

Comp  Consults

We know technology

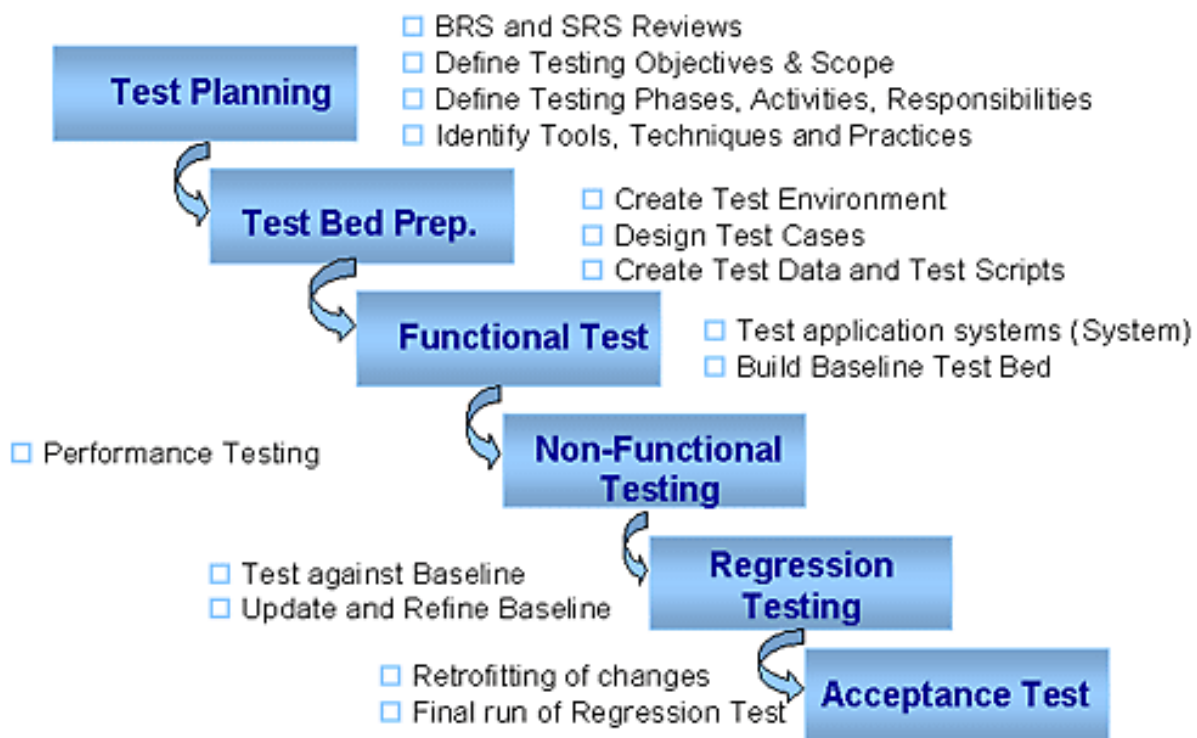


**Comp Consults** strongly believes testing as a key element in software development and maintenance life cycles. Typically organizations have to budget 40% of the total software development and maintenance time towards testing the solution for highest end-user satisfaction.

Our rich experience in building and testing IT solutions helped in formulating a dedicated QA practice to address the functional and non-functional testing needs of client systems.

## Our Methodology

### Testing Methodology



## Functional Testing Methodology

Unit, System, Integration and Navigational Testing are a part of functional testing. **Comp Consults** functional testing methodology is derived from the industry standard quality testing models and in crisp the phases in the testing cycle are

- Requirements Gathering and Analysis
- Design Test Specifications
- Test bed Creation
- Setting up the Test Environment
- Test Execution

### **Requirements Gathering and Analysis**

This phase will involve understanding the functionality of the System under Test (SUT). The following will be carried as a part of Requirements gathering:

- Study and Review the Application
- Understand the system functionality and its flow
- Identifying the Navigational paths / screens

This phase is aimed at getting a hang of the application and its functionality to arrive at Functional Test requirements.

