iTKO recently teamed up with technology consulting firm pureIntegration to deliver a complete LISA automated test suite for a leading Cable Service Provider, and ensure high quality in a critical provisioning application environment. We talked with Daniel Perovich, test engineering team lead for pureIntegration, about their experience applying LISA to streamline test execution on the project.

**The Challenge**
For leading cable service providers, timely and accurate service provisioning is the lifeblood of the business. While these systems may have been in existence for years, there is a constant level of new functionality being added to the process as new service offerings and packages are rolled out to meet the demands of new and existing subscribers. Accuracy and clarity at the point of provision are critical to customer satisfaction.

The provisioning application was a complex application with several components that needed to interact at runtime in a secure transaction environment. The client’s staff had built custom Java test harnesses that allowed test engineers to manually exercise the elements of the application. Challenges included:

- **Constrained QA resources.** Continuous updates to the system from the engineering team made it difficult for a small QA team to validate all of the possible issues each change could create.
- **Long cycle time for test execution.** Manually running the suite of about 300 regression tests using the custom harness as a test tool would take up to two weeks for the team, which delayed release cycles.
- **Difficulty documenting a manual test suite.** Though some test scripts and events were stored in the Test Director test management tool, much of the process of validating the system required subject matter experts applying their personal knowledge to look for issues within the architecture, therefore regressions became difficult to execute in a consistent, repeatable manner.

With an eye toward test reuse and agility, the integration and testing team considered several options for a way to increase quality and improve upon the value returned from testing efforts, and decided upon the iTKO LISA solution, due to its strong test automation capabilities and ability to reuse existing test harnesses.

**Why iTKO LISA?**
The first motivation for using LISA was not SOA testing, it was testing a proprietary communication protocol – the set of Java test harnesses TWC was using to expose the underlying methods of the provisioning application.

“Our vendor analysis proved LISA was capable of integrating a lot of the custom tool development that was already developed in Java, so the extensibility of LISA was very much a bonus,” Perovich said. “We were able to reuse a lot of the clients’ proprietary testing tools and scripts to talk to these unusual protocols, and we didn’t have to reinvent the wheel.”
LISA contains a rich LISA Extensibility Kit that allows teams to rapidly develop direct interaction with the custom components found in most large enterprises. Once a component appears as a step in LISA using this process, it appears to the tester just like any other point-and-click testing step, so there is no need to code a test client, or test these components in isolation.

“Our second reason was the ability to create the back end verification scenarios with LISA. The client’s process is very technical and thorough in requiring deep back-end verification,” said Perovich. “LISA rolls up the technical aspects of functional testing, letting a non-developer use the tool. So the ability to abstract the test and take out the coding from the testing process would allow a non-development team to execute and get results from the test.”

The Solution

“If your tests are not built correctly, there is no sense in automating them” said Perovich. “Extensive effort was put into clearly defining and improving the manual test case documentation at the onset of the project. At the same time, developers were prototyping the invoke and verify interfaces to ensure no design flaws were evident.”

The small team of consultants from pureIntegration and an expert resource from iTKO decided to enable the test automation process in three project phases:

- First, the team used the LISA Extension Kit to write Test Steps that would operate the proprietary Java APIs in TWC’s existing custom test harnesses. This produced a much simpler graphical control interface in LISA, allowing test engineers to input data into the custom harnesses, and make assertions against the system in a point-and-click fashion, using test terms they were already familiar with.
- Next the existing suite of approximately 300 test cases were modeled in LISA, tied to test data sets, and entered into Mercury Quality Center test sets that could be run either at the time of a new release or on a scheduled basis. As new functionality was introduced into the provisioning system releases, the team spent their effort creating new tests, and adding those to the regression suite once the new functionality was verified to work correctly.
- Finally, the team created tests to validate deeper back-end system behaviors, including verifying entries in the SQL databases and LDAP servers. Results were also checked by having LISA employ regular expressions to parse through the text in system log files that were recorded as part of each transaction.

Rather than change their process, LISA’s integration with Mercury Quality Center allowed the team to replace a set of written test scripts with a catalog of verifiable LISA test cases, launch these tests, and store the results within TWC’s existing test management platform. LISA’s ability to configure the test data and system state before and after test runs also came in handy.

“We gave the test engineer the capability to play with a couple toggles when they were running the test suite,” said Perovich. “One was to either leave or clean up the data in the system after a test execution, so each test case could read that configuration parameter, and either clean up the data or leave it there after the test execution. And similarly, if the test case fails, they could choose to leave or clean up the data. That added a level of complexity, but added a great deal of root cause information for the test engineers, especially when the test case failed.”

The Results

Using LISA, pureIntegration was able to take a manual test execution process of roughly 300 tests that used to take two full weeks to run, and automate that same test suite overnight.

“On the first run of our test suite, we identified 2 issues in an overnight time frame. One of the defects we found could have been caught by the manual testing, but another issue would never have been caught without the extended verifications made possible with LISA-built solution,” said
Perovich. “Right there that created a lot of excitement. And saving 2 weeks in each test process has created a lot of excitement too.”

Naturally, there is a lot of room for human error in manual testing, or rote testing from a procedural script. Even if a test script is constructed by expert testers, not knowing or remembering what is expected to be tested, or exactly how the results should be documented is a primary concern, as the question of “who should test the test” arises. The team also used the automation project as a justification for improving the quality of the test suite itself.

“Previously, manual testers used to manually send transactions into the system using their own test harness to touch 5 or 6 different systems and look at the results,” said Perovich. “We were able to find a lot of instances where the expected data within databases were completely incorrect. Sometimes the test case was written incorrectly or engineering changed something in the provisioning system, but didn’t necessarily communicate the expected result to the QA organization. It is so important that before any test case is automated, we communicate to the testers that it is still ‘garbage in, garbage out,’ and you really need to have the diligence to know that the test suite that you are automating is rock solid.”

With LISA fully enabled and automating the test execution, the team could now perform a complete regression suite in hours for every feature enhancement instead of only having the time to test what they thought had changed in the environment. This level of automation will prevent the “unintended consequences” that can cascade into software when a change in one area affects the results elsewhere in the implementation.

**Next Steps?**

“LISA will definitely reduce the number of issues released into production,” said Perovich. The reduction is estimated to be at least 10% with the first release of automation alone. Future releases are planned and will reduce issues released into production by upwards of 40%. “This automation drastically reduced the time and resource requirements of executing tests, allowing those engineers and testers the ability to focus on testing what is considered new functionality, which really required someone skilled looking at it.”

While the team needed to utilize existing test harnesses on the legacy applications and really think about modernization of the testing process first, LISA’s ability to conduct complete, collaborative and continuous SOA testing was still important to the future expansion of the ongoing quality effort.

New components will be brought on in a more agile, services-based fashion, as much of the time spent testing existing functionality can now be spent on new integrations. Once the new functionality is tested, it can join the regression test suite and be automated with LISA. The partner and client are confident that adoption will continue to increase.

Aside from the continued improvements in quality and reduced support time enabled at the client, iTKO and pureIntegration can now identify other customer situations where this level of test automation with LISA would be a good fit.

**About pureIntegration**

pureIntegration is a systems integration company with a track record of achieving measurable business results. pureIntegration has a strong delivery background within telecommunications, cable & media industry segments, built on our understanding that project success is achieved when business goals are aligned with the proper enabling IT capabilities. Our resource team has extensive industry experience, and is prepared to assist our clients via a thorough understanding of their operating environment and business objectives.