Automature: Providing Automated Software Quality Management for Verifiable, Continuous Improvement

Software Quality Management Challenges

Software is pervasive in the technology oriented living of the 21st century. Whether it is databases and applications containing financial, health, and personal information or real-time monitoring applications of critical processes, software is used to automate systems used in our daily lives. Consequently it is critical that software applications perform as expected and evolve with the changing and highly interrelated systems on which they are used.

To cope with these diverse and rapidly changing software application needs, software developers today have adopted flexible delivery processes. Agile development methodologies have been developed to shorten development cycles while steadily enhancing application features to meet end-user requirements in a competitive environment. In addition, service packs and hot fixes are continuously being released to address issues discovered after the software release ranging from software bugs to security patches.

Further compounding release challenges, software today is highly complex due to the wide range of features supported, the myriad of deployment environments and multiple interdependencies among software and system components. In addition, a variety of independent organizations, including subcontractors and outsourced development organizations, may contribute to any specific release, straining inter-organization communication. Coupled with the frequency of releases, these factors increase the business risks to software suppliers of releasing products that either do not function as expected or worse, contain bugs that jeopardize functioning altogether.

To meet these challenges, senior managements of software delivery organizations have invested in tools and processes to get a handle on software quality. Tools range from manual testing, coverage analysis, test scripts, and automated test procedures. Processes include collaboration within the development team and between developers and quality test engineers to identify critical areas for testing, as well as extensive alpha and beta code testing.

However, in spite of these investments, management still does not have a complete picture of the quality of any release or whether quality is progressively improving. Even worse, software management does not have the tools today to demonstrate to their clients the quality of any specific release, how release quality is improving between releases, or even how they compare to competitors.

Software Quality Management Tools Today

To meet these challenges, software development organizations have taken several approaches to overcoming the software quality management issues. Development teams have implemented record and playback tools for certain kinds of applications, the results of which can be analyzed to determine if the software is performing as expected. However, analyzing the test results is tedious, monumental, and error prone. Such methods, also offer no way to automate verification, so it depends heavily on human eyeballs.

Scripts are also widely used to exercise software components. Unfortunately, scripts do not cover all the possible use cases, leaving management in the uncomfortable position of deciding on the suitability of a release without complete information.

Several well-known software development tool vendors sell expensive, complex software quality management suites. Although these suites typically have components which address multiple facets of the software development life-cycle from requirements gathering to automated component testing, utilization of the suites involves significant investment in training, license costs and vendor lock-in. Therefore the utility of these suites is limited to very large projects and enterprise-scale applications. In addition, adoption of these suites requires a large, long-term commitment to a specific vendor's methodology and tools.

Automature Vision

Automature believes there is a better way to address the software quality management challenges. First of all, software quality management tools should be accessible to a broad range of projects and developers, including projects that involve only a handful of developers and limited software quality management expertise. To address the broader audience, automated software quality management tools need to be easy to learn and have a lower entry cost than the enterprise suites available today. In addition, the software infrastructure required to utilize tools should not require purchasing proprietary infrastructure components such as databases and integrated development environments and run on a variety of industry standard platforms.

Secondly, Automature believes that the tools should focus on collecting and reporting on actionable data to aid management in identifying incremental quality improvements and the business benefits accrued through the application of the automation tools. To accomplish this goal, the automation tools should facilitate applying the appropriate metrics and collecting relevant data throughout the software quality test process. Metrics should focus on the essential quality management attributes for the project. Sufficient probe points must be provided to insure an adequate level of granularity to identify issues.

Thirdly, Automature believes that the software quality management suite must address the needs of all the stakeholders in the development process and enhance collaboration. The tools provided must be approachable and usable by all the development team roles including the development engineers, quality engineers, test automation engineers, business analysts and product managers with their differing software skill levels, and need for information.

Implementing the Vision

Automature addresses these challenges through an easy-to-use, integrated set of tools that can be used by the various development team members to manage the definition, development and delivery of releases that meet steadily improving quality standards. User organizations are not required to use all the Automature tools. Instead, user organizations can decide which tools provide the greatest immediate return with the least investment in training while building their automated software quality process. Each tool has multiple entry points addressing different stages of the development cycle, allowing development teams to only utilize the immediate functionality required to get the job done.