### **Test Bed Creation**

This phase is aimed at building automated test scripts. The following activities will be carried out in this phase:

- Translating the test cases into WinRunner / QuickTest Scripts or any Other automated test scripts
- Sample Runs of the test scripts to ensure the coverage
- Resolving script issues if any
- Creating the required data pool for testing

The test scripts will be stored in a repository like Test Director.

### **Test Execution**

This phase will involve execution of the test scripts to identify functional bugs in the SUT. Following will be carried out in this phase:

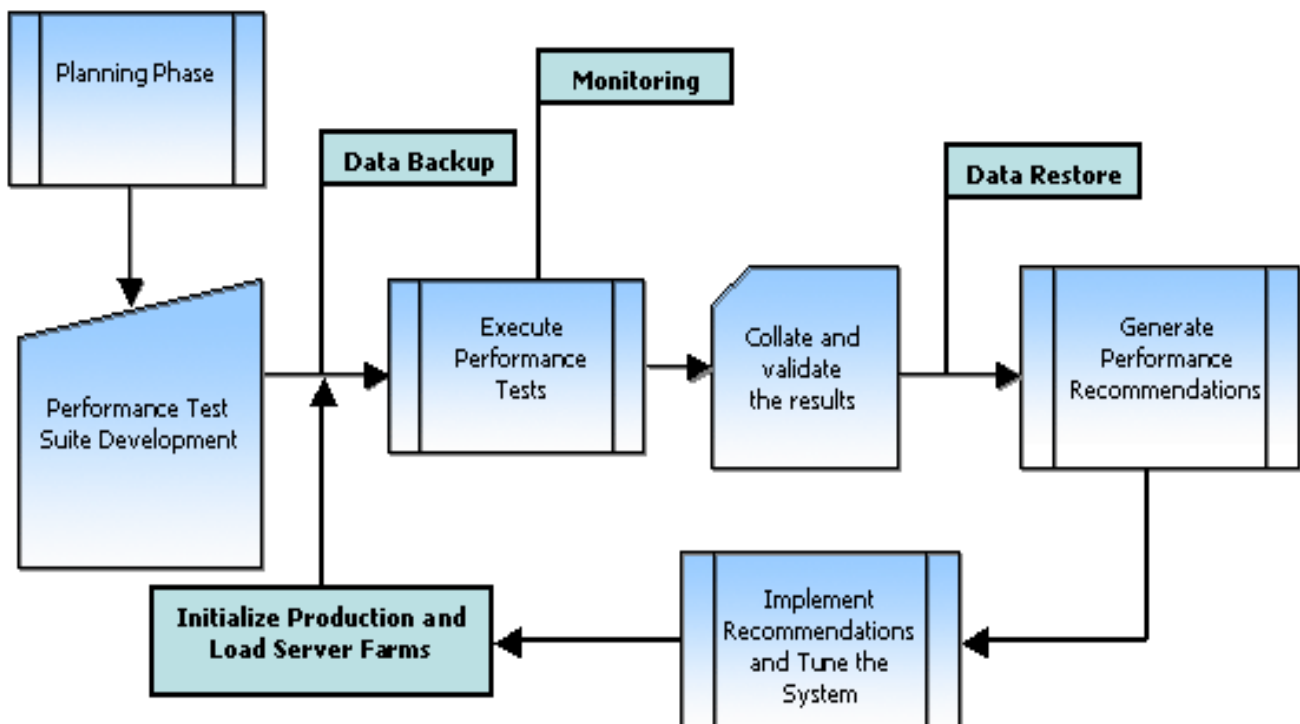
- Identification of the functional bugs
- Logging the test results and the bugs into the Test Director
- Generating reports on the functional test coverage and results.

## Performance Testing Methodology

Most of the organizations has standardized on LoadRunner for their performance testing needs. **Comp Consults** has been involved in carrying out benchmarking at various client locations using the following methodology.

The performance testing and tuning methodology of **Comp Consults** is usually structured in to 5 phases.

