

Research on software quality management optimization

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Abstract: With the rapid development of information technology and big data intelligence, the content of information projects is becoming more and more abundant, people's dependence on information is getting higher and higher, and the requirements for software quality are becoming more and more demanding. Software quality management has become more and more important in the field of contemporary software engineering, and software quality management plays an extremely important role in ensuring the quality of software products. The purpose of this paper is to deeply study the optimization of software quality management, through the comprehensive analysis of software quality management strategy, to explore the effective way to improve software quality. The research method focuses on the integration of theory and practice, in order to provide a more feasible quality management method for the software engineering field.

Key words: Software quality; Software quality optimization; Quality control; Quality management strategy

Introduction

With the increasing scale and complexity of software, software is playing an increasingly important role in various fields, and the requirements of software quality are becoming more and more demanding. High-quality software can significantly improve work efficiency, reduce costs, and promote innovation. In reality, there are problems such as uneven software quality and difficult to control project progress, which not only directly affect the normal use of software, but also affect the quality of software. It involves the normal development of enterprises and individuals, and also affects the operation of the entire social and economic system. This paper aims to deeply study the optimization problem of software quality management, through the combination of empirical and theoretical, through the comprehensive analysis of software quality management strategy, optimize quality management, improve the stability and security of software, reduce the software defect rate, so as to improve the credibility of software in practical application, better adapt to the change of market demand, enhance the competitiveness of enterprises, To provide feasible and effective solutions for quality management in the field of software engineering. On the theoretical level, in-depth study of the basic principles and methods of quality management, clear the position of software quality management in the software development life cycle, and build a more comprehensive theoretical system of software quality management. In practice, the software maturity model is introduced, and based on the relationship between agile practice and quality and data-driven quality management method, the specific practices of quality management are analyzed in detail, and a more accurate, forward-looking and innovative quality management practice method is constructed, which provides a foundation for the optimization of quality management. It provides theoretical support and guidance for the future development of software engineering field.

I. The existing problems of software quality management in the new era

With the increasing scale and complexity of software, software is playing an increasingly important role in various fields, and the requirements of software quality are becoming more and more demanding. However, software quality management faces a series of severe challenges and problems, such as the increase of software scale, complexity and difficulty of development cooperation. These problems directly affect the normal launch of software products, the increase of enterprise costs, and the decline of social competitiveness, so the optimization research of software quality management is particularly important and urgent.

1. Increase in complexity and scale

With the intensification of technological change, the requirements for software projects in the new era are also increasing, not only to meet the operation of a single platform, need to consider the compatibility of a variety of operating systems and various types of hardware and software equipment, covering a variety of environments, normal operation on multiple platforms and devices, but also need to consider the integration of other systems or services, It makes the software project function points and non-function points numerous, complex interaction, multi-level integration is difficult, quality control has become a complex task, in the face of such large-scale software management using traditional project management seems powerless. At the same time, large-scale software faces the security control of distributed data, such as data security transmission, legal authorization and verification of data, data security and user privacy protection are also urgent problems to be solved.

2. The challenge of new development model

The software quality management of large-scale software pays attention to the convenience, maintainability, flexibility of software project integration, and rapid response to market demand. Therefore, faced with a variety of development modes, such as agile development, DevOps, cloud native, modular development, etc., combined with the characteristics of the team itself, forming a new development mode suitable for the team culture is a new challenge. The new development mode to solve the balance between software quality and development speed, to achieve the optimization of software quality management, is also an urgent problem to be solved.

3. The challenge of team cooperation

Software quality management of large-scale software has higher requirements for talents. In the context of cross-team cooperation, problems such as communication barriers, task synchronization differences, difficulties in progress and quality control, high data risk,

and property rights disputes are faced. It is necessary to have a deep understanding of the background, purpose of participation, fields of expertise and roles that the team is good at. It is also an arduous task to adopt a comprehensive management strategy, closely integrate with the tasks in the development, testing, operation and maintenance of large-scale software, and deeply optimize the software quality management process to achieve the normal operation of large-scale software with high quality.

To sum up, the quality management of large-scale software in the new era faces many problems such as increasing complexity and scale, challenges of new development mode and challenges of team cooperation, which affect the quality of software products and increase the uncertainty and risk of software quality management. Therefore, it is necessary to formulate corresponding optimization strategies and solutions. It is urgent and important to optimize software quality management systematically and at multiple levels.

II. The new era of software quality management optimization countermeasures

Large-scale software management in the new era needs to continuously pay attention to the changing needs of users and the evolving technology of the industry. By introducing new technologies and using advanced tools, we can improve the comprehensive literacy of team members, constantly improve the methods and processes of software quality management, optimize the countermeasures of quality management, and better adapt to the needs of social development. To ensure that software products stand out in the highly competitive market. The following are a series of quality management optimization countermeasures aimed at solving the problems faced by large-scale software quality management in the new era.

