

Keysight Eggplant Revolutionizes Testing for DB Netz AG's Railway Operations

Eggplant brings automation to DB Netz, enabling end-to-end testing across both modern and legacy systems, while maintaining source code and security

Introduction

DB Netz AG is the railway infrastructure manager for the Deutsche Bahn AG, the German National Railway. With 600 workstations for dispatching trains and traffic control in eight operating control centers across Germany, DB Netz is the second largest transport company in the world and manages the largest rail network in Europe.

Challenges

We spoke to Rico Feist from the IT Projects Railway Operations team to understand what challenges DB Netz were facing and how they came to choose Eggplant test automation software to resolve these.

Privacy and security

Maintaining accuracy and security holds the utmost importance when managing railway infrastructure and train control systems for 23,500 trains across over 33,000km of track daily. In a highly regulated industry, failing to keep high standards risks passenger safety and incurs financial penalties through delays.

Keysight Eggplant excels at “black box” testing, having a long history of testing high-stakes situations in secure environments because its intelligent, non-invasive technology enables software teams to automate testing without interacting with the codebase.

Systems that restrict access to the source code require black box testing to remain private and secure. Testing at the graphical user interface (GUI) is the only way to test thousands of scenarios quickly and accurately at scale while keeping the source code secure.



Figure 1. A TCMS workstation in one of the eight operations control centers based throughout Germany

Accuracy and precision

A Windows-based platform, the train controlling management system (TCMS), handles signal points to indicate when trains should accelerate or slow down and manages train destinations, station stops, and which tracks to use. Screens display so much information and real-time modeling of train journeys, it is vital to ensure accuracy to prevent delays, passenger refunds, and financial penalties.

To maintain accuracy, the TCMS is hardened for security, making it impossible to install testing software. All connections to test the TCMS must utilize remote desktop protocol (RDP) or virtual network computing (VNC), further complicating the testing process.

Furthermore, the software to be tested is developed in JAVA and uses canvas controls to display hundreds of dynamic lines representing trains and their journeys from station to station. Regular testing software cannot access or recognize the lines drawn within the canvas.

As the TCMS is responsible for controlling train journeys, slowing down, and speeding up trains via signal systems on the tracks and inside the trains to minimize delays and prevent collisions, nothing must interrupt the software.

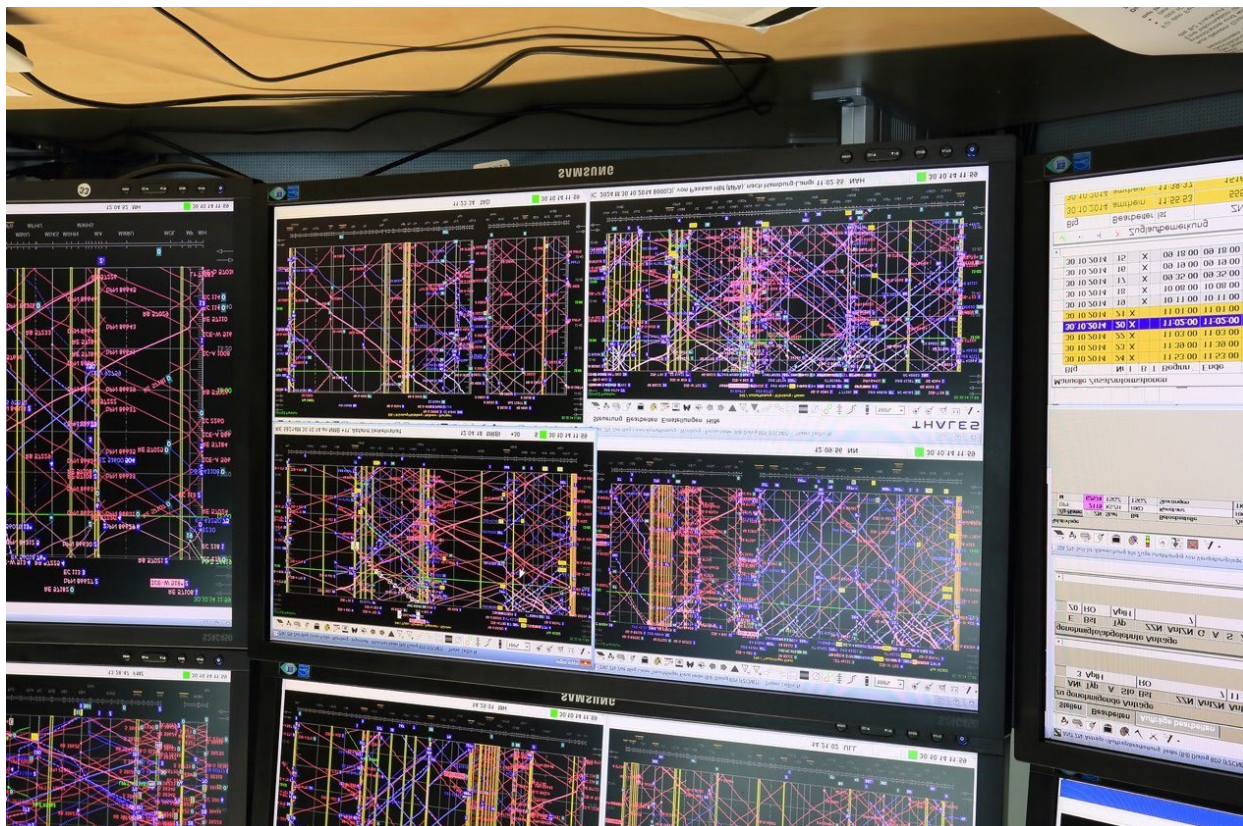


Figure 2. Hundreds of dynamic lines depicting real-time modelling of train journeys that require image-based testing

The Eggplant experience

When looking for the appropriate test automation software, DB Netz found no open-source test automation market tools that excelled at image recognition and could integrate with Robot Framework, which is vital to create test cases.

Keysight Eggplant was the only solution suitable for such a complex UI. Eggplant's intelligent computer vision validates the signals, track information, and train journeys at the pixel level.

Eggplant's ability to test the TCMS and JAVA-based GUI user controls, like button and text fields, without needing to access the codebase proved essential to ensure multiple actions on the screen remained operational.

Furthermore, Eggplant's ability to automate repetitive functional regression testing proves crucial for ensuring accuracy when updating the TCMS every three months.

Future plans

Rico informed us that DB Netz has identified several areas in which Eggplant can continue to contribute to enhancing business efficiency. One such area is to verify their environments daily, which is presently a manual process. Additionally, the business is exploring the possibility to further integrate Eggplant into their workflows by leveraging GitLab pipelines.

Key outcomes

- DB Netz has successfully automated 200 regression test cases, all of which were previously performed manually.
- They can now conduct daily smoke tests, reclaiming almost a full day per week that was previously spent on test runs.
- Eggplant's non-invasive process critically maintains the security of the source code, considering the prohibition of software installation on the target system within their production environment.
- Given DB Netz's assortment of legacy systems, Eggplant's technology agnostic solution enables consistent testing approaches across both legacy and modern systems.

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