Customer

Conscius (www.conscius.com) is a Danish company that specializes in development, adaptation, maintenance, and support of the sorting machines software. The end client of Conscius is a company that produces sorting machines for a number of industries (post offices, airports, etc.).

Challenge

The end client of Conscius had a special framework for sorting process developed. However, each sorting machine needed this framework to be adjusted, configured or extended in terms of functionalities. This is where Conscius and ScienceSoft as their subcontractor were involved into the development. Software development started along with creation of a sorting machine. At this stage the developers used the sorting machine simulator configured to imitate the real sorting machine as realistic as possible. Simulator was created on the basis of sorting machine drawings and specification. Having the development process structured in such a way, the end client could receive the sorting machine and software for it that are ready for the final onsite testing.

Solution

INITIATION PHASE

The end client of Conscius was responsible for providing Conscius technical specialists with the technical specifications for the future sorting machine. At this stage the sorting machine existed as a drawing and a set of technical requirements only. The sorting machine started to be constructed and software development moved to the analysis & planning stage.

ANALYSIS & PLANNING PHASE

Technical specialists analyzed the sorting machine topology, technical specification and created a list of the tasks for adaptation of the existing sorting framework to each particular case. The clear component based software architecture allowed to combine the software from the existing modules making as less changes as possible. Basically, development meant determining the list of required changes, additions and configurations of the system. Conscius selected two senior developers from ScienceSoft for development of new subsystems. One of the specialists was invited onsite for studying the system's architecture and peculiarities. Such knowledge transfer stage ensured effective transfer of all the related system knowledge to ScienceSoft team offsite. As a result, ScienceSoft team obtained all the required information to be involved in development and testing together with Conscius. After the list of requirements was created and all the risks were analyzed, the requirements were approved and frozen, and the design phase started.

Solution (continued)

DESIGN PHASE

During the design phase the main task for the team was to develop a technical solution based on the functional specification. Technical solution was divided into tasks that were further distributed among the developers. Also the team discussed possible database structure changes and their influence on the system. Interface suggestions were clarified and approved as well. After the interface approval, the test plan for GUI models was created. At the same time, a sorting machine simulator was constructed and configured with test plans for sorting machine functioning being elaborated. Thus, for the implementation phase developers had a ready system for testing their modules and a set of test rules. If necessary, it was possible to extend test system by means of special testing scripts that could be integrated with simulator. GUI and sorting test plans could further be used for testing real sorting machine as well.

IMPLEMENTATION PHASE

During the implementation phase the team iteratively implemented the functionality planned for each particular iteration. The development was conducted in accordance with the procedures and processes that were used at Conscius. The development process included the following important processes:

unit test creation

Each developer created test scenario that by default corresponded to the scenario elaborated during the design stage. Additionally, another developer, who was not familiar with system realization, was involved to write an alternative scenario to ensure "black box" testing. Thus, the system had double testing. All the implemented functionality was covered by unit tests. The unit testing coverage was calculated automatically on a regular basis (except of presentation layer).

code review

All changes in the source codes were double checked. In other words, developer 1 checked the code of developer 2 and visa versa. Thus, high quality of code was ensured; also close interaction and knowledge system sharing within the team added to the high quality of collaborative work.

All sources (as well as all other data of the project) were collected and shared at the dedicated CVS server. Each specialist at the project used a copy of data from the CVS server. They made their own changes and synchronized (updated) their copy with the changes of other team members via the CVS server.

INTEGRATION PHASE

In fact, the whole implementation process was the process of integration of new modules into the basic configuration. As the modules were not dependant on each other, the there were no conflicts during the integration. Such database scheme conflicts usually appeared and were fixed at earlier stages. After integration was over the system was additionally checked by unit tests.

Solution (continued)

STABILIZATION PHASE

During the stabilization phase system testing and bug fixing were performed. First, system smoke test was performed; this smoke test was meant to reveal any evident bugs in critical functionalities, and also regression testing checked the system integrity. If system smoke test ran successfully, then a dedicated test team checked the functionality that was implemented for a particular iteration. Test cases were launched for the implemented/changed modules.

All the allocated defects were registered in the bug-tracking system Jira that was hosted at Conscius side.

The development team tracked the bugs in Jira and fixed them. The results of their work along with all the comments were put into the bug-tracking system and assigned back to the test team. Thus all the resources were loaded continuously and the stabilization phase took less time.

DEPLOYMENT PHASE

After all the hardware part of the sorting part was assembled, the deployment phase started. The lead developer went onsite to deploy the system and get it ready for final testing. In case the system did not pass testing, technical specialists of the end client and Conscius technical specialists analyzed the failure case, found its reason and determined the best solution for it. If the problem was related to software part only, the additional test cases analysis was performed, the test cases were updated and the problem was fixed. After the additional testing, the updated software was delivered to the end client. In case the problem was related to the hardware part, the documentation related to this very part was updated and additional tasks were initiated to solve the problem.

Results

By today ScienceSoft has participated in development of the software for several sorting machines all over the world. Sydney, Dublin, Dallas are few of the cities where the software modules developed at ScienceSoft ensure efficient production of the sorting systems.

Technologies and Tools

Technology domains: Software Architecture, Windows Services, Web Applications, Web Services.

Technologies & tools: MS SQL 2005, MS Windows 2000/XP/2003, Idea.

Language: Java

Development processes: ISO 9001:2000

Business domains: Trasportation