For example, during the requirements phase, Automature Zermatt is utilized to capture use cases and prioritize features. Zermatt users select which step in the process to start working on by selecting the step in the multiple work-flows available. Selecting the step in the workflow launches the appropriate form to enter the required information. Similar workflows are available to define use cases, prioritize a feature, and define scenarios and test suites related to the requirements. Scenarios can easily be grouped into test suites, such as installation, performance, user interface, etc., depending on the specific application being developed.

Since there are multiple entry points into the Zermatt application, development teams can focus on the steps in the process that are most critical for the specific development project. Furthermore, the Zermatt application allows organizations to easily define who in the organization is allowed to add, delete, change or view the data entered, thereby managing the planning data entered.

Zermatt can also be used to define which scenarios are automated and which scenarios are run manually. Tests can be tagged by their relevant attribute for the project. Tagging tests allows simple analysis of test results by critical attribute, assisting the team to focus on the key areas that require further attention. Examples of tags could be attributes such as a critical feature, a customer reported bug, an environmental property, etc.

In the Automature suite, test automation is accomplished using the Zug tool. The test cases to run, the test logic (expressed in a high-level business-analyst comprehensible language), and test variables are defined by entering the information in an easy to use

spreadsheet-like format. This spreadsheet can then be "executed" on the target host, using Automature's Zug engine. Zug can interpret the test case hierarchy, logic, variants, as well as the results, and record all relevant data in the database.

Once the test cases are executed, the information gleaned by Zug is automatically uploaded into Zermatt to archive not just the test outcome, but also many other attributes of each test case, including log files belonging to the application under test. Note, however, that it is not mandatory to have the Zermatt environment to run Zug. If Zermatt is not installed or used, the Automature tools will simply report the results in a log file and not record any contextual details in a database. Therefore, organizations can choose which tools to use to fit their specific project requirement and are not forced to utilize all the Automature capabilities.

Uploading the test results into Zermatt allows test data to be analyzed for trends and management reports generated for continuous improvements. For example, the test results uploaded can be analyzed to determine progress against the release plan and the quality trends for selected metrics. More detailed information to satisfy specific roles can be viewed by drilling down in the report.

Since Automature realizes that no software organization has made progress, without having some investment in QA artifacts, the tools need to support a migration strategy. Automature's Davos provides a set of webservices that allow any existing testing framework to report results into the Zermatt data repository, thus making it easy to get an integrated view of all QA processes, including the legacy ones.

Benefits

Application of the Automature vision provides a number of benefits. By implementing a comprehensive software quality management process using easy-to-learn Automature tools, development organizations achieve a predictable, repeatable software release process. Furthermore, the business risk for releases is reduced, since issues can be identified earlier in the process and fixes prioritized. Since all test results are collected and stored, problem areas and trends can be analyzed using the customizable reporting tools provided. Problem areas can be easily identified, providing management with the critical data to prioritize areas that need further attention. Since the reporting works from the live database, information is always guaranteed to be current.

Reports produced using the Automature tools can also be used to review release status with customers, thereby giving them insight into the quality of the release and increase their confidence. Increasing customer confidence in release quality through the detailed reports provides the additional benefit to both the developing organization and the customer of reducing the number of releases that have to be supported, since customers will be more comfortable adopting the latest releases.

Summary

Software is pervasive in the 21st century to monitor, control and manage critical health, financial and real-time processes, as well as provide consumer conveniences such as text messaging and video conferencing. It is critical to software users and developers that the software utilized works as expected. To achieve that goal, comprehensive software quality processes and automation are needed, whether the development is a small project involving a handful of people or a multimillion dollar project with hundreds of developers in multiple organizations.

Key enablers to achieve predictable, continuously improving software quality are easy-to-use, scalable automated software quality management tools and repeatable development and test processes. Automature provides easy-to-use, flexible, extensible automated software quality management tools and infrastructure to meet these requirements.

Further information

For further information on the Automature tools, please visit www.automature.com or call Automature corporate offices at (781) 205-9641.