- Planning phase.
- Test suite development.
- Execution of load tests and monitoring.
- Performance analysis and review.
- Preparation of performance report.
- Performance Tuning and Optimization



**Comp Consults** suggests the following types of Performance Tests to be carried out for understanding the state of performance of the SUT using LoadRunner or any other load testing tool from Rational, Compuware etc.

## **Load Test**

Load testing subjects the SUT to virtual user loads beyond the anticipated or target loads. The goal of load testing is to determine and ensure that the system function properly within the set performance targets and also the designated maximum loads do not compromise the designated sensitive elements. Load testing can be used to predict future production loads.

## **Stress Test**


Stress testing is intended to find errors due to extended usage of the SUT. Memory leaks, low available memory, disk space and other defects may occur when the SUT is subjected to maximum virtual user loads for extraordinary periods of time. Stress testing can help identify system fails.

## **Volume Test**

Volume testing subjects the SUT to large amounts of data. The goal of volume testing is to determine if the high volume limits can be obtained without degrading the performance of the SUT. Degradation of the SUT may occur when a maximum load performs the same function against a maximum size database. Volume testing can be used to predict future production loads.

## **Scalability Testing**

This type of performance testing will measure the response time, transaction rates and other time sensitive elements of the System under Test (SUT). Scalability testing is executed several times with different virtual user loads. Tests are executed with virtual user loads below and above the anticipated or target load. The results of these tests will display the scalability of the SUT over the designated virtual user loads. Additional tests may be executed in order to tune the components of the SUT.



## Our Test Execution Models

**Comp Consults** executes its functional and performance testing projects using three different execution models depending on the complexity of the SUT

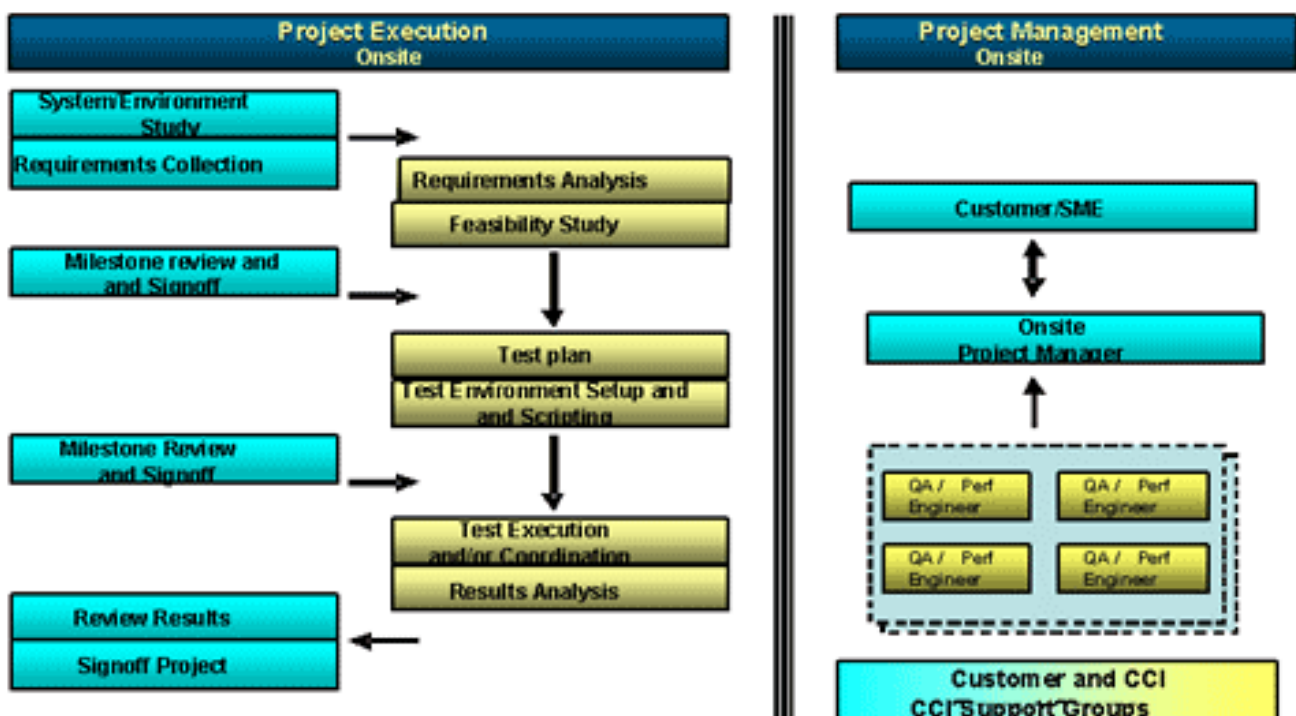
Functional testing involving system and integration is preferable to be carried using onsite or onsite-offshore methodology. However unit, component and regression can be executed using any of the above execution models

