Spirent Mobile Network Infrastructure

End-to-End Mobile Network Infrastructure Test and Lab Automation Solutions
Customer Experience
Automating end-to-end user experience testing of data, voice and video services assures quality of customer experience.

Machine-to-Machine (IoT)
Automating end-to-end machine-to-machine (IoT) tests assures quality of network communications for machines.

Infrastructure Reliability
Automating end-to-end mobile network infrastructure reliability tests assures lifecycle network performance under load and stress.

Accelerated Pace of Change
Continuous testing integrated with DevOps, enables rapid development and deployment with confidence.

Live Network Administration
Automating end-to-end NOC tasks improves live network operations and performance against network service level agreements.

Mobile Network Infrastructure Challenges
Network service providers that are implementing and operating rapidly evolving mobile infrastructure technologies such as “Any-G” including LTE, RAN, IoT, Wi-Fi back-haul or HetNet are challenged to assure customer experience quality, machine-to-machine (IoT) communication, infrastructure reliability, keep up with the speed of changes and administer network operations tasks in the live network to meet service level agreements.

All of these challenges require advanced, comprehensive test solutions that test end-to-end system topologies. Complex, yet repeatable, test requirements demand end-to-end test automation and advanced lab orchestration capabilities that manage and orchestrate all mobile test lab resources and topologies.

End-to-End Test and Lab Automation Solutions
Spirent’s Mobile Network Infrastructure solution includes Spirent’s Velocity innovative end-to-end test automation and orchestration product, together with other test tools, and delivered by professional services, based on best practices. Spirent’s Mobile Network Infrastructure solution can be configured according to different use cases to test the entire range requirements for rapidly evolving mobile network including specific solutions for customer experience testing, machine-to-machine (IoT) testing, infrastructure reliability testing, continuous testing and live network administration.
Customer Experience
—Use Case

Mobile network infrastructures offer a broad range of services to users that may be tested for satisfactory customer experience. Some of the key customer experience tests are listed below:

- Voice services including voice and call quality (E.g., MOS, call delay, call performance), VOLTE call performance, voice handovers, interoperability
- Data services including quality including download times, latency for control messages and data and data throughput
- Video services including live streaming, video chat services, and broadcast services, VQoE, and ViLTE, video smoothness, frame rates, loss rates, frozen frames, impairments, video sync and start-up times
- Compare new UEs, device models browsers and OSs on user experience criterion
- Pre-launch accelerated acceptance testing based on user experience criterion
- Charging accuracy from a user experience point of view

Components

- Spirent Velocity for test and lab automation
- Spirent Nomad for voice testing
- Spirent Datum for data testing
- Spirent Chromatic for video testing
- Spirent Landslide for Load Generation
- Spirent Professional Service for system configuration and training

How It Works

- Multiple real UEs are used to automate meaningful end-to-end test data
- Network traffic generators provide background stress
- Automated tools orchestrate and automate the devices, tools and network interfaces

Results and Measurements (examples)

- Voice: MOS, call delay, call performance, VOLTE call performance, voice handovers, interoperability
- Data: download times, latency for control messages and data and data throughput
- Video: VQoE, and ViLTE, video smoothness, frame rates, loss rates, frozen frames, impairments, video sync and start-up times

Benefits

- Automation of end-to-end customer experience testing enables thorough, fast testing while at the same time saves OpEx and CapEx.
- Using real devices for testing ensures realistic meaningful testing
Machine-to-Machine (IoT) – Use Case

Mobile network infrastructures are required to support an increasing range of services for machine-to-machine communication, especially with the rapid implementation of Internet of Things. Because software drives everything, software quality is critical. There are many software-driven components in the chain of systems that provide service, and all of them must work flawlessly or the end-to-end machine-to-machine service will not function. Depending on the application, these failures can be catastrophic as more and more mission-critical, life-affecting applications are stood up across the infrastructure. Some of the key machine-to-machine test requirements are listed below.

- Functional testing of IoT gateways and devices
- Protocol testing of and devices and network interfaces
- Peer application compatibility testing
- Regression testing IoT gateways, devices and network components
- Security testing of network components and devices
- End-to-end network configurations

How It Works

- Multiple real devices are used to automate meaningful end-to-end test data
- Network traffic generators provide background stress
- Automated tools orchestrate and automate the devices, tools and network interfaces

Results and Measurements (examples)

- Functional tests: gateways and devices
- Peer-to-peer protocols
- Regression test results of gateways and devices
- Security tests of network components and devices
- Configuration of network components and devices

Benefits

- Automation of end-to-end machine-to-machine testing enables thorough, fast testing while at the same time saves OpEx and CapEx
- Using real devices for testing ensures realistic meaningful testing
- Automated test and lab tools implemented according to best practices enable the integration of the entire range of network, devices and tools needed to test any network condition

Components

- Spirent Velocity for test and lab automation
- Spirent Landslide for background load
- Spirent Professional Service for system configuration and training
Network Infrastructure Reliability
—Use Case

Network congestion is the root cause of many network services problems and customer complaints. Mobile network infrastructures are required to support an increasing mix of traffic from many types of UEs and devices simultaneously. Because software drives everything software quality is critical. There are many software-driven components in the chain of systems that provide service elements and all of them must work flawlessly under high traffic load or the end-to-end service will not be acceptable. Depending on the application these failures can be catastrophic as more and more mission-critical, life-affecting applications are stood up across the infrastructure. Some of the key network reliability test requirements are listed below:

- Network end-to-end reliability at scale with multiple UEs and Devices simultaneously
- QoS measurements with realistic traffic mix under massive load and high conditions
- Performance characterization of control and data plane traffic
- Regression testing under stressful conditions
- Performance of multiple device types under high network stress
- Problem isolation under high network traffic conditions

Components
- Spirent Velocity for test and lab automation
- Spirent Landslide for Load Generation
- Spirent Professional Service for system configuration and training

How It Works
- Create a test and lab environment for automation of many UE and Device sessions and massive background load
- Multiple real devices and network traffic tools generate massive amounts of meaningful end-to-end test data
- Automated tools orchestrate and automate the devices, tools and network interfaces and consolidate analysis of many tests into one results repository

Results and Measurements (examples)
- End-to-end use case reliability measurements
- QoS measurements with realistic traffic mix under massive load and high conditions
- Performance characterization of control and data plane traffic
- Regression testing under stressful conditions
- Performance of multiple device types under high network stress
- Problem isolation under high network traffic conditions

Benefits
- Automation of end-to-end infrastructure reliability testing enables thorough, fast testing while at the same time saves OpEx and CapEx.
- Using real devices for testing ensures realistic meaningful testing
- Automated test and lab tools implemented according to best practices enable the integration of the entire range of network, devices and tools needed to test any network condition
Accelerated Pace of Change
—Use Case

Keeping up with massive number of continuous changes of software versions for the many device and network components that make up and affect the performance of mobile network infrastructures is challenging. A fault introduced by an update may cause performance problems affecting customer experience, machine-to-machine communications or network reliability. The solution to this is continuous testing and DevOps5. Some of the key Accelerated pace of change requirements are listed below:

- Integration of Network end-to-end testing with the Continuous Integration (CI), and Continuous Delivery (CD) processes that create and deploy product and service changes for the mobile network infrastructure
- Continuous test cycles enabled by automated testing and best practices
- Identify and remediate problems with end-to-end network services as rapidly as the changes are introduced to the processes that create and deploy product and service changes

Components
- Spirent Velocity for test and lab automation
- Spirent Nomad, Datum and Chromatic for customer experience testing
- Spirent Landslide for Load Generation
- Spirent Professional Service for system configuration and training

How It Works
- With plugins and scripts automated Continuous Testing (CT) is integrated within the DevOps framework and the CI, and CD processes
- Enable rapid test configuration orchestration and efficient use of resource by employing lab automation tools and infrastructure as code
- Provide rapid in-process analysis of many tests by employing real-time CM analytics

Results and Measurements (examples)
- Test verdicts for each change processed at each CI and CD pipeline stage
- Test trends resulting from multiple test runs
- Number of changes that need to be remediated as a result of tests

Benefits
- Fast time-to-market
- Take manual tests out of the critical path
- In-process testing and results analysis
- CapEx and OpEx savings using resource sharing and test automation
Live Network Administration Automation

—Use Case
changes deployed to the mobile network infrastructure components, or UEs or devices that may affect end-to-end customer experience, machine-to-machine performance or network reliability. Network administrators actively support the deployed end-to-end network and strive to meet or beat customer SLAs. It is critical to identify and remedy faults introduced by updates within SLA timeframes. The solution to this is to provide test and lab automation capabilities which automate live network administration tasks. Some of the key live network administration requirements are listed below:

- Network inventory automation
- Automated provisioning
- System orchestration
- Automated health checks
- Automate active/backup switching
- Log file analysis
- Predictive failure analysis
- Automated facilities monitoring

Components

- Spirent Velocity for test and lab automation
- Spirent Nomad, Datum and Chromatic for customer experience testing
- Spirent Landslide for Load Generation
- Spirent Professional Service for system configuration and training

How It Works

- End-to-end network monitoring designed to match the SLAs
- Automated test asset inventories and repositories of test results and device logs
- Trent analytics which leverage the repository data
- Scripts that automate network administration actions using response
- Rapid test configuration orchestration as needed to quickly recreate live network scenarios

Results and Measurements (examples)

- Network inventory reports
- Automated provisioning metrics
- Automated health checks
- Automate active/backup switching metrics
- Log file analysis
- Predictive failure analysis metrics
- Automated facilities monitoring metrics

Benefits

- Reduce automation time from months to minutes
- Improve SLAs
- Suitable for any level of staff
- CapEx and OpEx savings using resource sharing and test automation
About Spirent Communications

Spirent Communications (LSE: SPT) is a global leader with deep expertise and decades of experience in testing, assurance, analytics and security, serving developers, service providers, and enterprise networks.

We help bring clarity to increasingly complex technological and business challenges.

Spirent’s customers have made a promise to their customers to deliver superior performance. Spirent assures that those promises are fulfilled.

For more information, visit: www.spirent.com

Spirent Automation Solution Suite

**Spirent iTest**—An integrated test authoring and execution solution for rapidly developing, automating, and maintaining test cases.

**Spirent Velocity**—A robust virtual/physical testbed orchestration and test case management solution for facilitating lab management and scheduling, as well as, executing and analysis of test cases.

**Spirent Professional Services**—Provide qualified test experts with hands-on solution knowledge with a deep bench of professionals to deliver solutions.

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