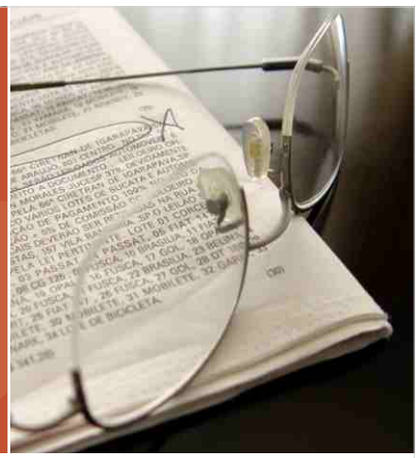
Case Study

Product Re-engineering: Performance Tuning of a healthcare billing and claims management product



THE CUSTOMER

The largest physician practice management firm in the US, specializing in billing and reimbursement solutions for anesthesiologists and CRNAs nationwide.

THEIR NEED

They had an existing web-based, proprietary billing software that catered specifically to anesthesiologists and pain management specialists. This product had been built in-house but was not configured to allow even a minimum number of concurrent users. The customer wanted to improve the performance of this product to allow at least 150 concurrent users, with a response time of less than 10 seconds for every request that a user sent.

OUR DEED

Aspire performance-tuned their product and evolved effective processes for testing, fixing and re-engineering the code. The immediate task of enabling 150 concurrent users with a response time of less than 10 seconds for each user request was easily met.

Subsequently, the Aspire product development team re-architected the entire product - it has currently been upgraded with several new features and supports more than 350 users concurrently. Aspire's key contributions were to bring in a process-driven approach, product development best practices and the recommendation of new technologies to improve product performance.

TOOLS & TECHNOLOGIES USED

J2EE, Oracle, Struts, DWR, JMeter, JProbe, Eclipse, PL/SQL developer, JDeveloper, MyEclipse plugin, Ajax, Hibernate

Billing and claims management software for health-care professionals

The customer had an innovative billing software that took the hassle out of anesthesiologists' day-to-day operations. It helped anesthesiologists ensure claim accuracy and get speedy reimbursement from patients, hospitals or the insurance companies involved. Some of the key features of the product were determination of proper codes of medical procedures, integrated concurrency tracking, online links to hospital management systems, capitation tracking and electronic claims submission.

The project started with 2 weeks of training for the Aspire team in India, on the

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product and the health-care domain in general. Later there was an additional 2 months of training provided at the customer's US offices for a few team members. The knowledge gained through the training sessions were documented by the Aspire team to serve as a repository for new inductees into the team.

Performance Tuning

Aspire performed load testing of key modules through usage of advanced tools and the results were used as a benchmark towards optimizing the performance of the product.

System throughput requirements and response times – defined by business requirements and user expectations - were assessed. Thereafter, system parts that could be changed, tuned or optimized, including the architecture that interconnects different modules and the design of the modules, were identified.

The process driven approach that Aspire's product development team brought in as part of its performance tuning efforts really impressed the customer. Documentation at various phases – requirements gathering, design etc. were either non-existent or minimal, leading to inaccurate estimation, complexities discovered later in the development cycle and hence missed deadlines.

Aspire brought in product development best practices and ensured that proper documentation and appropriate processes were followed at every stage.

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Model-driven approach

Aspire adopted a model-driven approach to performance-tune the system. This approach applies appropriate modeling, benchmarking, tuning and optimization methodologies to ensure that all stakeholders are involved at the appropriate system requirement, design, development and testing stages.

Modeling: The extension of Unified Modeling Language (UML) sequence diagrams to "Software Execution Models" provided a preliminary understanding of system performance. This allowed the customer to review the underlying design before actual implementation.

Performance Testing: Another important element of the holistic approach to optimal system performance was reliable testing and benchmarking of the product.

Optimization and Tuning: The system performance was enhanced by re-engineering the Architecture, Design, Code and Configuration of the existing product.

Recommendations

Aspire made the following recommendations to the customer for better product performance:

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- Use of Ajax (DWR framework), to optimize performance and response times of the product
- Use of an object relational mapping tool, Hibernate
- Recommended against the use of “Oracle Rules Engine”, because it was slowing down response times considerably,
- Usage of Bugzilla to maintain complete lifecycle of each request.
- Appropriate processes and documentation

Best practices followed

- Integrated UML document
- Review checklist for Java, J2EE, and JSP to check for best code conventions
- Usage of ‘Code pro’ for code review.
- Tracking of change requests using “Bugzilla”
- Analysis of performance and load using advanced tools

Key benefits to the customer

Initially, Aspire was hired to fine-tune and enhance the performance of the customer’s web-based bills and claims management software. Aspire met the immediate need of fine-tuning the product to allow 150 concurrent users. Every aspect of the system (architecture, design, code, and configuration) was reviewed and improved to provide a stable and well-designed product to the customer, with concurrency of more than 350 currently.

Aspire also brought in product development best practices, the proper use of detailed test cases to ensure a stable and high-quality product and a focus on the right processes at different phases of the project lifecycle. Aspire was also able to add value by suggesting the appropriate technologies needed to enhance product performance.

Following this, Aspire gained the customer’s complete confidence and was awarded the entire re-architecting of the product with a 150% increase in team size. The Aspire team is now the dedicated development partner for the customer and even interacts regularly with the customer’s end-users.

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ABOUT ASPIRE SYSTEMS

Aspire Systems is an Outsourced Product Development firm committed to helping our customers build software products better and faster. We work with some of the world's most innovative Independent Software Vendors and software-enabled businesses, ranging from start-ups to established industry leaders, transforming the way software is built.

Aspire provides complete product lifecycle services, ranging from new product development and product advancement to product migration, re-engineering, sustenance and support. Our product development teams are spread between our Global Innovation Center in Chennai, India and offices in the United States.

Quick Facts

- *Thought leader in Outsourced Product Development*
- *32 customers; 375 Producteers*
- *500+ product releases to date*
- *63% CAGR over the last five years*
- *Offices in Chennai (India), San Jose, CA and Branchburg, NJ*
- *Privately-owned and self-funded*
- *ISO 9001:2000 certified*

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