



# SmartDelta

## Managing software quality across product versions and builds

To accurately analyse the quality implications of each change to a software system, the ITEA project SmartDelta (Automated Quality Assurance and Optimisation in Incremental Industrial Software Systems Development) will develop automated solutions for the quality assessment of product deltas in a continuous engineering environment.

### Addressing the challenge

Software-intensive systems are usually developed incrementally over an existing product or as a customised version for specific customers, markets or regions. Companies therefore end up with a range of product versions and components that need to be analysed for possible reuse in new products. This manual, unscalable task depends on the expertise and availability of engineers with knowledge of previous versions, leaving it prone to human error as system complexity grows. Given the pressure on companies for ever shorter times to market, certain quality aspects of the system typically begin to deteriorate. Whereas existing paradigms have fallen short in addressing these challenges, automated quality-driven reuse presents a solution.

### Proposed solutions

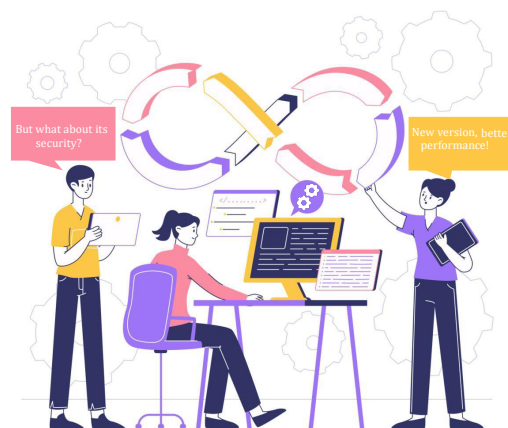
SmartDelta will develop tools and approaches for large-scale automated quality assurance and optimisation in the incremental development of industrial software-intensive systems. Within this framework, automated analysis solutions based on techniques like AI, machine learning, model extraction and pattern recognition will identify and extract quality improvement/degradation trends from existing product versions and development artifacts. Techniques will be developed to identify the features, design decisions and development artifacts that cause quality degradation and deviation, as well as for automated reuse analysis and design recommendations for future builds. Static and dynamic

verification and validation solutions will use techniques such as static code analysis, test prioritisation and selection, model-based test generation, and mutation testing to assess and ensure the system's desired quality attributes. Finally, visualisation solutions will be used to illustrate these quality attributes and trend analysis results over time.

2. the mean time to detect anomalies and
3. the average time to patch bugs/ vulnerabilities.

This will provide end-users with increased quality guarantees, reduced development and maintenance costs, as well as a quicker time to market. Additionally, increased visibility throughout the development lifecycle will create better alignment with business goals, thereby reducing risk.

The wide applicability of these benefits will be demonstrated via case studies in domains as diverse as enterprise software, banking, mobility, and



### Projected results and impact

Today, attention to the evolutionary nature of software development can play a decisive role in the long-term success of companies – especially given that poor software quality cost organisations roughly USD 1.69 trillion in 2020 in the US alone. SmartDelta aims to remedy this with, among other things, a 50% reduction to:

1. the mean time for automated reuse of system artifacts (compared to manual reuse),

telecommunication. As there is currently a lack of solutions for the quality assurance automation of variant-intensive products, SmartDelta will also help to open up a new market area which will support and extend its results after the project's completion.

# Project partners

SmartDelta

20023



**Project start**  
December 2021

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**Project website**  
<https://smartdelta.org/>

**Project end**  
March 2025

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<https://itea4.org>