Performance testing involving load, stress, volume& scalability testing needs a production-like environment and is preferred to be carried out using onsite or onsite-offshore methodology. However, unit level and component testing can be carried out on a down-scaled environment at offshore.

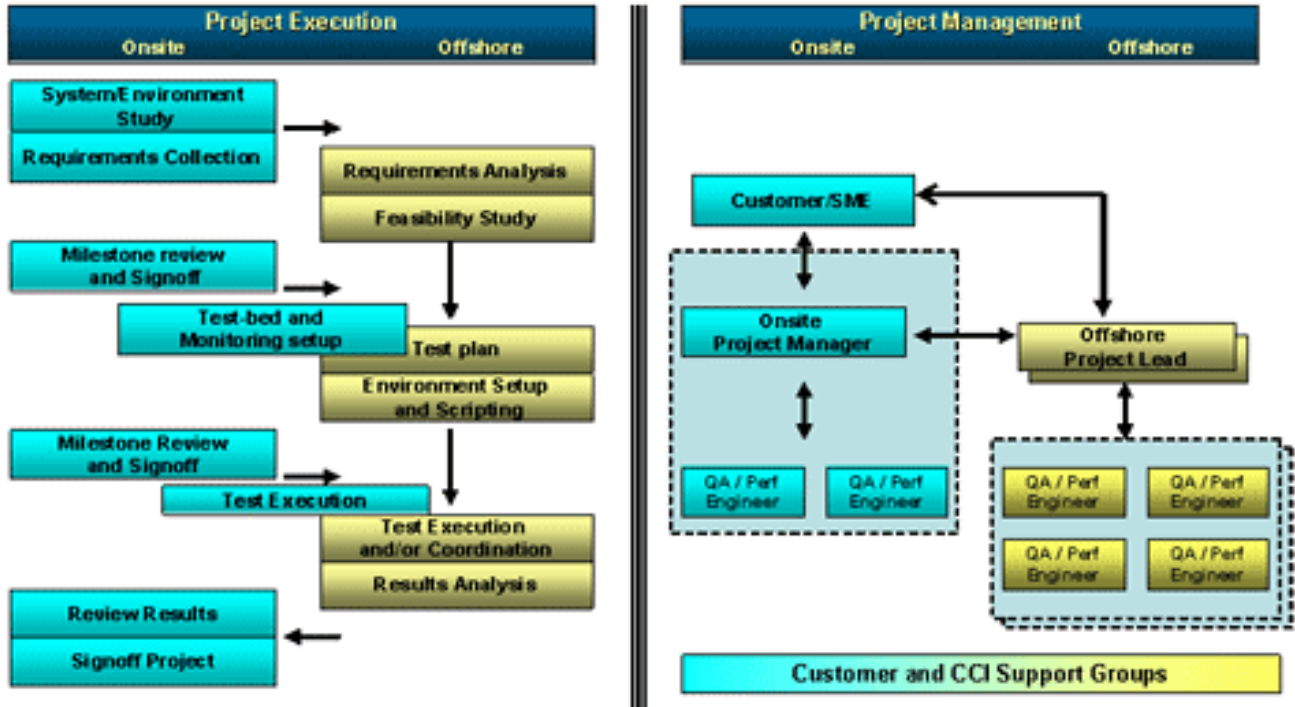
Following are the execution models that help in accruing cost-benefits:

