

Tier-1 U.S. Service Provider Delivers High-Performance, Reliable IoT Services over Mobile Network

Software-Based Solution Saves Millions and Proactively Assures Service Quality for Thousands of Enterprise Customers

A Tier-1 North American service provider (SP) offers Virtual Private Networks (VPNs) for mobile and IoT services to enterprise customers. But evolving technological complexity, urgent new business goals, and rapid growth in their customer base rendered its slow, hardware-based testing inadequate. They turned to testing and assurance leader Spirent for a solution that met—and exceeded—their goals.

Background

When you're a major U.S. service provider (SP) offering Virtual Private Networks (VPNs) for mobile and IoT services to 5,000 enterprise customers—each one representing hundreds or thousands of devices—assuring the performance of these services is absolutely essential. Those customers include first responders, home security providers, and logistics and financial services on whom lives and livelihoods depend.

For the service provider, fulfilling the promise to their high-value customers of quality services and network is not only a differentiator; it's an existential imperative.

The Challenge:

The network operator had been following a legacy approach, a hardware-based solution that involved test gear at fixed aggregation points, such as hub or switching sites, that contained Packet Gateways (PGW). Active testing would generate synthetic traffic Over-the-Air (OTA) to test whether a user could reach the PGW from the customer access point.

While their process did include active testing, they could only test the top seven percent (175 out of 2,500) of their customers and even that would take over eight hours and a team of three people to manage the testing. Moreover, the tests had to be reprogrammed for each different customer. And even then, the OTA testing approach wasn't able to effectively isolate root causes between the radio network, the SGW/MME and the PGW leading to time-consuming, manual troubleshooting. The process was slow, labor intensive, and not scalable.

Despite the shortcomings, this process held them for many years. But three factors accelerated their decision to find an alternative:

- **New goals.** They wanted to test each customer once per hour and to continuously monitor the SLA for all of their customers, not just a tiny representative segment.
- **New complexity.** Virtualizing the PGW introduced a measurable increase in complexity. Previously, signaling had a primary and backup path and it was easy to isolate problems to primary/backup. But with virtualization, load balancing rendered isolating problems much more difficult.
- **New growth.** Over just a couple of years, the service provider leaped from 2,500 to 5,000 enterprise customers—and added swarms of new devices.

Rapid growth became both a blessing and a call to action for our customers.

Solution

It was clear that the service provider needed to change how they did testing if they were to keep up with the growth and complexity. When the SP went to their existing vendor, they proposed an expensive upgrade that involved the same slow, hardware-based system as before.

After a considered search, the SP reached out to Spirent, impressed with the company's history of providing test automation solutions in the lab. For this client, though, Spirent presented a more far-reaching solution, Spirent's VisionWorks.

VisionWorks: A Groundbreaking Solution for Assurance

VisionWorks for operational service assurance leverages virtual test agents (VTAs) and network emulation. It continuously monitors the quality of each of the critical enterprise mobile services that run over VPNs from the edge of the network to the enterprise customer's cloud networks.

Three elements that made this a revolutionary solution for this service provider:

1. Instead of physical test gear, with actual 4G smartphones, Spirent offered a software version of the User Equipment (UE) that could run on x86 resources in the network core.

The solution can run tests from other locations (interfaces) in the network, as it does not require specialized hardware at fixed aggregation points in the network. This made testing all customers practical.

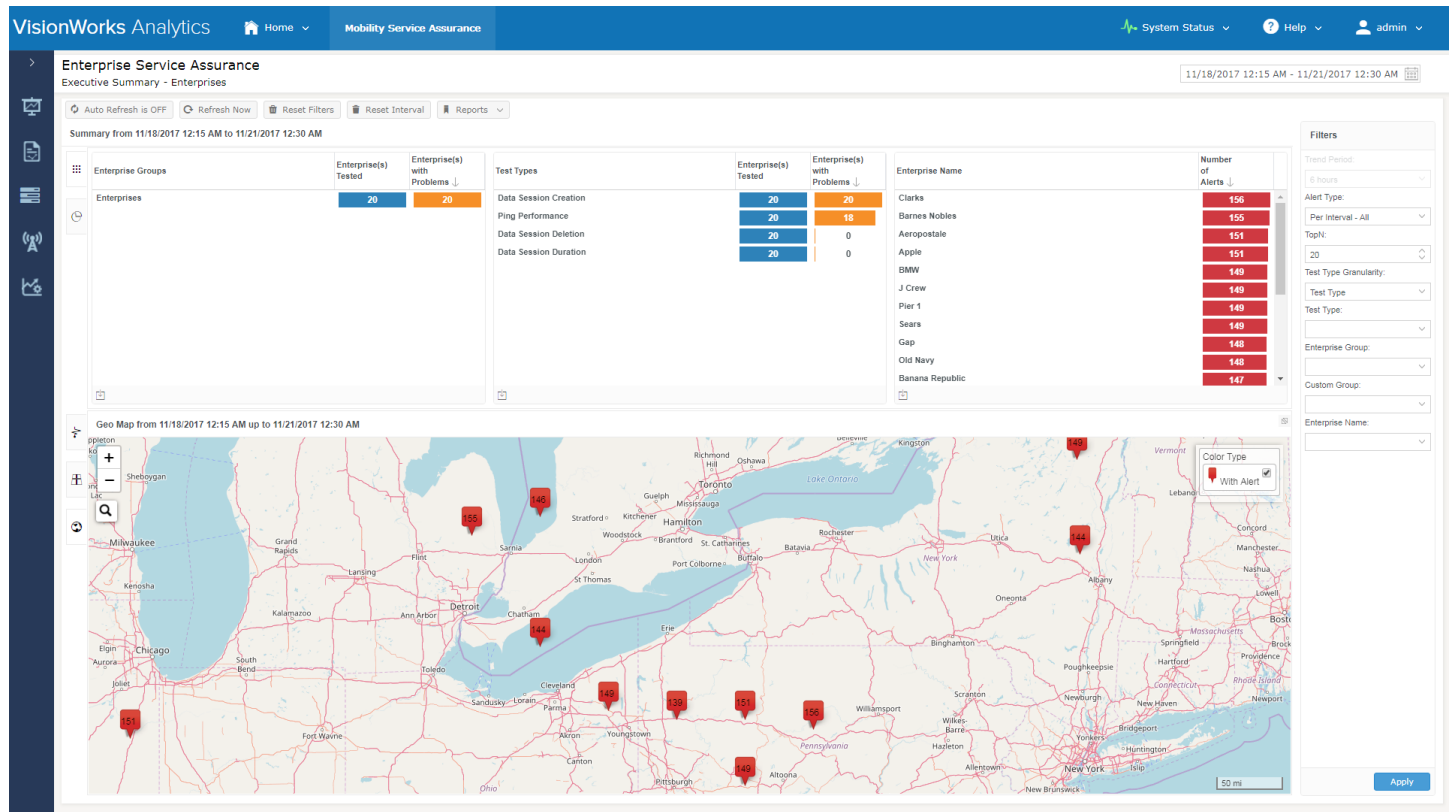
2. The testing does not go Over-the-Air but rather, emulates the UE with a "Virtual UE" that, from a network perspective, looks exactly like a UE.

