

**Independent Testing Services for Mobility and
4G (LTE), IMS, 3G, VoIP, GPRS, GSM Solutions**

TELECOM AND MOBILITY CAPABILITY SNAPSHOT

Software Performance Assurance

Assuring Telecom and Mobility Software Performance...

SPA TELECOM AND MOBILITY CAPABILITY SNAPSHOT

SPA is a **specialist** provider of software testing services with extensive experience in the Telecom and Mobility industry at all the points in the value stream, from components manufacturers to network equipment vendors to service providers to mobility solutions providers. Our customers include some of the largest and most respected global enterprises in the world, as well as new startup ventures.

As specialists in our field, we integrate measurable and repeatable processes, patented technology, and highly capable specialists in the field of software performance assurance to offer our client an efficient solution that **reduces time, cost, and the overall risk associated with software testing of Telecom and Mobility solutions**. Our pre-built test scripts and frameworks significantly reduce the time and resources required to create comprehensive test plans for Mobility, LTE, IMS, 3G, VoIP, GSM, SS7, and other Telecom and Mobility solutions.

- 100+ testing specialists on staff with extensive Telecom testing experience in 4G (LTE), IMS, 3G, VoIP, GPRS, GSM, and legacy technologies.
- Testing solutions for equipment providers, service providers, mobile device, reference platforms and application providers, etc.
- Comprehensive test tool set and LTE expertise to help deliver LTE solutions at significantly reduced cost. We provide functional and load testing of LTE eNB via S1, S11, X2 and LTE Uu interfaces and simulation of heavy control and user plane load. We test LTE Uu interface over both CPRI and OBSAI RP3 interfaces. We can simulate hundreds of LTE UEs over multiple sectors in a cost effective manner.
- Comprehensive test tool set, network simulation capability, and legacy, 2G, 3G and IMS expertise to help deliver voice and data solutions involving soft switches and SMSc involving VoIP, SMPP, MAP, MGCP, SIP, SCCP, TCAP, M3UA, DTAP, BSSAP, SS7, ISDN, POTS. Provided functional, performance, inter-operability testing services.
- Extensive experience with testing mobile devices, reference platforms, and mobile applications ensuring backward platform compatibility and third party application compatibility on the device/OS platforms. This includes regression, exploratory, application/multimedia testing.
- Purpose-built Functional, Load and Stress, and Automation Framework to improve productivity and quality of results.
- Network simulation expertise and deployed test tools to help reduce CAPEX and OPEX.
- Extensive experience with various commercial and open source testing tools and pre-built frameworks. We leverage open source test tools when appropriate to manage cost and build custom extensions for customers-specific needs.
- Leverage transition methodologies, risk-based prioritization techniques, and our proprietary Q-Patterns-based techniques for rapid ramp up.
- Testing strategies based on defined business objectives that identify and prioritize the most critical testing areas. Our services help our customers achieve higher customer satisfaction by minimizing disruptions in service delivery, product updates, and regulations.

Applications	Technologies	Test Tools
Call Processing, SMS, VOIP, M-Commerce	Mobile & Wireless Networks LTE, 3G, CDMA, GPRS, GSM	Network Simulation, Testing & Monitoring
Mobility Mobile Devices, Reference Platforms, Mobile Applications	Convergence IMS, UMA, VOIP, SIP, Sigtran	Nethawk test tools, Ixia test tools, Malden DSLA, IPERF, IXVoice, Shunra Cloud, Smartbits, Bulk Call Generator, TCL , other tools
Testing Services Functional, Integration, Compatibility, Security, Accessibility, Compliance Test Automation and Regression Performance Benchmark, Load & Stress, Availability	Protocols HTTP, TCP/IP, DHCP, PPPoE, PPPoA, EoA, IPoA, VLAN, OSPF, FTP, TFTP, SSH, RTP, DNS, PPTP, L2TP, NAT IP, Legacy Networks SS7, ISDN, IN, Analog	Other JMeter, OpenSTA, WebLoad, LoadRunner, QTP, SilkPerformer, and most other commercial & open source tools



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Case Study 1: Fixed convergence solution provider tasked to test voice and messaging solutions that allow operators to evolve to single platform

Challenge: Client tasked us to create automation framework, perform regression and perform pre-acceptance tests to ensure application was robust and meets their customer requirements. There was no room for errors or downtime as these could adversely impact client image.

