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Automating xDSL, G.FAST and Vectoring Regression Testing

for major European service provider

With the scale, spread, and bandwidth of internet services rising exponentially, internet service providers need a way to quickly ensure their infrastructure can handle new demands. Here's how Spirent helped a major European service provider adopt automated regression test cases to simplify and accelerate its testing.

The Challenge

With modern consumers and businesses consuming more bandwidth-heavy services than ever before, ISPs like have moved to offer faster cable infrastructure such as G.FAST and Vectoring. At the same time though, the company must continue supporting existing technologies such as VDSL and ADSL and ensure that new infrastructure does not interfere with existing services.

Assuring both new and old services demands extensive regression testing. However, with largely manual regression test cases in place, the process was inefficient, slow, and resource-intensive. Previously, regression testing had been handled by a single member of the service provider team. With the new system, the service provider needed a more modern approach that could be supported by multiple engineers—as well as by engineers from a trusted testing partner.

An automated approach would offer much faster regression testing, while also ensuring fewer defects slipped through the net. But creating new test cases for the service provider presented several obstacles that needed to be overcome:

Integrating with Existing Equipment and Processes

The major ISP already had sizeable investments in a variety of testing equipment and processes. It wouldn't be economical to discard these in the shift to automated regression testing, so it needed a test partner that could adapt to and integrate with its existing systems.

Spirent worked with the service provider to ensure its new test cases could support its existing investments—specifically its spectrum analysers. While the Spirent base testing solutions and cases do not support this equipment, they were customised to the ISP's specific needs to ensure the integration needs were met.

Supporting a Range of Connections

With complex infrastructure and network environments, the European service provider needed test cases and hardware that could support dozens of connections to both digital subscriber line access multiplexers (DSLAMs) and customer-premises equipment (CPEs).

Specifically, the ISP wanted to automate several test bays and support switching between up to 48 DSLAM ports and 12 CPEs for DSL bays, and up to 48 CPEs and five cable lengths for Vectoring bays.

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The Solution

The service provider asked Spirent Professional Services to help solve its testing challenges and automate its test bays.

Spirent developed a custom testing environment for the ISP. Based on our iTest solution, it offers an intuitive web UI that empowers engineers to quickly create and queue automated tests to run at any time of day.

Spirent also customised the solution and accompanying support package to meet the service provider's needs with:

- Support for its existing spectrum analysers
- Dozens of DSLAM and CPE ports
- Extensive support from the engineers that designed the test cases

Test Approach

Spirent's customer needed tests covering xDSL, G.FAST and Vectoring bays, and automation of the test bays across three categories:

1. single pair VDSL/ADSL bays

2. single pair G.FAST bays

3. vectoring bays

The Test Equipment

Hardware

- 48x xDSL CPE under test
- 3x xDSL WTI Power Controller
- 1x xDSL chassis
- 2x L2 switch
- 3x xDSL chassis
- 1x Terminal server
- 1x Application server

Software

- Customised eART system
- Microsoft Windows Server 2016
- SVN or GIT repository
- Spirent iTest Runtime
- Spirent iTest Enterprise

The Test Bays

Despite covering the range of xDSL and modern network technologies, the test bays used similar setups: a DSLAM connection on one side, a CPE on the other, and Spirent testing equipment in the middle.

