

THE PROBLEM

In this case study we have addressed our experience of testing a CRM application, a company-wide business marketing system that helps an organization to manage existing customers, target new ones and generate quality leads.

The product was web based and developed within the .Net framework. The client's business users accessed the CRM across the globe to perform various functions within the domain of sales, marketing and customer management. Testing was executed at the client's site.

Testing of this application was aimed at detecting possible errors related to security, stability and compliance. The client also required that QA team at Kualitatem should understand, analyze and test the application based on the OWASP (Open Web Application Security Project) standards.

THE APPROACH

The testing was performed in a step by step order as illustrated in Figure 1. Client's requirements were gathered and documented before testing commenced. Application testing was broken down into 4 phases: Cross-browser testing, security testing, user role testing and performance testing.

In order to understand the CRM system the test team was provided with project documentation and online help manuals. Workshops were also held which involved the development and testing teams along with project and test managers. Before going through the client was asked for their specific requirements. QA team prepared reporting templates that were shared with client and modifications were made based on feedback sessions.

Figure 2 illustrated the type of tests performed along with their outcomes;

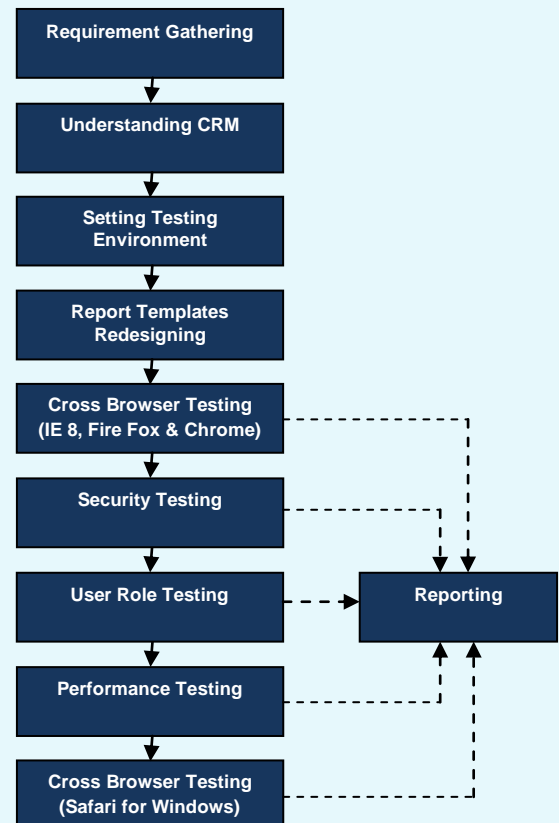


Figure 1: Testing Process

Testing Performed	Experience Gained
Cross Browser Testing	<p>Cross Browser Testing was performed using the IE 8, Fire Fox 3.5 and Google Chrome. The main aim of conducting the Cross Browser Testing was to find out the best browser that our client can suggest to their clients for efficient results. Depending on the limited timeframe and requirements other browsers were not considered. Cross Browser Bugs were reported based on the platforms and severity level.</p> <p>The next step was to perform Security and User Role Testing side by side.</p>
Security Testing	<p>In order to perform Security Testing various tools and OWASP standards were considered. The main aim was to test system for Un-Validated Inputs, Cross Site Scripting, Injection Flaws, Buffer Overflow and Broken Authentication & Session Management. All the possible pages were tested in order to find any of these vulnerabilities. The issues were reported in the form of Level 1 and Level 2 where Level 1 was treated as serious threats and Level 2 as tools generated and standards dependent warnings. All the issues were reported in a meaningful way and suggestions were given after a thorough research of OWASP standards.</p>
User Role Testing	<p>Under the User Role Testing key users along with their rights to perform various operations were identified and shared by clients. Before jumping in to testing phase each user role was studied and purpose of the restrictions were considered. Each user role was than tested for their access and rights of creating, modifying or viewing various data. Also the scenarios were considered and tested where users have limited or no access at all of viewing various set of data. All the reports were generated and discussed with the client before proceeding to Performance Testing.</p>

Performance Testing	<p>In the Performance Testing all the possible test scenarios were identified and documented. Scenarios were than shared with the client for the enhancements or outcome. Out of them some of them were dropped as to their usage and needs. After the finalization, all the scenarios were than transformed in to 5 Test Suites in order to make a flow of the application. Current users of the system were found to be 5 and the expected users of the system are noted to be around 150 users. Considering these figures client wanted us to conduct performance test for 250 and 500 virtual users. Based on the requirements each test suite was scripted for 250 and 500 virtual users. Each test suite was than executed in order to measure the figures of Throughput, Response Time, Round Time and Hits per Second.</p> <p>After successfully executing the load test all the figures were considered and a report was generated based on the results to present the performance measures. Though the system was found strong enough to bear the expected load efficiently but still some recommendations were made that were noticed during the test.</p> <p>Following table list the max and min values noticed for different parameters of the performance test.</p> <table border="1"> <thead> <tr> <th>Parameters</th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>Response Time</td> <td>9 sec</td> <td>14 sec</td> </tr> <tr> <td>Throughput</td> <td>45 kb/sec</td> <td>80 kb/sec</td> </tr> <tr> <td>Hits per Second</td> <td>3 sec</td> <td>8 sec</td> </tr> <tr> <td>Round Time</td> <td>15 sec</td> <td>20 sec</td> </tr> </tbody> </table> <p>At the end of the project the client wanted us to spend a bit of time on finding any issues that may exist in Safari for window browser. The main purpose was to give an ease to their clients who may use MAC OS. Bugs that were generic to browsers and already reported were not reported again but a reference was provided in order to trace them easily.</p>	Parameters	Min	Max	Response Time	9 sec	14 sec	Throughput	45 kb/sec	80 kb/sec	Hits per Second	3 sec	8 sec	Round Time	15 sec	20 sec
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SUMMARY

An efficient process was put in place to manage application testing within the specified time frame. Workshops, reports and discussions proved to be helpful in streamlining the overall process.

The following table illustrates that how Test Result was presented to the client for each Test Suite.

Parameters		Number of VU	
		250	500
Response Time (sec)	Min	0.092	0.106
	Max	8.157	93.236
	AVG	4.1245	46.671
Throughput (KB/sec)	Min	1764.450	738.000
	Max	13982046.100	14583784.000
	AVG	6991905.275	7292261
Hits per Second (sec)	Min	0.95	0.450
	Max	346.650	433.200
	AVG	173.8	216.825
Round Time (sec)	Min	16.966	18.626
	Max	317.052	977.648
	AVG	167.009	498.137

All reported bugs were fixed and a final round of regression testing was carried out to ensure an error-free product.