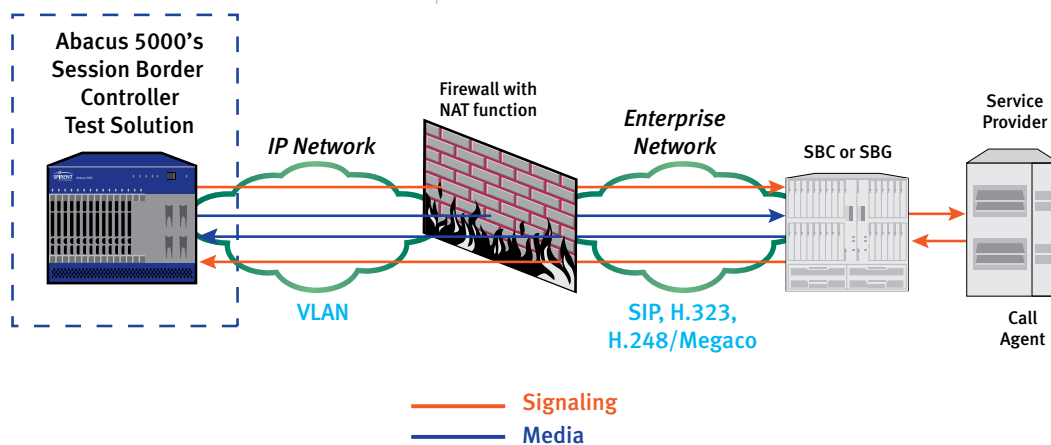
Session Border Controllers (SBC) or Session Border Gateways (SBG) control real-time session traffic at the signaling, call-control and packet layers on a packet-to-packet network border. SBCs are critical to the deployment of VoIP networks because they control session traffic that crosses network address translation (NAT) devices or firewall boundaries. Signaling protocols such as Session Initiation Protocol (SIP) and Media Gateway Control Protocol (MGCP) allow the transfer of the media session endpoint information.

Spirent's Abacus 5000 enables network equipment manufacturers and service providers to test SBC core functionality during development and deployment.

### BENEFITS

Abacus 5000 simulates real-world network conditions with hundreds of thousands IP telephones and/or gateways, generating the SIP signaling end points and RTP to perform performance and scalability tests on SBCs or SBGs.

Spirent's SBC testing solution is part of Abacus 5000's ICG3 subsystem, which also includes test methodologies for all-in-one MGC testing, softswitch testing and other IP Telephony and IMS testing.



## SBC TESTING

### High Scale Signaling Emulation

Spirent Abacus 5000's industry leading SIP signaling emulation offers a large-scale SBC test solution. Abacus 5000 emulates real-world signaling traffic scenarios with up to 512,000 SIP signaling endpoints per instance (20,000 SIP signaling endpoints per ICG3D subsystem).

### High Volume Media Generation and Analysis

Abacus 5000 provides the highest real-world performance media generation and analysis capabilities for SBC testing. Abacus 5000 simulates over 130,000 concurrent RTP streams on a single chassis (10,000 concurrent RTP streams per ICG3D subsystem, with an RTP packet size  $\geq 20$ ms).

Abacus 5000 provides powerful, fully integrated media generation and analysis capabilities to test the functionality of devices such as:

- Network Border Switch
- PSTN Gateway Services and Security
- Border Gateway
- Session Controller
- Signaling Session Border Gateway (SSCG)
- Data Session Border Controller (DSBC)
- Firewall

### Voice Quality Testing

Abacus 5000 performs real-time voice quality measurements to objectively test the voice quality on an end-to-end network that traverses firewalls, various VLANs and SBCs. Abacus 5000 ICG3 subsystem performs voice quality measurements on thousands of RTP streams using E-Model – R-factor (G.107).

Abacus 5000 ICG3 also performs real-time voice quality on 256 channels using MOS, PSQM/PSQM+; or 128 channels using PESQ, MOS-LQO, R-factor (P.834), J-MOS; or 64 channels using PESQ-WB.

### Video Telephony Testing

Abacus 5000 tests video telephony with H.263, H.264.

### Path Confirmation

Path confirmation is the verification of a two-way speech or data path between two channels. After call signaling is complete and a script is running during the call length period, a two-way speech or data path is verified. Each channel passes a sequence of tones, WAV files, fax bits or data bits representing real traffic activity on the calling (originate) or called (terminate) channel.

### VLAN Testing

Abacus 5000 supports VLAN tagging according to the IEEE standard 802.1Q. VLAN tagging is essential to test SBCs operating in different VLANs. Abacus 5000 configures multiple VLAN/MAC and supports stacked VLAN QinQ.

### QoS Verification

Abacus 5000 allows service providers to verify that Quality of Service (QoS) was appropriately remapped by the SBC to match the Service Level Agreement (SLA). Abacus 5000 supports TOS/Diffserv (DSCP) for SIP signaling and TOS/Diffserv for RTP.

Abacus 5000 also performs QoS validation using the Scripting for Voice Pattern Matching by comparing a received WAV file against a sent WAV file.

### SIP Scripting – Negative Testing

Abacus 5000's SIP Scripting allows network equipment manufacturers to modify SIP headers and parameters to test user defined messages.

SIP Scripting is a powerful light-weight embedded programming language that allows the configuration of SIP parameters and headers using custom fields.

