

Quality Control for Integrated Information and Education System

Customer

The customer is a leading IT services provider in the Russian market. The company specializes in services in the IT infrastructures creation field (system integration), IT support and IT outsourcing.

Company	<i>System Integrator</i>
Country	<i>Russia</i>
Business Domain	<i>Information Technologies</i>
Services Used	<ul style="list-style-type: none"> ✓ <i>Development of testing models</i> ✓ <i>Requirements analysis</i> ✓ <i>Functional testing</i> ✓ <i>Microsoft SharePoint Portal design testing</i> ✓ <i>Code verification for compliance with enterprise standards</i> ✓ <i>Database structure verification for compliance with the object model</i> ✓ <i>Development of acceptance testing requirements</i> ✓ <i>Overall quality control</i>
Cooperation Model	<i>Rendering quality control services to an external software development company</i>
Duration	<i>13 months</i>
Efforts	<i>2.2 man-years</i>

Project

The project consisted in development of an integrated information and education environment of a university. The work was based on integration of several information systems and purposed at automating of the basic business processes and, as a consequence, increasing the quality of education.

Challenge

The customer lacked resources and decided to outsource testing to a testing team that would accomplish a number of tasks to prepare the system to acceptance tests.

The first priority tasks on the project were to:

- Develop a testing model that would include nontrivial test cases covering features of all the developed systems
- Analyze the project requirements for correctness, explicitness, consistence and information fullness
- Find out errors and ambiguities in the business processes
- Hold functional testing
- Test the design styles and structures for individual universities
- Test C# and SQL code for conformity with enterprise standards
- Verify database structure for compliance with the object model
- Work out acceptance testing requirements for the handover of the system to the customer
- Verify the portal content
- Execute overall quality control

Solution

The following tasks from the total tasks scope are worth outlining:

- **Testing Model Creation.** Detailed testing models including SQL queries were developed for all functionality models, which was based on a business process study and the practice of the testing team's work. This allowed checking correctness of data processing operations not only on the user interface level but at the database level as well. To ensure completeness of the test coverage, nontrivial models for specific features of the systems to integrate were developed. There were also specific test cases for checking data conversion performed when synchronizing the portal with other systems.
- **Requirements Analysis.** All the business processes were analyzed for conformity with the following criteria: correctness, consistence and explicitness.
- **Execution of Functional Testing.** Functional testing of an integrated university information and education system was executed. This included testing the operation of services for synchronizing the portal database with the Active Directory, data conversion for synchronizing the database with third-party automated systems and the user password changing procedures.
- **Portal Design Testing.** All the customer universities have own design styles of their information and education information environments. Each of the design solutions was individually checked against the design requirements.
- **Development of Acceptance Testing Requirements.** For handover to the customer, acceptance testing requirements were developed. The requirements were based on the functional requirements with account for incomplete functionality implementation.
- **Data Completeness Control.** The acceptance testing presumed verifying the correctness of how the database was filled with content compared to that of real working conditions in quantity and nature.

Cooperation with Remote Developments and Testing Teams

The cooperation with the customer was organized in the following areas:

Project Team. During the initial stage, several CVs were proposed to the customer. The candidates were selected on the basis of the project's requirements and specific characteristics. In the course of the cooperation, feedback communication with the customer was established to consider the quality of the employees' work.

Organizing Remote Work. An SVN repository on the development side was used as storage for both project and testing documentation. The access to the testing facilities was organized via a VPN connection.

Testing System for Work on Customer Premises. A1QA used the corporate project management system on the customer side for testing and building reports. The system was used for testing tasks and development tasks as well as for tracking software defects and working with the system code and functional specifications.

Communicating with Remote Project Team. To increase the effectiveness of the cooperation, the following communication means were chosen: telephone conferencing, text messaging and email. Business trips were organized for the employees where necessary.

Multilevel Reporting System. A three-level system was chosen as the reporting system. The system included the following:

- Reports on task completion in the project management system
- Weekly reports reflecting task statuses for set periods
- List of completed tasks and information on the number of hours spent over set periods

Technologies Used

Planning and Defect-Tracking System. The customer's corporate project management system

Database System. MS SQL Server 2005

SQL Server Administration Tools. SQL Server Management Studio

User Interface for SQL Trace Utility. SQL Server Profiler

Structured Query Language. SQL

Development Environment for Verifying C# Code. Microsoft Visual Studio 2005

Concurrent Versions System. Tortoise SVN

VPN Client. The Cisco Systems VPN client

Browsers. Microsoft Internet Explorer (6.0, 7.0), Mozilla Firefox 2.0

Results

In the cooperation with the customer, the team of A1QA specialists achieved the following results:

1. The customer successfully performed the acceptance testing of the system, which was achieved with the following:
 - A complete testing model allowing to explore the information and education environment of a university on the user interface and database levels
 - Correction of inaccuracies and errors in the functional requirements
 - Timely detection of defects and potentially unstable system processes
 - Usage of a developed set of documents with acceptance testing requirements
2. The customer highly appreciated the level of responsibility and the communicative skills of A1QA specialists as well as their ability to work efficiently under time deficit.
3. The customer has kept hiring A1QA employees for other projects as well.