- **Onsite Model**
- **Onsite-Offshore Model**
- **Offshore Model**

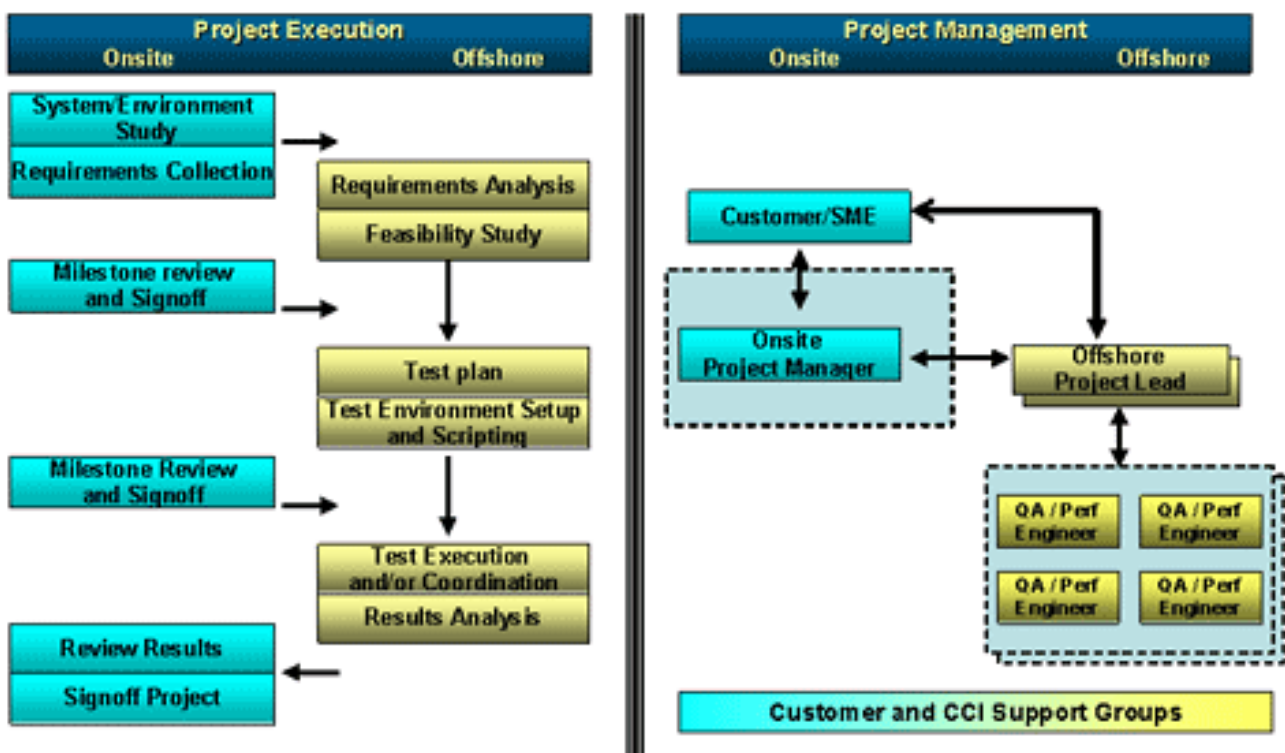
### :: Onsite Model



:: Onsite-Offshore Model



:: Offshore Model



## QA – Tools we use

**Comp Consults** executes its QA projects either manually or by using industry standard third party tools. The automated tools we use in our projects include:

### **Functional Testing**

- Mercury Interactive WinRunner / QuickTest Pro
- Rational SQA Robot
- Compuware QA Run
- Silk Test

### **Performance Testing**

- Mercury Interactive LoadRunner
- Rational Robot
- Compuware QA Load
- Silk Performer

CCI also uses various kinds of profilers like VTune, JProbe, Statspack etc...