### Functional Testing

Abacus 5000's SIP testing solution allows users to perform SBC core function testing. SBC core function testing with Abacus 5000 includes the definition and modification of SIP header and message content, generation of SIP messages based on standard or user defined call flows and automatic response to incoming SIP messages.

The built-in SIP Protocol Development tool allows the user to configure specific SBC tests. By using the SIP Protocol Development test, engineers and developers can edit the call control settings to easily pinpoint possible future failures.

### Test Results and Reports

While performing functional SBC testing, all call statistics, errors and channel measurements are collected and displayed in real time. Results are displayed numerically as tables or graphically as histograms.

Errors are listed as they are detected, presented in table by error type and then graphed over time.

Reports can be printed or saved on the PC's hard disk, either while a test is running or after the completion of a test. The user can select the content and format of reports in PDF, HTML or XML.

### Troubleshooting and Diagnostics

Resolving SBC system configuration issues, or identifying errors resulting from test activity, can be performed easily by Abacus 5000 using a variety of tools.

Abacus 5000 measures delays, call setup time, lost packets, out of order packets, jitter, calls attempts per second and call completions.

Tracking the signaling history only on the channels where errors occurred with the event, AutoTrack provides detailed failure information around the time of the event.

Correlation of SIP signaling issues can be done easily with the call tracer window. The call trace monitors the call signaling flow between two SBC voice communication channels (call originator and call terminator) and provides a graphical depiction of the signaling message flow in the form of a ladder diagram.

VoIP traffic can be captured during call generation or without call generation. The VoIP traffic capture provides monitoring of Ethernet packets in the network where an ICG3D card is connected to.

### CONVERGENCE TESTING

Spirent Communications is the leading provider of PSTN to VoIP convergence testing. As SBCs evolve, there is an overwhelming need to simplify the testing of converged applications and devices.

Abacus 5000 SBC test solution – when used with SS7, SIP-T, SIP-I, SIGTRAN, BICC, MGCP, H.248/Megaco, H.323 and Skinny (SCCP) – enables users to test the convergence capabilities of an SBC with other network elements.

Abacus 5000 Convergence Testing includes support for:

- Skinny client end-points and Cisco Call Manager (CCM) emulation
- Functional and load testing for H.323
- All in one media gateway emulation with MGCP, NCS and H.248/Megaco
- Routing and switching of H.248/Megaco and MGCP calls
- Message Fragmentation and 521 redirect for MGCP
- Advanced trunking signaling testing with SIP-T (SIP for Telephones)
- Softswitch emulation with SIGTRAN M3UA and IUA
- IPv6 for SIP and RTP
- SS7 and Analog emulation
- Analog feature testing to verify FTTP, PON, VoDSL and VoIP
- ... and SIP Testing

### SIP Testing

- Support for SIP 65K simultaneous registered SIP users per ICG3 subsystem (845,000 simultaneous registered SIP users per chassis)
- Generate or terminate up to 20K channels of signaling without voice per subsystem
- Support IPv6/Unicast addressing and IPv6 traffic class
- T.38 FAX payload for SIP session
- Configurable SIP call flow and message generation
- Configurable SIP ports
- Configurable SDP

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- Configurable RTP ports
- Filter protocol messages displayed by message type or message headers for SIP signaling
- Support TOS/Diffserv (DSCP) for SIP signaling
- Support 3PCC – 3<sup>rd</sup> Party Call Control RFC 3725, and automatic detection with SIP protocol development
- Support VLAN tagging according to the IEEE standard 802.1Q
- Configure multiple VLAN/MAC
- Support stacked VLAN QinQ
- Support multi-proxy (2 SIP proxies) functionality as described in RFC 3665 Section 3.3
- Support video and voice streams in the same call within the SIP session
- Test VoIP Security with Secure RTP and TLS
- Send/receive video using H.263 and H.264 CODECs (encoding)
- SIP Scripting
- Call Tracer (ladder diagram)
- SIP Message Editor
- SIP Proxy emulation, registrar and call routing
- RTP Replay
- IMS Security (IPSec and AKA)
- SIP Signaling Compression (SigComp)

### H.323 Testing

- Up to 65K H.323 end-point registrations per subsystem
- Send bearer capacity information within “speech” using H.323
- Support H.323 IRR call status report
- T.38 fax over H.323
- Configurable GRQ (Gatekeeper ReQuest)

- H.235 VoIP gateway user credential encryption
- Functional and load testing specific to GRQ messages and H.235 signaling encryption
- Multiple VLAN/MAC configuration

### SIP Protocol Specifications

- SIP IETF RFC 3261, RFC 3312, 3GPP (RFC 3891), RFC 3608 6.1

### Standard Bodies

- MSF, ETSI, 3GPP, TISPAN

### ORDERING INFORMATION

Ordering information for the Abacus 5000 and the ICG3 circuit generator with firmware options is available in the following data sheets:

- Abacus 5000 IP Telephony Migration Test System
- ICG3 Subsystem – IP Telephony Signaling and Media Traffic Generator

### FOR MORE INFORMATION

Visit Spirent Communications’ Website at [www.spirent.com/go/voice](http://www.spirent.com/go/voice) where you can learn about Spirent IP Telephony test systems and services, download product literature, white papers and test methodologies. Contact your local sales representative for details.

### SPIRENT GLOBAL SERVICES

Spirent Global Services provides a variety of professional services, support services and education services – all focused on helping customers meet their complex testing and service assurance requirements. For more information, visit the Global Services Web site at [www.spirent.com/gs](http://www.spirent.com/gs) or contact your Spirent sales representative.



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