Case Study

Spirent **Test as a Service**

Managed Solution for Accelerated 5G Deployments

Customer Profile

A tier 1 mobile operator, in transition to 5G, sought to deploy a 5G core in a multi-vendor cloud environment to enable faster innovation and position its 5G offerings favorably for the future.

Benefits

- **Faster time to revenue:** accelerated the launch of the 5G core by providing 5G expertise and a turnkey suite of validation tests
- **Improved agility:** new 5G core features can be developed, validated and released 3X faster than 4G
- **Reduced costs:** automated key development workflows and over 100 5G test cases, minimizing the need for new 5G resources
- **Reduced Capex:** 5G test infrastructure delivered as a service, avoiding significant upfront investment

Situation Explanation

Transforming to drive new 5G revenues. The operator wanted to be first to market with a 5G core so they could introduce advanced 5G services ahead of competitors. The 5G core brings innovations such as highly scalable network slicing which the operator needed to create new services that drive new revenue opportunities with consumers and enterprises.

To create new 5G services and compete effectively, the operator had to achieve a new level of agility. The 5G core's cloud architecture is designed for rapid, agile releases, but the operator's current organization and processes were built around traditional waterfall style releases that take months to complete.

The operator decided they needed to build a *Telecom Innovation Pipeline* which would allow them to collaborate with multiple network vendors to rapidly develop, test and deploy new 5G core features. The pipeline needed to enable releases in weeks, not months. While the operator had a clear vision of what it wanted to achieve, it lacked the expertise and tools to realize the vision and didn't have time build them.

Blazing a new trail into the unknown. The tier 1 operator decided to embrace a completely new approach to developing networks and services. Managing a cloud platform consisting of cloud infrastructure and software-based cloud native network functions (CNFs) required the operator to behave more like a software company, a major change from its role overseeing a network of monolithic elements.

In this new role, the operator needed to have greater control of the software provided by their network vendors. At the same time, the operator needed to divest themselves of certain infrastructure responsibilities they had traditionally managed, while still maintaining visibility of issues in their network. These were big changes with no roadmap and no certainty of success.

> **Operator: *"Does the new 5G CNF I'm launching break anything?"***

The operator realized they needed a robust CNF validation approach to ensure their new cloud native architecture would perform as expected. With each new release they needed to be able to confidently answer a simple question: *Does the new CNF I'm launching break anything?* Because CNFs were delivered by multiple vendors, the operator needed a strong and neutral technology partner to validate CNFs across vendors, where interoperability was a critical concern.

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New requirements for rapid CNF validation. The operator's testing of previous generation networks had been focused on validation of collections of network functions in well-defined physical network elements. With the shift to the 5G core and its cloud native architecture, these monolithic network elements must now give way to individual CNFs that may be deployed in traditional centralized locations or closer to the network edge to enhance performance.

This flexibility requires that new CNFs are validated both in isolation and as part of an end-to-end cloud network. To enable rapid collaboration and development, CNF validation must be automated and seamlessly integrated into systems for tracking feature requests, creating new builds and managing the status of testing and bug fixes. This combined approach is called Continuous Integration / Continuous Development (CI/CD) and is considered a best practice for accelerating cloud software releases.

Adopting CI/CD requires new capabilities:

- Implementing a CI/CD environment for multiple vendors with a constant stream of releases
- Integrating automated CNF isolation and end-to-end validation tests into the CI/CD environment
- Emulating the network to perform realistic validation including interoperability testing of vendor CNFs

5G Migration Challenges

- Increased complexity – especially new cloud native architecture
- Increased number of vendors and volume of software releases
- Requirement to take ownership for vendor interoperability
- Lab validation times have been increasing
- Inconsistent tools and methodologies between Dev and Ops groups
- Network on-boarding and activation are too slow
- Time to identify faults, isolate and resolve is increasing

Organizational inhibitors to change. Three internal groups were involved in the operator's initiative to create a Telecom Innovation Pipeline based on CI/CD: *Technology Development, Engineering and Operations*.

The operator faced several challenges to moving to a new collaborative model:

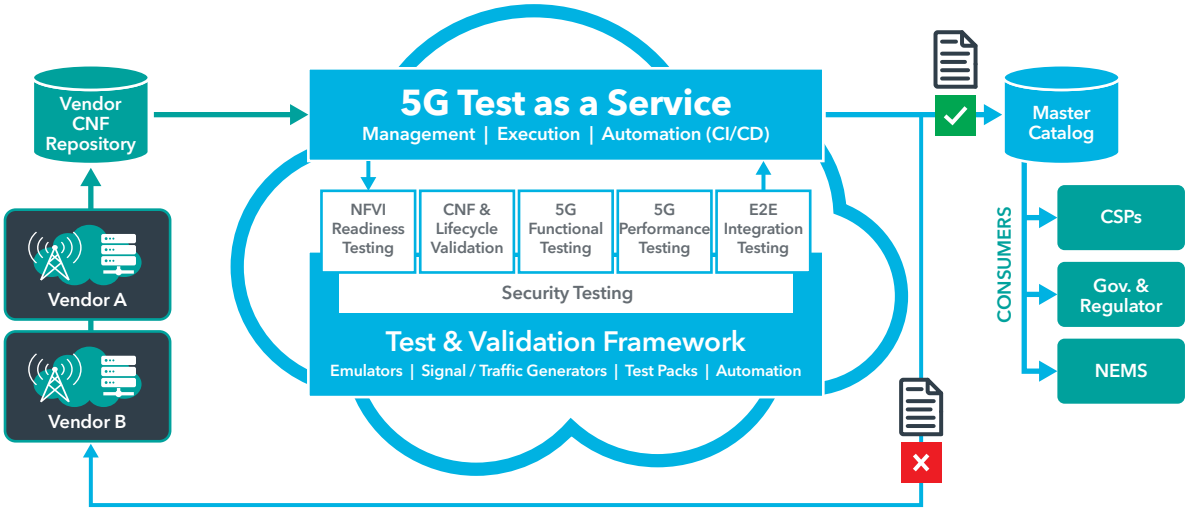
- *Technology Development* historically assessed the high-level feasibility of new technology but didn't provide test cases or best practices for validating the new technology. This meant Engineering needed to create these from scratch, without the benefit of months of lessons learned from concept testing, a time-consuming task.
- The *Engineering* test bed was focused on LTE regression testing. Their lab was not geared for cutting-edge 5G core migration to the cloud and the team didn't have the 5G or cloud expertise to build new validation tests.
- The *Operations* team needed to automate workflows to improve efficiency, but historically received mostly manual test procedures from Engineering which required additional operational automation work.