### **Defect Tracking**

- Test Director
  - Rational ClearCase and ClearQuest
  - PVCS Tracker
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## Our Experience

Following is the sample list of profiles where **Comp Consults** was involved in Functional and Performance Testing:

### Functional, System, Regression, Integration

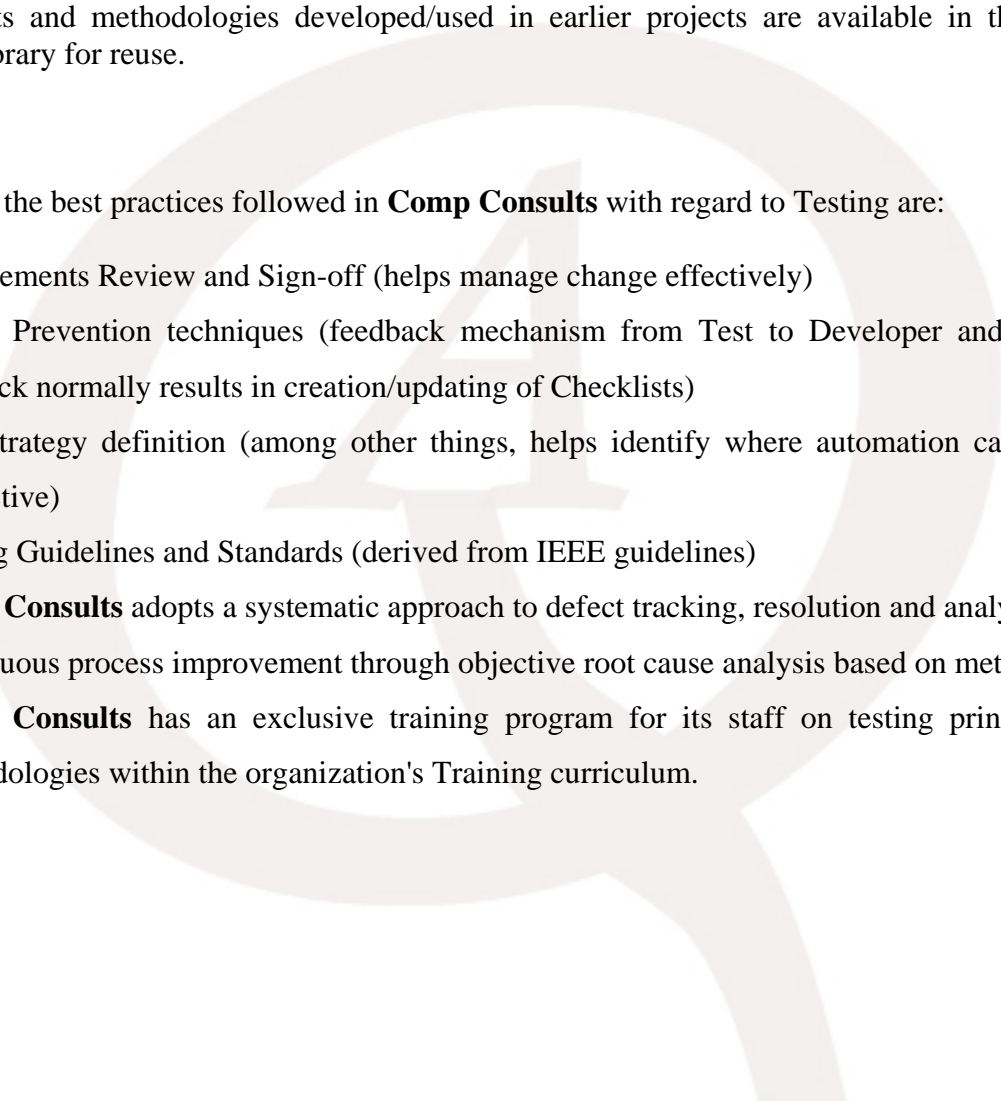
Client	Large Consumer Retail Organization
Project Name	RETAIL SALES SOLUTION
Type of Project	Functional, System, Regression, Integration Performance Testing and Performance Tuning.
Application domain	Siebel Analytics
Testing Project Description	<ul style="list-style-type: none"> <li>➤ To test Configuration changes made to the OLAP database</li> <li>➤ High level testing of data flows, key processes like ETL initial and increment loads,</li> <li>➤ Caching of reports,</li> <li>➤ Production of required reports, dashboards, iBots, Answers, delivers, and ad-hoc analysis.</li> <li>➤ Performance testing and analysis of reports.</li> </ul>
Deliverables	Test Plan. Test Execution summaries, Fault logs, Test Results Analysis.
Architecture (CS, Web, Host based )	Web
Client software	Internet Explorer 6.0
O/S, DBMS, OLTP, Application Developed tools, communication s/w	Unix, Oracle 8I, Siebel 7.5,2/Siebel 7.5.3, Siebel Analytics, Quick Test Professional 6.0, Test Director 7.6, Load Runner7.5
Tools and techniques/utilities used - purchased /in-house/ developed/reused/reusable	Create test conditions database, Fault logs, Functional System and Performance testing Process refinement