1. Introduce intelligent and automated tools

One of the first challenges of large-scale software in the new age is dealing with increasing complexity. The first step is to develop software quality management standards and guidelines that define the quality management process of software development. Secondly, intelligent and automated tools, such as automated test tools, static analysis tools and continuous integration tools, are used in the key stages of software testing, quality assurance, code review, security audit, etc., to improve the efficiency of software quality control, help to discover and solve problems in a fast iterative agile environment in time, and improve software quality. Again using cloud platform and virtualization technology, more focus on business development, reduce the software system's dependence on the environment, maximize the use of hardware resources, reduce the difficulty of software project operation, and improve the speed of deployment online. Finally, adopt the mature software framework to improve the development efficiency and improve the quality of software.

2. Agile quality management practices

Agile development is an idea-centered software development method that emphasizes rapid response to changes, rapid iterative continuous delivery, and the principle of small steps to make quality management more flexible and adaptable. The quality management of large-scale software in the new era needs to adapt to the development mode, adopt the current mature agile management, combined with the status quo of the team, strengthen the data collection, analysis and utilization of software process management, based on machine learning algorithm, can analyze the test data, identify potential problems and anomalies, and establish a data quality analysis system. Real-time monitoring of the running data of quality management, to achieve decision optimization, so as to establish a matching quality management model. Through the deep integration with the development team, the software quality management team can adjust the test strategy and optimize the quality control process in time to better adapt to changes.

3. Strengthen team training and communication

Large-scale software teams in the new era need to have a higher level of technical literacy and communication and collaboration ability. Regular training should be conducted to strengthen the learning of software process, software quality management standards and guidelines, so that they can adapt to and skillfully use new tools and methods, and keep the team's technical update. At the same time, strengthen the deep communication mechanism inside and outside the team, and promote the formation of a closer collaboration relationship between large-scale software teams, so as to better cope with the rapidly changing needs.

In a word, the optimization countermeasures of large-scale software quality management in the new era need to fully consider the new characteristics and challenges of software development, introduce intelligent and automated tools, make data-driven decisions based, adopt agile quality management practices, strengthen team training and communication, establish more flexible and advanced methods to better adapt to today's rapidly changing user needs and improve software quality. To ensure the sustainable development of software in the new era.

III. The development trend of software quality in the new era

Large-scale software quality management and optimization in the new era are facing with ever-changing challenges and opportunities. Under the background of the rapid evolution of technology, large-scale software quality management and optimization must adapt to the rapid change of technology and the diversification of user needs. The following are several trends in the development of large-scale software quality management and optimization in the new era, aiming to guide the software industry to meet the challenges of the future.

1. Convergence of Agile and continuous integration

Agile quality management strengthens the integration with continuous integration and automated testing, uses virtualization technology and cloud computing technology, and utilizes the quality management system based on machine learning algorithm to identify potential problems and anomalies in real time, quickly realize decision optimization, track and supervise the quality of the team, so as to ensure the quality throughout the whole software cycle and better adapt to the timely launch of software projects.

2. The combination of software quality management and AI

With the gradual maturity of Artificial Intelligence (AI) technology, AI can be used in the process of software quality management for test case generation, static code detection, automatic code generation and repair, anomaly detection, code review, static and dynamic analysis, vulnerability scanning, quality detection and evaluation, etc. To ensure the quality of the whole software cycle in an all-round way, and better cope with the increasingly complex functional quality management and optimization of large-scale software.

3. Continuous learning and teamwork

Large-scale software quality management and optimization in the new era requires continuous learning and training of the team, keeping up with the development of technology and changes in the industry, and having a higher level of technical literacy and teamwork ability.

In short, the development trend of large-scale software quality management and optimization in the new era shows a multi-directional and comprehensive characteristics, the use of advanced methods and tools, keep up with the pace of technology, and better adapt to the complex and changing customer needs. By means of data-driven decision making, agile practice, and combination with AI, large-scale software teams need to actively respond to these trends, constantly innovate and optimize their own methods and strategies, so as to better cope with the challenges of the new era and provide strong support for the development of the software industry.

Concluding Remarks

This paper discusses many challenges of large-scale software quality management and optimization in the new era, aiming to provide feasible and effective solutions for quality management in the field of software engineering.

First of all, we dig deeply into the problems faced by large-scale software quality management in the new era. The increasing complexity and scale, the challenge of new development model and the challenge of team collaboration are many aspects, and we deeply realize that quality management needs to adapt to new challenges, and need to formulate systematic and multi-level optimization strategies and solutions for software quality management optimization, so as to improve the ability to cope with complex environments.

Secondly, we put forward a series of strategies to solve the problem in the countermeasures section. From the introduction of intelligent and automated tools to the agile quality management practice based on data-driven decision making, through strengthening team training and communication, we put forward innovation points and improvement ways of quality management optimization. The proposal of these countermeasures is the sublimation of the quality management concept.

Finally, we look forward to the development trend of software quality management in the new era. The development trend of large-scale software quality management and optimization in the new era is multi-directional and comprehensive. Through data-driven decision-making, agile practices, and the combination of AI, large-scale software teams need to actively cope with these trends. This trend is not only the iteration of technology, but also the improvement of management thinking and team literacy.

In general, software quality management is a process of actively adapting to changes and constantly optimizing the cycle. In this process, we need to continue to learn and innovate, be good at introducing advanced technologies and ideas, and constantly improve the team's cooperation ability and adaptability.

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