- 3GPP compliant IP-based SMSc solution for seamless evolution of IMS
- Complex technologies including MAP, SMPP, SIP, VOIP, SCCP, TCAP, M3UA, DTAP, and BSSAP
- Telecom network simulation experience
- Challenging timelines

Solution: The client leveraged us as a full outsource partner. As part of the project, we:

- Simulated network using Nethawk EAST test tool and built custom stack on test tool saving significant CAPEX and OPEX
- Created automation framework, automation test suites and performed regression test cycles
- Created pre-acceptance test suite and performed pre-acceptance tests
- Performed security and reliability testing
- Follow the sun approach for challenging timelines

Results: Leveraging our Risk-based Prioritization methodologies, the team was productive in a short period. We detected many functional, performance bottlenecks, and security and reliability issues. The appropriate use of tools and optimization of testing plan using appropriate test methods resulted in the project finishing ahead of its stated deadline. We helped client with smooth acceptance test.

Case Study 2: Leading communication solutions provider tasked us to test various CPE solutions.

Challenge: Project challenges included:

- Resource crunch, Challenges with hiring resources with complex VoIP technologies such as SIP

Solution: We provided functional and performance testing, and test automation solutions for the following:

- Wireless Testing for standards 802.11N, BG, etc. Voice testing including protocols SIP, MGCP, H.323 etc
- VC support for PPPoE / PPPoA, EoA, IPoA as per RFC1483; VLAN support
- Bridging and Routing modes operation of the Modem/chip
- IP routing and Routing protocol support like testing of RIP, OSPF, etc.
- Network Address Translation (NAT) and Application Level Gateway (ALG) support
- Support for protocols like FTP, Telnet, TFTP, SSH etc.
- DSLHome CPE configuration supports like TR 69 (CPE-WAN management), TR 64 (LAN-Side DSL CPE configuration), TR 111 (Remote Management) etc.
- Protocol testing of common protocols like SNMP v1, v2 and v3; SNTP, IGMP including Snoop and Proxy, RTSP, RTP; DHCP in Server, Client and Relay modes; DNS in Relay and Client modes, STP, etc.
- Tunnelling protocols like PPTP (Point-to-Point Tunnel Protocol) and L2TP
- Firewall testing, including NAT IP filtering, Port filtering etc.
- Attack Protection in IDS including DoS, PoD (ping of death), Broadcast packet dropping etc.

Other Project Examples...

- End-to-end testing of SIP-based CRBT solution for a large Indian Telco
- SIP conformance for different scenarios for Proxy and Registration
- Created unit test suite for Conformance Test Specification for SIP (IETF RFC 3261) and a tested with BTS4.5, Asterisk and Openser
- Performance testing of voice to SMS text conversion system for over 35 million SMS per day
- Working with different version of Cisco Call Agent BTS 10200
- Working with Cisco IAD2420, IAD432, ITP Server, and Broad works Application Server, Cisco Unified Call Manager Admin, Adtran IAD, Cisco BTS
- End-to-end testing of broadband solution (involving SIP, VPN, QoS)
- Automation and acceptance testing of fixed mobile convergence solution provider for voice and messaging services.
- Automation testing of VoIP / Packet Cable and other next generation advanced services.
- MGCF conformance testing over Mg and Mj interfaces of IMS
- End-to-end testing of M-Commerce applications for a large India Telco
- Performance testing of OSS Billing solution
- Performance testing of Call Center Solution for a large UK Telecom player



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