The operator needed buy-in across the organization before the CI/CD initiative could begin. Ultimately, these teams saw the move to a common testbed and automated development approach would address many of the legacy handoff challenges they faced and measurably improve their pace of 5G innovation.

Spirent's Solution

The operator selected Spirent's Test as a Service (TaaS) Managed Solution. When our customers don't have the expertise, time or resources to perform testing and assurance functions internally, Spirent offers a suite of managed solutions to perform these functions as a service. Spirent TaaS combines our test expertise, products and resource management capabilities into a bundled service that allows us to quickly deliver testing functions and seamlessly integrate these with other operator functions.

We began the TaaS project with our operator customer by engaging with key stakeholders from various groups to discover their requirements for implementing a CI/CD pipeline. Once requirements were agreed, we performed technology demonstrations and proof of concepts to validate our understanding and facilitate development of our managed solution operational procedures which covered people, processes and products.



Spirent's Test as a Service Managed Solution covered management, execution and automation of a CI/CD pipeline with automated validation testing of 5G CNFs and network functions virtualization infrastructure (NFVI) for multiple network vendors.

We took a phased approach to deployment working closely with customer at each step. The following solution elements were delivered:

1. A **CI/CD pipeline was built** in the operator's cloud environment to allow Spirent, the operator and the operator's network vendors to collaborate. An agile project to integrate our automated validation tests to the pipeline was created and managed using the pipeline.

2. We **deployed our core network validation** solution, **Landslide**, and our cloud infrastructure validation solution, **CloudSure**, in the operator's cloud environment.

3. We **developed, automated and integrated over 100 5G test cases** with the CI/CD pipeline, working with the customer's automation framework and test controller to automate test scripts. An additional 250+ test cases are planned to cover additional test needs. Tests cover both 5G Non-standalone and Standalone modes.

4. We started with a validation test suite for regressions and then **expanded this to include Isolation, Pair-wise and End-to-end (E2E) testing**.

5. As new CNFs become available, **validation tests are automatically triggered**. Our automation scripts reside in a Git repository connected to customer's test controller that recognizes new configurations, cloud templates, automation scripts and CNFs needing to be tested.

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

AMERICAS 1-800-SPIRENT
+1-800-774-7368
sales@spirent.com

EUROPE AND THE MIDDLE EAST
+44 (0) 1293 767979
emeainfo@spirent.com

ASIA AND THE PACIFIC
+86-10-8518-2539
salesasia@spirent.com

Results

- **Accelerated the operator's deployment of new 5G services.** The TaaS Managed Solution delivered critical 5G test infrastructure and expertise in a turnkey offering, substantially accelerating the operator's path to new 5G revenues.
- **Improved agility with 5G releases that are 3X faster than 4G.** Moving from legacy network 4-month waterfall releases to agile 6-week releases enables the operator to adapt to changing market demands much faster.
- **Improved operational efficiency by automating validation tests.** TaaS has delivered more than 100 fully automated validation tests to date with hundreds more planned, reducing the need for additional 5G resources.
- **Assured new CNFs would work across vendors.** Our vendor-neutral position and rich suite of interoperability tests ensures vendor CNFs perform both individually and as part of multi-vendor end-to-end systems.
- **Provided confidence the cloud platform would perform.** Our TaaS solution included a comprehensive suite of validation tests covering not only the 5G standalone core but also cloud infrastructure and legacy LTE core networks.
- **Helped successfully overcome key skill shortages.** As part of our TaaS offering, Spirent provided the 5G test and CI/CD expertise the operator needed to create a pipeline for rapidly building, testing and deploying new 5G core functions.
- **Reduced Capex.** Avoided the heavy upfront Capex associated with purchasing test infrastructure by delivering this as an integral part of our TaaS managed solution.

Why Spirent?

The tier 1 operator selected Spirent because:

1. Spirent is a trusted vendor-neutral test and assurance leader already used by all their network vendors and cloud service providers.
2. Spirent is recognized as the leader in 5G / LTE Core and cloud infrastructure / NFVI validation.
3. Spirent has the expertise to help design and implement a CI/CD model including integration of automated validation tests.
4. Spirent brought a mature Test as a Service model which matched the operator's need to accelerate 5G while avoiding upfront Capex.

Spirent. Promise. Assured.

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