



AVISTO

EASTERN EUROPE

CASE STUDY

HW & SW BASED CO-VALIDATION DELIVERED BY SW QA SERVICES



Case Study: HW & SW Based Co-Validation

HW & SW QA Services

To meet some specific clients' requirements it was necessary to develop both, test HW and SW.

Since a huge number of DUTs must be tested in each test cycle, high level of automation is needed.

Due to the amount of data generated, efficient databases storage and test results visualization developed from the scratch was required to meet clients' needs.

Also, HW and SW test environment as well as data has to be accessible from multiple sites in different countries.



Comprehend the Client

Starting from the clients' idea work on requirements, architecture, design and development to execution and reporting.



Goal

Ensure quality and compatibility within the complete product line.



Solution

Develop test HW and SW, execute tests on all major operating systems, report bugs and issues noticed during the test cycles.



Results

Fully automated HW/SW test environment that ensures complete product line quality and compatibility.

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Comprehend Client

Starting from the clients' idea work on requirements, architecture, design and development to execution and reporting.

Technology

Multinational semiconductor company

One of the biggest semiconductor company in the world with a great history of designing and manufacturing integrated circuits.

An innovative thinker and solution provider in numerous industries, with key focus on empowering the society of future.

Client successfully delivers wide range of solutions from analog to embedded silicon chips making an impact in even technologies we encounter on daily basis.



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Goal

Ensure quality and compatibility within the complete product line

Quality & Compatibility

Within product lines

Starting from the clients' bare idea our primary goal was to thoroughly understand and transfer client's ideas into a project requirement specification.

Being dedicated to the quality of delivered products, our customer had two clear requirements:

- Ensure **quality** of the products;
- Ensure **compatibility** within the product line.



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Solution

Develop test HW and SW, execute tests on all major OS, report bugs and issues.

Debug Stack Microcontrollers product line

Testing the complete microcontrollers product line debug stack.

Debug stack is comprised of:

- dll being part of the IDE, running on the host computer;
- debugger FW;
- microcontroller FW.

In order to test debug stack on all customer's microcontrollers, a **huge number** of devices has to be tested.



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Solution

Develop test HW and SW, execute tests on all major OS, report bugs and issues.

Test Rack

Made in-house

Devices are stored in custom developed test racks. Each test rack contains one control card and a few test cards. Each test card contains about 10 different microcontrollers.

Control card addresses required microcontroller and routes debugger signals to it. It is controlled from the host computer and test program by the USB interface. The same applies for the debugger.



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Solution

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Proprietary SW test framework

Written in Python

Test Framework is entirely written in Python 3 using different additional modules like pyserial, pyodbc, ctypes, multiprocessing, etc.

Test framework contains command dispatcher, configuration files parser, HW controller, database controller, test result generation module, etc.

It executes test cases which are also written in Python. Each test case contains different test steps according to the test specification.

Test can be started using CLI (Command Line Interface) or Jenkins (Continues Integration Tool).



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Data Storage and Visualization

There are three different mode of storing results: using SQL Server remote database, using local SQLite database or writing results in XML file.

Test report is generated automatically and can be in Excel or HTML form. It is multi level document containing detailed results as well as statistics and overviews.

Tests are designed and executed at Avisto Eastern Europe and results are stored in database at customer site. They are browsed via Apache WEB server running at customer's site and presented on the local machine.

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Results

Delivered software is bug/ issue free and quality requirements are met

4.5x Time reduction

of test cycle

- More the **20 in-house designed HW test racks** shared with the client
- Test racks used in other clients' BUs which was not initial requirement
- Test cycle time reduced from **18 days to 4 days**. This is counted from the time when first level of automation was already implemented until present day.
- Average number of executed **tests per test cycle 63000**

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Results

Delivered software is bug/ issue free and quality requirements are met

> 400 devices
Complete product line

- Tested representatives for more than 400 different devices
- Maintenance over 690 issues
- Used new **WEB technologies** like Node.js and React to enable real time test results visualization with user authorization.
- **Computer Vision** used to enable test engineer to draw desired test report table layout on the paper, which brings the whole new level of interaction with the test framework.

ABOUT

Avisto Eastern Europe

Avisto Eastern Europe is a service company specialized in software engineering with extensive expertise in the area of Application Software, DevOps, Embedded Software and Quality Assurance & Automation. Established in 2008 as a fully owned subsidiary of Avisto, a French-based company and a member of Advans Group, Avisto Eastern Europe with its development centers in Belgrade and Novi Sad (Serbia) successfully delivers complex projects and provides support to top-notch international enterprises, highly specialized mid-size businesses, and startups.

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