Ensuring Better Release Quality with Early Defect Detection

STAG's unique engineering approach to designing test cases, with high fault-finding ability, for the network software used to manage the network devices of a large consumer electronics major, results in early defect detection and accelerated product release, while ensuring 'Quality-on-Time'.

▶ Domain - Consumer Electronics

▶ Technology - Microsoft Technologies, C/C++, and ASP

CUSTOMER AND PRODUCT BACKGROUND

The customer is the India development center (IDC) of a major consumer electronics and computer peripherals company. The IDC had approximately 100 engineers and is a strategic unit of the parent company's R&D efforts.

The product in question is a software application that the company uses to manage its network devices.

PROBLEM STATEMENT

The product release cycles were tight, with three to four releases per year. In addition to product releases, patch releases also had to be accommodated during this period. Release validation was done in two phases – Project QA and Final QC. The Project QA team, approximately 25-strong, was involved from the start of the project and was responsible for system testing while the Final QC team was responsible for last mile validation and assessment of test results.

The main problem was that releases were often delayed, in spite of every team member working hard and clocking more than 50 hours a week. This issue was gradually drawing the attention of the top management, who were unhappy with the increase in unproductive cost and the delayed releases to market. The customer, therefore, opted for an external expert to resolve this issue.

SOLUTION

The STAG team quickly analyzed the situation by interacting with the project team and reviewing the test documents. The team found that the test cases were largely positive and ineffective in terms of discovering new defects. The team selected three critical components from different projects and identified the following gaps:

- Incomplete requirements
- Lack of breadth in testing
- More focus on the use aspect than on the abuse aspect
- No updating of defects found from historical data in the test document

▶ Test cases were complete and effective – the number of test cases improved by 70%

▶ 90% of the defects were detected by the STAG-designed test cases

The team applied the HBT technique of Value Analysis on test cases for the identified gaps. It developed module-level test cases for all critical requirements in the three pilot projects and used HBT's Behavioral Stimuli (BEST) technique to design the test cases. To enhance the depth in coverage, the team applied techniques like boundary value analysis, equivalence class, and domain-specific special value. The team also enhanced the breadth in coverage by adding test cases to validate the key non-functional aspects of each module.

In addition to black box techniques, the team also applied coverage-based white box techniques. Code coverage (Decision coverage) was measured using the Pure Coverage technique. The uncovered code was analyzed and appropriate actions were taken, including deleting unwanted code, reviewing the exception handling code, and adding missed test cases.

The team implemented a measurement program and put together a process for measuring the release quality of every module to the Project QC team every month. This approach ensured that module defects were discovered early, allowing the QC to focus on system-related defects

OUTCOME AND VALUE ADDITIONS

The STAG team was able to engineer a drastic drop in the module defect escapes, from 24% to a meager 3%, in just two months. The external defect escapes dropped even lower, from 60% to 5%. There was also a significant reduction in the number of defects being detected ad hoc.

The team also created clear and simple documentation for module validation. The organized and neatly documented test cases helped in better estimation of the test cycle time.

CUSTOMER SPEAK

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…As a policy, every project must have one STAG engineer to ensure good test case design.

- Managing Director, IDC

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