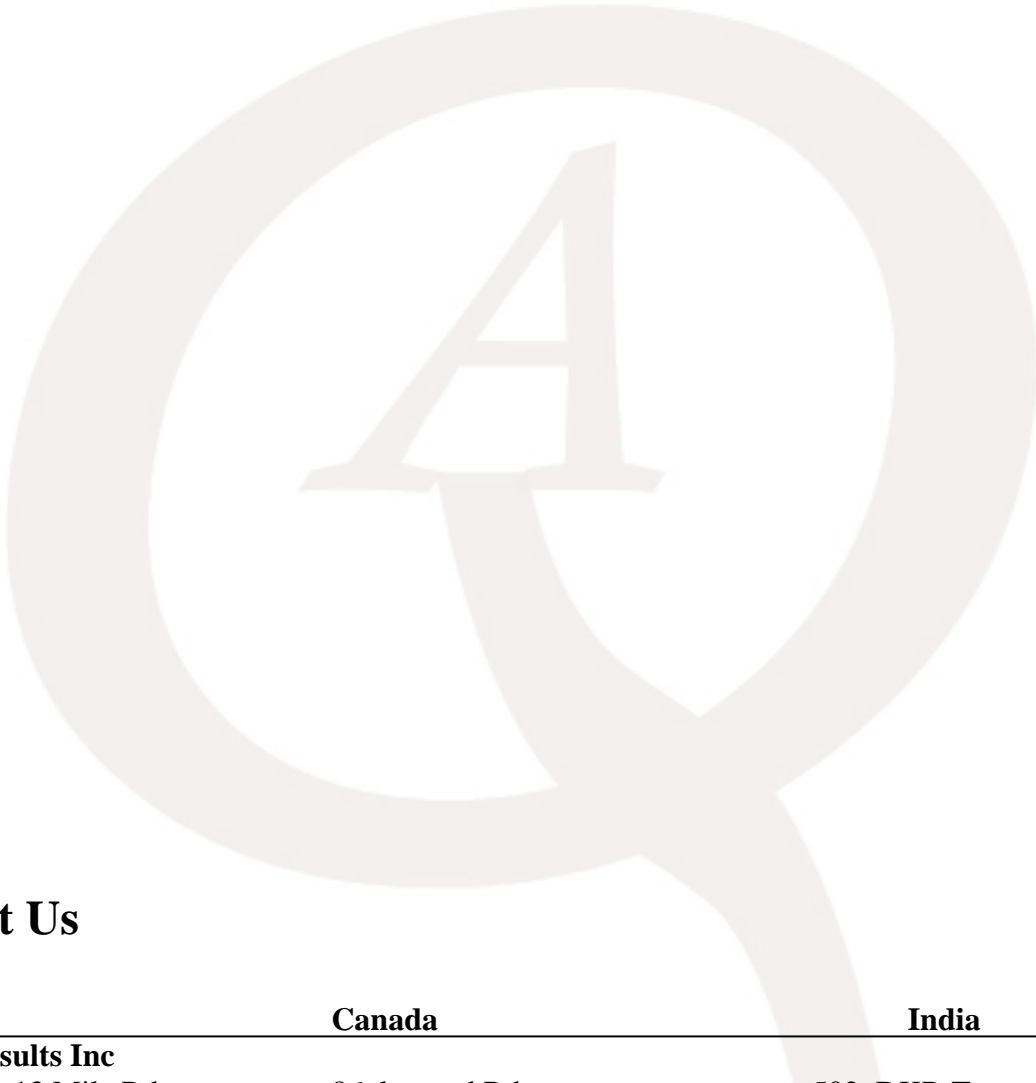
Client	Large Wireless Customer
Type of Project	Performance Testing and Performance Tuning.
Project Description	System Under Test (SUT) is the integrated Siebel customer application designed to assist enrollment of new wireless services, modification of existing services etc. The application communicates with the other key external applications such as Address Verification system, Usage area, Numeric Track, Financial Profile system through Vitria. The system is supposed to handle a concurrency of 10,000+ users.
Challenges	Whenever a software or application upgrade has to be moved into production, a end-to-end performance analysis of the e-configurator, EAI, Siebel Server, web server, resonate is to be carried out. The CPU and memory usage of all the servers involved needed to be monitored by simulating the identified business scenarios for different workload characteristics.
Solution	<p>The performance testing team from <b>Comp Consults</b> was involved in setting up the hardware and software environment along with the benchmark suite for performance testing and tuning in the client's Performance Engineering Lab. The following activities were carried out as a part of this exercise:</p> <ul style="list-style-type: none"> <li>• Refine the performance testing process</li> <li>• Installation and configuration of Load Runner 7.5 for Siebel</li> <li>• Configuration of Siebel Application Server.</li> <li>• Configuration of Gateway and Web Plug-ins (Thin Client).</li> <li>• Configuration of Resonate load balancing s/w</li> <li>• LoadRunner scripting for complex business transactions</li> <li>• Creating and executing various load runner scenarios for 1000, 5000 and 10000 users</li> <li>• Analysis of VMSTAT (Unix Performance Monitor) data for each server.</li> <li>• Configuration and Tuning of each Application Server in Siebel suggested way and as per the performance test results</li> <li>• Configuration of P2P link such as numeric track, KMS service, Credit Card validation system</li> </ul>