Removing the OTA portion of the testing eliminated a source of errors that had no bearing on the objective of the tests. Instead, the tests emulate an SGW/MME, which sends session packets for virtualized UEs directly to the PGW over the S5 interface.

3. Since Spirent's solution is automated and scalable, the service provider can achieve (and significantly exceed) their goal of testing every customer once per hour. The controller automates the continuous monitoring of each customer service and is capable of handling large telecom data sets and processing billions of metrics per day.

In addition to standard connectivity tests, the solution has the capability to test higher-layer traffic including HTTP/HTTPS, which is becoming increasingly important as more mobile traffic is encrypted.

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Spirent's VisionWorks solution goes beyond performing tests and measuring the results. It provides active intelligence: analytics that automatically benchmark service quality levels and alert the operator to any deviations from established benchmarks. VisionWorks analytics have provided additional benefits by enabling this Tier-1 provider to:

- Prioritize troubleshooting by notifying users which gateways have the most issues, which test types failed, and which customers are affected.
- Reduce MTTR by narrowing the focus on likely causes of network issues. Hierarchy and relation analysis bring together data about the customers, gateways, and test types, allowing users to determine if an issue is specific to an enterprise, due to a gateway that serves many enterprises, or network-related.

- Prevent false-positive test results by defining alert conditions. For example, operations can be notified only when an alert persists for an hour. This saves time and solves problems faster than dealing with numerous alerts from multiple systems.

Results and Impact

Across all the dimensions of the service provider's VPN challenge, Spirent's VisionWorks solution delivered improvement. **Rather than only testing the top seven percent of customers, the scalable solution could test all 5,000 enterprise customers in a matter of seconds. The service provider automatically monitors each enterprise service every five minutes.**

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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.

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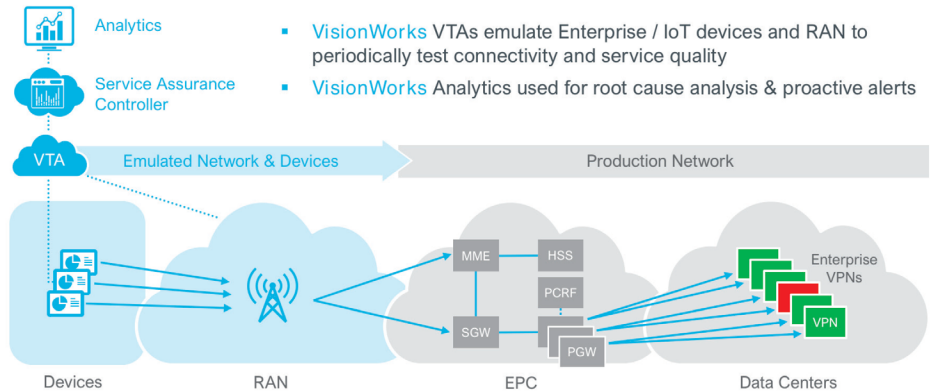
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Enterprise VPN Assurance

Validating Mobile Private Networks from RAN to Customer Cloud



The Numbers Speak Volumes

Goal: Test every customer once per hour. Reduce testing time by 87.5%.

Delivered result: Testing every customer at 5-minute intervals.
99% decrease.

The software-based VisionWorks solution was much more cost-effective, saving millions of dollars over a hardware-based solution that ultimately would not have met the service provider's goals.

Where Will They Go from Here?

As the ongoing virtualization of the gateways adds complexity, Spirent's cloud-native controller and virtual test agents enables the service provider to emulate traffic on new virtual gateways for several weeks before running live traffic. With this cloud-native solution installed on the service provider's telco cloud, they can continue to benefit as they virtualize their network.

Looking ahead, the service provider reports that they are now looking to expand the user groups and test cases so they can test the RAN address space. Thanks to the scalability and flexibility of the Spirent solution, the service provider is exploring building on their success in the enterprise space by deploying the solution with consumer wireless services.

Find the Right Solution for Your Testing Needs

Other service providers, facing similar challenges as those highlighted in this case study, will find Spirent VisionWorks to be a lightweight and flexible solution that can help improve the quality of services and save millions in operating expenses.