In between these connections, a signal generator and injector simulate user traffic.
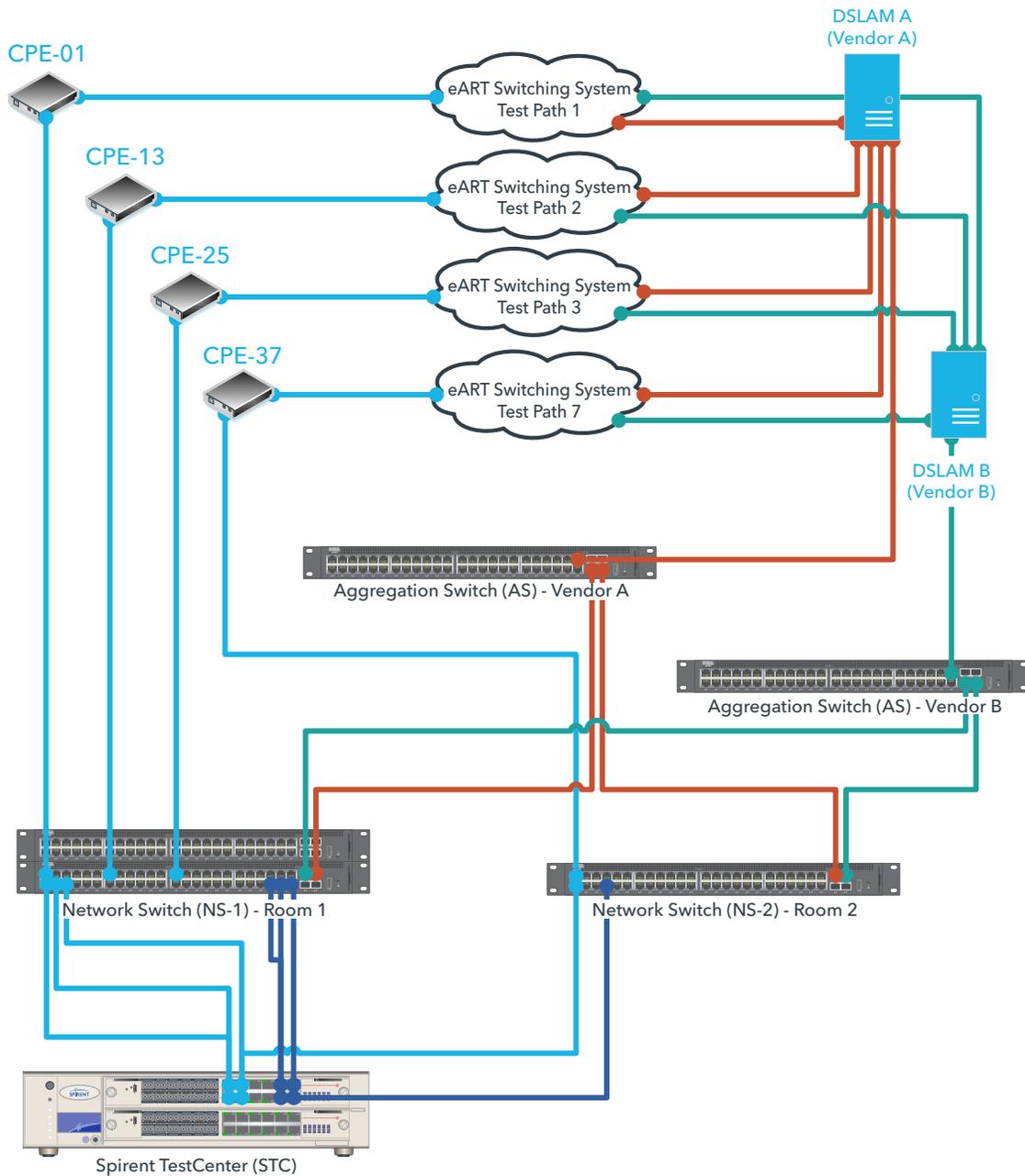
Establishing Test Cases

Within the test bays, Spirent automated several test cases to help the service provider to simplify its testing and improve productivity. These test cases include:

- **Rate vs. Reach** to ensure the DSLAM/CPE pairing could achieve minimum upstream and downstream rates and noise margins

- **Rate vs. Reach Custom** to verify that a DSLAM/CPE pairing continues functioning at successively increasing loop lengths

- **Bit Swap** to make sure DSLAM/CPE pairings can maintain synchronisation over time, even in the presence of fluctuating noise levels

- **Combined US-DS ReTx** to check if DSLAM/CPE pairings will automatically retransmit packets that are lost in the downstream direction due physical layer errors

- **Error Reporting** to ensure the systems can accurately report errors to engineers and other users

- **SRA** to verify that the selective routing arrangement (SRA) is functioning correctly

- **STC Forwarding Performance** to measure how the system can forward L3 IP packets to different CPE, DSLAM and profile combinations

- **DSLAM Integration** to ensure different DSLAM cards integrate correctly with iTest procedures

Solution Spotlight: Spirent iTest

- Fully automated Testing-as-a-Service
- Enables rapid, reusable test case creation
- Simplifies continuous, automated testing
- Increases bug detection rates

The Results

By creating the automated test bays and cases outlined above, Spirent helped the ISP to achieve faster, more productive regression testing.

Greater testing productivity. With a fully automated approach to regression testing, the service provider can test faster, and ensure more errors are caught before they can affect services. The ISP can also test outside of business hours and make better use of its technical teams and resources.

True peace of mind—today and tomorrow. Spirent Professional Services includes on-going support from the engineers who created the test cases—ensuring continued system reliability and peace of mind. This was particularly important for a company that has so many customers relying on its services

Integration with existing systems and processes. We customised our iTest solution to meet the customer's needs—integrating with its spectrum analysers and supporting connections to its existing hardware.

Next Steps

Since automating its regression testing environments, the service provider has been able to test faster using a more modern test environment.

And with extensive, bespoke support from Spirent engineers included in the package, the customer will continue to enjoy a reliable, dependable testing system in the future.

Contact Us

For more information, call your Spirent sales representative or visit us on the web at www.spirent.com/ContactSpirent.

www.spirent.com

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

US Government & Defense
info@spirentfederal.com | spirentfederal.com

Europe and the Middle East
+44 (0) 1293 767979 | emeainfo@spirent.com

Asia and the Pacific
+86-10-8518-2539 | salesasia@spirent.com