Results	<ul style="list-style-type: none"> <li>✓ Managed to identify bottlenecks and slow running queries</li> <li>✓ Identified memory leaks on Siebel e-configurator and EAI</li> <li>✓ Identified memory leaks on Siebel e-configurator and EAI</li> <li>✓ Identified tuning requirements on database side</li> <li>✓ Further testing and tuning in progress</li> </ul>

## Best Practices

**Comp Consults** maintains a repository of best practices across projects as part of its process assets. Best practices are evaluated and incorporated into the operational process documents by the Software Engineering Process Group. Whenever new projects are undertaken, tools, checklists and methodologies developed/used in earlier projects are available in the process assets library for reuse.

Some of the best practices followed in **Comp Consults** with regard to Testing are:

- Requirements Review and Sign-off (helps manage change effectively)
  - Defect Prevention techniques (feedback mechanism from Test to Developer and QA. The feedback normally results in creation/updating of Checklists)
  - Test Strategy definition (among other things, helps identify where automation can be most productive)
  - Testing Guidelines and Standards (derived from IEEE guidelines)
  - **Comp Consults** adopts a systematic approach to defect tracking, resolution and analysis
  - Continuous process improvement through objective root cause analysis based on metrics
  - **Comp Consults** has an exclusive training program for its staff on testing principles and methodologies within the organization's Training curriculum.
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## Contact Us

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