

SEGA

SEGA Improves Efficiency of Development Process by 20% with Coverity® Static Analysis



Business Benefits

- Extremely accurate analysis results
- Developer identified false positive rates under 5%
- Improved development process efficiency by approximately 20%
- Identification and elimination of bugs early in the development cycle
- Installed in under a day and immediately produced analysis results

“For new titles, we can speed up the development process because we can fix bugs while coding. We feel at ease when we develop new titles from scratch.”

Setsumasa

Technical Director, SEGA Corporation

Business Overview and Challenge

The game industry is constantly evolving. As technical capabilities increase, so do consumer desires. This has led to the expansion of game categories along with the sophisticated technical requirements for higher quality graphics. Today's game developers are writing code that renders photorealistic games by taking advantage of advanced shading technique that requires both the CPU and GPU. Due to scaling game development, the game software developers' burden has been intensified. The number of lines of code has increased dramatically and can vary exponentially depending on the type of platform - a mobile game contains at least 200,000 lines of code, while a console game contains closer to 500,000 lines. The number of lines easily doubles to a million lines of code when the game is written for a PC network.

With fast-paced changes in consoles and intensifying competition, for a game to be successful it must be released at the peak of the demand. If delays take hold it can quickly go from being the latest cutting-edge game to being unworthy of a gamers' time. These market dynamics put extreme pressure on game developers for faster development speed so that games can make it to market faster. Economic damage caused by bugs can be critical for game software manufacturers. To add to the complexity, given the formats that game titles are shipped in, such as ROM cartridge and DVD-ROM formats, they do not allow for on the fly bug fixes. The ROM cartridges and DVDs need to be physically collected and updated, making any bugs that are found pre-release extremely costly to fix. If a bug makes it into the market, the problem compounds and can severely tarnish a game vendor's brand.

Given these challenges, game software developers are constantly working towards reducing the game development processes while improving the games performance and quality. At SEGA, developers rose to this challenge by researching advanced software development tools that could help them to find and fix defects early. SEGA discovered that Coverity Static Analysis was the best solution to help get ahead of defects and ensure code quality in their games prior to release.

Before implementing Coverity Static Analysis, SEGA did not have an effective source code analysis tool. Historically, after developing a software program in accordance with coding conventions, developers needed to compile the code for analysis with a syntax checker to complete the coding process. After, they proceeded to functional testing to detect defects in the code. They recognized this process left a lot of their defects undetected.

“We saw the light with Coverity’s accurate bug analysis. Coverity Static Analysis is a tool that doesn’t impose a burden on developers. Instead, they are delighted to use it.”

Takashi Shoji

*Department Manager, CS R & D support
Dept. at Consumer R & D Div.,
SEGA Corporation*

Solution Evaluation

In learning about source code analysis tools, SEGA came across Coverity and felt it could be a good fit. To ensure it was the best fit, SEGA evaluated Coverity Static Analysis along with two other static analysis tools. After a short two weeks evaluation, Coverity was clearly the leader. Usually tool evaluations take place over a period of approximately three months. However, seeing the early results of the evaluation coupled with the pressures to release a PC game title under development, SEGA decided to implement Coverity Static Analysis software. The deployment was quickly adopted by a team of 25 developers, analyzing 900,000 lines of code (700,000 lines for the client side and 200,000 lines for server side). Since the initial deployment, Coverity’s solution has been implemented in five additional projects.

Coverity Deployment Benefits

Unmatched Static Analysis Accuracy

Coverity Static Analysis includes far less noise (false positives) in analysis reports (less than 5%), compared to other static analysis software that generates large amounts of errors and warnings. Because Coverity Static Analysis defect detection is so accurate, developers spend less time searching for the cause of bugs.

Easy Setup and Complete Engineering Support

The support for installing Coverity Static Analysis was detailed and complete, requiring less than a day from setup to the first analysis results. “Working with other tools can take one to three months to make them work,” said Technical Director Setsumasa. “We were pleased to be able to implement Coverity’s solution very easily with minimal setup time.”

Detecting Fatal Failures

Static Analysis has detected important failures that could have destroyed memory and bugs that they had not been able to resolve or detect before. Coverity’s software also proved its effectiveness by detecting bugs that were very difficult to reproduce.

User-friendly Interface to Facilitate Developers’ Work

Coverity Integrity Manager provides a project progress status at a glance, enabling developers to prioritize detected defects for more effective bug fixing. The systemized defect tracking capability shows the fluctuation in the number of bugs at a glance. Coverity’s solution is highly effective for progress management by enabling us to foresee the development needed.

Increase in Developer Productivity

At SEGA, Coverity Static Analysis has streamlined the development process. Now developers first check code scripting with a syntax checker then conduct a nightly analysis of the latest code with Coverity Static Analysis. Developers review the Coverity defect report the next morning and fix code as needed. In game software development, the functionality check process is the most important and time-consuming step. It is vital to test all possible usages, knowing and simulating all the controller’s functional tendencies and the different modes of display. With Coverity Static Analysis, developers can find and fix bugs at an early stage, which saves time and labor in the test process, improving productivity approximately 20% the entire development process.

About Coverity

Coverity is the trusted standard for companies that have a zero tolerance policy for software failure, problems, and security breaches.

Coverity's award-winning portfolio of software integrity products enables customers to prevent software problems throughout the application lifecycle.

Conclusion

At the in-house studio of SEGA in Japan, forty developers are now using Coverity Static Analysis to analyze development programs on a daily basis. SEGA recognizes another advantage of using Coverity Static Analysis in addition to overall quality improvement, an increased confidence SEGA developers. When executing a large project with a number of developers at different skill levels, Coverity Static Analysis allows developers to focus on writing the complex code by checking the code quality. Coverity Static Analysis saves time by locating defects and enabling senior developers to work with new developers to review the analysis results. Coverity's software implementation has been a success. SEGA continues to improve their product quality and development productivity by working with quantitative data related to development work, including comparison of bugs and development processes.

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