

Embedded Code Analyzer Solution

Product Engineering



Embedded systems are becoming increasingly sophisticated, with rich software features and shorter product release cycles, given the rising demand for IoT-based applications. Original equipment manufacturers (OEMs) need to ensure superior code quality for multi-threaded, multi-core software, while addressing security issues. Detecting problems early on is vital to business continuity, which calls for streamlined, yet exhaustive, quality assurance practices. Moreover, companies need to comply with stringent industry standards such as ISO 26262 and MISRA C, necessitating the use of efficient tools for software quality management.

Tata Consultancy Services' (TCS') Embedded Code Analyzer Solution helps automotive, industrial, medical devices, and defense manufacturers improve software quality and boost compliance to industry process standards, by delivering zero-defect code consistently. It analyzes applications based on C and C++ to identify potential defects by employing data flow analysis, semantic analysis, and abstract interpretation, thereby validating all execution paths.

Overview

With the proliferation of connected devices, embedded systems are being designed with advanced features that enable them to process and analyze huge volumes of data. Applications like advanced driver-assistance in the auto industry and insulin monitoring in healthcare use high-performance software running on embedded devices, necessary for consistent and timely delivery of services. Therefore, software developed for embedded systems demands rigorous testing and security practices to keep vulnerabilities from infiltrating the code. Existing quality management processes are largely manual, which makes them error-prone and time-consuming, leading to suboptimal speed-to-market and poor code quality.

TCS' Embedded Code Analyzer Solution enhances collaboration among developers and testers, and streamlines the defect validation process by providing a cost-effective, web-based integrated code review platform. It allows OEMs to identify complex concurrency issues in multi-core architectures, early on in the development lifecycle. This tool can be integrated with programming environments like Jenkins, and scans the code to identify around 25 types of run-time defects including deadlock, data corruption, zero division, and illegal dereferencing of pointer. TCS' tools help automate the code compliance checking process for industry standards and guidelines, guaranteeing the stability, reliability, and quality of the code.

Benefits

With TCS' Embedded Code Analyzer Solution, you can reap the following benefits:



Improved code quality

Eliminate programming defects effectively with the tool's defect-specific analysis options and other configurable features. Proactively address security vulnerabilities in early stages of the software development lifecycle.



Faster time-to-market

Reduce code analysis time by up to 75%, and release new products at a faster pace, gaining sustainable competitive advantage. Enable rapid prototyping to continually refine system requirements and functionality, and review feasibility.



The TCS Advantage

By partnering with TCS, you can leverage the following differentiators:

- **Domain experience:** We have over 25 years of experience in designing and managing embedded systems and have worked with leading OEMs to develop new products. TCS has built the Embedded Code Analyzer based on years of research, and insights gained from one-on-one interaction with key clients and subject matter experts. We are a leading R&D partner and solution provider to the automotive industry, and work closely with manufacturers to help meet strict timelines as well as quality and performance requirements.
- **Highly scalable solution:** TCS' solution allows you to scale up quickly as it can analyze up to ten million lines of code in a short period of time, while covering all functional and technical aspects of the code. It can identify 30 defect patterns and enables detection of 15 unique defect patterns including crashes, freezes, and inconsistency.

How we help our customers

A Japanese multinational car manufacturer wanted to adopt an all-encompassing software quality assurance framework to improve the quality of embedded software and minimize recalls. As system complexity increased and more technologically advanced features were added, the OEM found it challenging to ensure the safety and security of its embedded software. The company partnered with TCS to deploy the Embedded Code Analyzer Solution for code quality verification before testing, and recognizing and rectifying the errors that could potentially lead to system breakdown. This implementation helped the manufacturer reduce time-to-market, prevent recalls, and optimize quality-related costs. It also provided a platform for automated compliance management and executing standardized quality assurance procedures, leading to error-free, secure code.



Greater software testing productivity

Scan almost ten million lines of auto-generated or handwritten code in a few hours with automated testing processes, minimizing the verification and validation cost.



Enhanced compliance

Adhere to legal requirements and industry guidelines, and inculcate best practices to boost software reliability.

Awards & Recognition



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About Tata Consultancy Services Ltd (TCS)

Tata Consultancy Services is an IT services, consulting and business solutions organization that delivers real results to global business, ensuring a level of certainty no other firm can match. TCS offers a consulting-led, integrated portfolio of IT and IT-enabled infrastructure, engineering and assurance services. This is delivered through its unique Global Network Delivery Model™, recognized as the benchmark of excellence in software development. A part of the Tata Group, India's largest industrial conglomerate, TCS has a global footprint and is listed on the National Stock Exchange and Bombay Stock Exchange in India.

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