

Case Study



Web Services Testing Enables Healthcare Organization to Cut Maintenance Costs

Abstract

A healthcare organization wanted to connect to its customers directly through the online medium. To achieve this, the client enhanced its Customer Ordering system by developing new web services and modifying existing web services. The client partnered with Infosys to help test the new and modified web services resulting in a defect-free release and a 93% saving in regression testing effort due to automation.

Overview

The Internet has dramatically changed the way we buy and sell products. An online sales channel far supersedes the limits of traditional business and is an effective mechanism to reach customers directly and increase sales. However, an online sales channel needs to be extremely efficient and streamlined to help an organization increase customer satisfaction, customer base and revenues.

A leading healthcare provider, with its business spread across 60 countries, was selling products to customers through traditional distributors. Realizing that they could increase sales by creating online business operations, the company developed a Customer Ordering strategy. Customer Ordering is Internet-based and provides a direct business link between the company and its customers.

To implement the online strategy, the client required system enhancements, for which it developed new web services. However, it also amended existing web services in the process. The modifications needed fool-proof testing for optimal implementation of the customer order management system. The company then handed over the testing project to Infosys. The testing in this case was going to be a daunting task because of the absence of an automatic testing tool.

Challenges

A Customer Ordering system enables a customer to purchase products on the Internet. The healthcare provider internally allocated customers to distributors who opted to be part of the campaign. To facilitate their online business strategy, the healthcare provider created new web services for system enhancements and rewrote existing ones using .Net technology with WSE 3.0 standards.

As with any new software, testing of the new and modified web services was vital and this was the challenge for Infosys. With no tool available for automated testing, manual testing seemed to be the only way forward.

However, manual testing needed a separate proxy/ stub for each web service. The downside in this case was that each web service and web method would need a separate client, which implied:

- **Greater development and testing effort**
 - Each client application needed 20 person hours
 - Testers needed to learn the usage of every client before testing them
- **Higher maintenance cost**
 - Any change in the web service entailed a change in the respective client application
 - Though automation of the manual web service testing process seemed feasible once the applications were developed, automated scripts needed greater maintenance

The Infosys Solution

Infosys developed a generic UI (user interface) and web client and a new XML comparison tool to test any web service. Besides this, Infosys automated the web service testing process.

Generic User Interface and Web Client

Infosys analyzed the design of all new web services and concluded that a single generic client could be developed to test all web services – developed in the new platform – that exposed a WSDL (Web Services Description Language) with SOAP (Simple Object Access Protocol) 1.1 or SOAP 1.2 bindings

Infosys then developed the generic web client and user interface, thereby eliminating the need for numerous proxy/ stubs. Apart from saving costs and maintenance effort, the generic client allowed testers to examine different web services.

Testing Technology

- Platform/OS: Windows, Linux and HP3000
- Databases: Oracle, SQL Server
- Languages: VB.6/VB.Net, ASP/ASPX, C#, .Net web services
- Testing Tools: HP Quick Test Professional 8.2 (QTP),HP Quality Center 8.2 (QC)

Automated Web Testing Process

After conducting an automation feasibility analysis, Infosys automated the web services testing. The testing process created reusable components which could be used for further cycles.

XML Comparison Tool

The new automation framework lacked the functionality to compare two XMLs – Baselined Output XML after manual testing, and the Output XML generated during the automated run. Infosys developed a new XML comparison tool that compared two XMLs and reported discrepancies, if any.

Using these tools, Infosys tested the web services for regression, performance, compatibility and data migration.

Benefits

Infosys' web services testing helped the client implement an efficient Customer Ordering strategy and increase sales. During the project, Infosys ensured that cost and time estimates were adhered to, which in turn assisted the client to reap the following benefits:

100% testing effectiveness during regression

Automated testing ensured that the services were tested using numerous permutations and combinations resulting in a defect-free release. Moreover, automation eliminated errors which could arise from human oversight while comparing actual and expected results. This also helped the healthcare company in revenue terms since defects in the working of the order system could have resulted in dissatisfaction amongst users, leading to a revenue loss for the organization. Fixing defects in multi-iteration mode would have led to loss of time and revenue

Effort saving

Though the Infosys design took 2.5 person months to create, the effort saved due to automation ensured that there was no delay in deploying the new strategy. There was a 93% saving in effort using automation in comparison to manual testing on each subsequent testing cycle. For 1 cycle (400 test cases),

- Manual Test Execution Effort was 234 person hours
- Automated Test Execution Effort was 16 person hours

This further resulted in reduced time to market

Cost savings:

Nearly one and half million dollars were saved in a year over 12 software augmentations done that year

IT benefits

- **Boost in user confidence:** On-time delivery and high-quality deliverables assisted in punctual deployment of the Customer Ordering strategy. The business user's confidence in the IT department's abilities was heightened. This resulted in aiding the IT team's growth
- **Reduced maintenance effort:** With the generic web client application and automated testing process improving re-usability, minimal maintenance effort was required for subsequent releases



For more information, contact askus@infosys.com

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