Deploying Landslide 5G test solution in OSM OSM-MR#9 Ecosystem Day

Iskil MOUSSE, iskil.mousse@spirent.com
Spirent Communications
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We develop products and services to shorten our customers’ product development lifecycle, improve the quality of their products & networks, improve their customers experience, and reduce their costs & risk.

We enable and assure the functionality, performance and security of connected devices, network equipment, networks and services.

We provide expert guidance and methodologies to help our customers find clarity in the face of complexity, overcome their challenges, and ultimately deliver on their promise to their own customers.

A LEADER IN THE TESTING INDUSTRY

<table>
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<tr>
<th>Global Customers</th>
<th>Spirent Employees</th>
<th>Countries Served</th>
</tr>
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<tr>
<td>1,500+</td>
<td>1,500+</td>
<td>50</td>
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Sales (2019) $500+ M
R&D Investment $100+ M

THE PROMISE OF PERFORMANCE
• Service Assurance & Analytics
• Cloud Infrastructure Validation
• High Speed Network Performance
• Cybersecurity
• Positioning, Navigation & Timing
• Wireless Device Performance & Service Experience
• Automotive
Business Units

Networks & Security
Provide automated performance and security test systems to accelerate development of new devices, networks and applications.

Lifecycle Service Assurance
Provide active test and analytics solutions for service turn-up, network performance improvement and customer experience management.

Connected Devices
Provide automated test systems to accelerate the development of connected devices and to simplify connecting them to the network.

By being the best at …
Test Methodologies | Active Test | Analytics | Automation
## Spirent 5G Portfolio

<table>
<thead>
<tr>
<th>5G Devices</th>
<th>5G New Radio</th>
<th>5G Fronthaul</th>
<th>5G C-RAN</th>
<th>MEC</th>
<th>5G Backhaul</th>
<th>5G Core Network</th>
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<tr>
<td>Vertex 5G RF Channel Emulation &amp; Modelling</td>
<td>Spirent TestCenter Ethernet testing</td>
<td>Spirent TestCenter 5G Cloud RAN &amp; Distributed Data Center infrastructure, inter &amp; intra connect validation</td>
<td>Landslide 5G CUPS emulation, test &amp; validation</td>
<td>Landslide 5G Core Network emulation, test &amp; validation</td>
<td>VisionWorks 5G Autonomous Service Assurance (Transport Network</td>
<td>Mobile Network &amp; Services</td>
</tr>
</tbody>
</table>

**8100 5G – 5G Mobile Device Performance Testing**
- Umertix 5G Data Experience Evaluation
- Spirent Security Labs 5G (IoT) security testing

**Umetrix 5G Data Experience Evaluation**

**Spirent Security Labs 5G (IoT) security testing**

### Automated Testing
- Vertex (5G Radio Equipment)
- 8100 5G (5G Device Testing)
- SSL (5G IoT Security)
- Paragon (Calnex – Synchronization)
- Velocity (5G Lab as a Service)
- TestCenter (5G Cloud & Transport)
- Landslide (5G Core Network)

### Autonomous Service Assurance
- Umetrix (5G Data Experience)
- VisionWorks (Service Assurance)
What is Landslide?

Landslide is a mobile core network testing and emulation solution for lab and production environments.

To perform End-to-End and/or Node isolation assessments:

- 5G SA Core testing & emulation
- 5G service-based architecture testing & emulation
- 5G native slicing testing and emulation
- 5G NSA options 3/3a/3x testing and emulation
- 5G IoT device and network testing
- R14 CUPS testing and emulation
- Legacy core network emulation for iRAT
- Full mobility Intra and Inter-RAT
- BH Call Modeling
- DPI/Data Performance
- Security/IPsec
- Core Services: FWA Voice, Video, Data
- Negative testing
- 5G CU/DU testing and emulation
- Virtual and Hybrid Networks Testing
- Virtual functions autoscaling test
What are Landslide NFs?

5G, LTE & Wi-Fi scenarios

*Including interworking functions: SMF+PGW-C, UPF+SGW-U, PCF+PCRF
Landslide Platform Overview

Test Administration Server
- Test Case/Session Configuration
- Results Reporting
- Automation

Test Servers
- Execution of test and emulation function(s)
- Results/Measurements

Flavors: up to 5 M UEs per Test Server
- Flavors: XS (20 UEs), S (1000 UEs), L (100K UEs), XL (400K UEs), XXL (1.25 M UEs) per Test Server

System Under Test

Java 1.8 Web-Served UI (up to 48 users)
- Automation Options
  - TCL
  - Restful API

SIM Servers
- From 32 to 416 physical SIMs

TCP ports list A
UDP ports list B
TCP ports list C

30+
60+
Using Landslide with OSM

- Resources orchestration
- Define your tests topologies (network functions)
- Assign NFs to vTS
- Run the scenario
- Collect stats/pcaps

\[ v\text{TAS}(\text{eth0}) \]

\[ \text{NFV Platform} \]

\[ \text{vTAS} \]

\[ \text{OSM} \]

\[ \text{A Single Landslide image} \]

\[ \text{VMs role Configuration} \]

\[ \text{vTAS NS} \]

Typically static

\[ \text{vTS(s) NS} \]

Static or dynamic (pre-)Deployed at different locations

\[ \text{NFV Platform} \]

\[ \text{NFVI} \]

\[ \text{VIM} \]

\[ \text{NFV Platform} \]

\[ \text{vTS1(eth0) eth1-ethX} \]

\[ \text{SGC NFs, 4GC NFs etc} \]

\[ \text{NFVI} \]

\[ \text{VIM} \]

\[ \text{NFV Platform} \]

\[ \text{vTS2(eth0) eth1-ethX} \]

\[ \text{SGC NFs, 4GC NFs etc} \]

\[ \text{NFVI} \]

\[ \text{VIM} \]

\[ \text{NFS} \]

\[ \overset{N}{1} \text{ vTS} \]

REST API

Landslide GUI
vTS NSD: back-to-back example

- DPDK support required (EPA (Enhanced Platform Awareness) or natively available to the guests)
- Port security disabled on Test ports is recommended for flexible IP configurations
vTS NSD: 5GC E2E signaling example
vTS NSD: 5GC E2E signaling example
vTS NSD: From Lab to Live

- Scenarios portability, DevOps...
- Service Assurance in Production environment
  VisionWorks Mobile Infrastructure SA - MSA
- Mobile core
  Networks 4/5G
- Test lab
  Landslide
- Active Test Agent(s) - vTS
  Landslide PNFs/VNFs/CNFs
- Staging environment
  Landslide
- OSM
Tentative Next Steps

• Landslide vTS:
  • Adding Day-X scripts
  • CNFs
  • Adding Landslide vTS NS testing to a fully automated 5GC workflow
  • Multi-VIM vTS NS
  • Using other VIMs (VMware, AWS etc)

• Nice to have in OSM:
  • Ability to specify predefined flavor names in OSM descriptors
  • Not sure if use_existing_flavors really supported
  • Maybe adding DPDK-related VFND examples to OSM descriptors tutorials