CASE STUDY

KJRs Role in Validating Rail Track Sensing System

Project: Broken Rail Detection

KEY RESULT 1

Provided teams with reusable test procedures and a comprehensive knowledge base

KEY RESULT 2

Demonstrated strong technical capability, ensuring precise execution and a clear understanding of the system

KEY RESULT 3

Redefined and updated outdated requirements documentation

BACKGROUND

KJR's longest-standing customer, a global technology company specialising in the Transport & Freight industry, implemented a digital/analog sensing system to track the state of the rail tracks that distribute large loads for an end-customer in Western Australia's mining areas. The system gathered information using laser frequency changes, tracking of brake pressures and the use of GPS (Global Positioning Systems) to detect anomalies and compare against known features. This data was gathered on moving trains and sent to a central tracking system. This technology company had developed this system and needed to carry out testing of the full suite of use cases that had been identified.

CHALLENGE

Only a small subset of the requirement use-cases had been developed into formal test documents.

KJR were engaged to create new official test process documents to cover off the missing use-cases, and in parallel, execute those test documents (providing evidentiary documentation) and have them formally signed off by KJR QA and the customer. KJR adhered to guidelines set out under EN 50128: Railway applications. This international standard sets stringent requirements for the development of software used in railway control and protection systems.

SOLUTION

KJR Consultants familiarised themselves with the testing environment that was set up to simulate the movement of trains on the track, and worked with the customer's Development Team to produce test process documents. This entailed understanding the "SUC" (System Use Case) document that had been prepared in conjunction with the end-user. Preparation of test documents was time consuming as each SUC item had several high-level outputs that needed to be checked, which meant understanding internal messaging logs between the system components in order to verify system quality.

In addition, KJR engaged software developers to assist with expanding and enhancing simulation tools to carry out specific simulated scenarios.

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DELIVERABLES

- Test Process Documents covering off sets of system use cases

- Execution reports of the released process documents

- Simulator Software enhancements which were reflected back into customer repositories

- Virtual machines to replicate key components to allow for more parallel testing

KJR also produced analytics providing estimations for how long each new specific run of a test document would take. This is important information to allow budgeting for full format testing of each release.

KEY OUTCOMES

- KJR was able to deliver full test execution of no less than 6 software releases including 3 major release upgrades.

- All SUCs considered testable had full official test documents produced

- Processing Unit Simulator upgraded multiple times to handle new features and scenarios

- Clarification and re-organisation of SUC documents to map more closely to actual delivered product

VALUE TO CLIENT

- Reduced time-to-market for new releases

- Lower testing overheads due to automation and reusable test cases

- Improved product quality, reducing maintenance and defect costs

TOOLS & TECHNOLOGIES

Python, Virtual Machines, QNX - Realtime Unix OS, Docker, Microsoft SQL Server, GPS Tracking