CANTATA

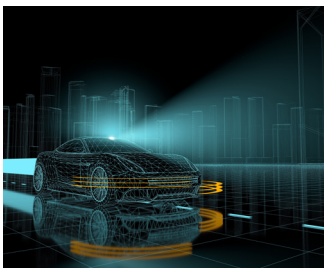
QA SYSTEMS
The Software Quality Company

SECTOR Automotive

STANDARD ISO 26262

Case Study

Hitachi Vantara



Autonomous Vehicle Guidance

ABOUT THE COMPANY

Hitachi Vantara Vietnam (formerly known as Global Cybersoft was founded in California in July 2000 and has been a member of the Hitachi Consulting Corporation since October 2014.

Hitachi Vantara Vietnam has designed and implemented embedded systems software since 2003, offering a broad range of embedded software development for consumer electronics, automotive, healthcare, telecommunications and IOT.

www.globalcybersoft.com

"Cantata was a great tool to use for white-box unit testing on our project"

Background

Hitachi Vantara were contracted to design and produce software for autonomous vehicles using the Adaptive AUTOSAR platform. This software, known as SelfDrivingAssistant, was written in C++ and was run on an MCU as a service application for use inside self-driving cars. SelfDrivingAssistant was designed to detect external inputs from the environment, analyze them and then decide on an optimal output or decision that the self-driving car should make. As this application was safety critical, the project was classified under the international automotive software safety standard ISO 26262 (ASIL D) and the coding standard MISRA C++ 2019.

Connected Autonomous Driving Systems

Tool Selection

Hitachi Vantara required a certified testing tool that could execute instantiated template classes in C++ on the MCU and the verification evidence required for certification to ASIL D. Due to the complexity and safety critical nature of the project, they looked for a vendor with extensive experience in the automotive industry and a tool which was pre-certified for use under ISO 26262.

Hitachi Vantara had previous client experience using Cantata for C code and were asked by their end customer (a global Tier 1 automotive supplier) to evaluate Cantata for this project. The customer, who was also their client, set the requirements for tool selection and Cantata was chosen after evaluation. Pham Hong Son, Manager for Consulting Services at Hitachi Vantara recalled **"I was impressed with the capabilities in Cantata since it was able to support many testing levels (Unit, Integration and System testing)."** Support for C++ and the flexibility in performing testing at these various levels was the deciding factor in the acquistion of Cantata.

CANTATA

QA SYSTEMS
The Software Quality Company

ISO 26262:2018 Certified

Working with Cantata

Initial stages of testing began with unit testing and integration testing on their complex code. Hitachi Vantara also used Cantata code coverage at system level tests, giving them a complete picture of what code was tested across all the stages of testing.

Hitachi found the built-in tutorials and the detailed documentation very helpful in understanding the testing of C++ templates. Pham Phu Quynh, a consultant for Hitachi Vantara was pleased with the level of support received, stating that **"QA Systems support helped us promptly to keep the project on time"**.

Project Development

Hitachi Vantara appreciated that they could use their own makefile structure to build and run Cantata tests with parsing of their nested templates. Test scripts in Cantata are also templates, preventing duplication of effort by allowing reuse of test templates. Hitachi Vantara found the interface easy to use, in particular the clarity of the tool and the test case options for Cantata were very useful.

Using white-box testing and the AutoTest capability in Cantata, Hitachi Vantara were able to access and check private methods and data automatically. According to Pham Phu Quynh, a consultant at Hitachi Vantara Vietnam **"Cantata was a great tool to use for white-box unit testing on our project. It provided a good test report with very clear information that helped us identify problems in our source code."**

They also found the code coverage on their templates impressive, because it reported the coverage obtained by the specific specialization type on which the template was instantiated, not just on the generic template code.

Conclusions

Overall Huy Van Doan, Branch Manager at Hitachi Vantara Vietnam found Cantata to be a **"great tool for testing"**. With the ability to see intermediary instrumented source files they were able to overcome the challenges presented by testing their complex code. The end customer wants Hitachi Vantara to continue using Cantata for both C and C++ testing in future because of its flexibility for all levels of testing to ISO 26262.

He highlighted the standout features in Cantata as **"being able to parse source code, add test cases, run tests and generate reports automatically reduces testing time"**. Pham Hong Son, Manager for Consulting Services added **"with the requirement of the highest safety standard and level in our automotive project, Cantata met and achieved the requirement and significantly contributed to our project success and customer satisfaction"**. He finished by saying **"we are looking forward to the new release of Cantata in coming time, so that we can serve our customers better and better."**

All case study text has been approved by the relevant customer.

CERTIFICATION

Cantata has been classified as usable in development of safety related software up to **ASIL D** as defined by the **ISO 26262** standard.
TCL1 can be reached.

SGS TÜV SAAR

CERTIFICATE NO FS/71/220/20/0626 PAGE 1/1

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PROJECT NO.-ID K3UX-AU10

LICENSED TEST MARK

CERT. REPORT NO. K3UX0017

Tested according to
IEC 61508:2010
ISO 26262-6:2018; clause 11.4.9
EN 50128:2011
IEC 60880:2006
IEC 62304:2015
EN 50657:2017

Certified product(s)
Cantata, Core product

Model(s)
Version: 9.1; Build_id: RELEASE_9_1_3

Technical Data and Parameter
Suitable for verification of safety-related software acc. to:
- ISO 26262 up to ASIL D,
- IEC 61508 up to SIL 4, class T2 tool
- EN 50128 up to SIL 4, class T2 tool
- IEC 62304 up to SW safety Class C
- IEC 60880 for category A functions
- EN 50657 up to SIL 4, class T2 tool

Specific Requirements
The certificate is based on voluntarily tests. Any changes to the design, components or processing may require repetition of some parts of the pre-qualification in order to retain the certification. The certificate report is an integral part of this certificate. The safety related application guidelines shall be maintained.

Certification Body for Functional Safety SGS-TÜV Saar GmbH

Munich, 03.12.2020
Gudrun Neumann

CERTIFICATE

For information on tool certification, please visit:
www.qa-systems.com/tools/cantata

MORE ON AUTOMOTIVE SECTOR:

Our Automotive Sector Briefs provide more information on how Cantata was successfully used by relevant customers in various projects worldwide.

All Sector Briefs can be found on the QA Systems website.

"a great tool for testing"

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