CardinalTS™
Redeem the soul of your enterprise

www.cardinalts.com

Web Application Performance Tuning

- An approach to identifying bottlenecks and improving overall Web performance

By

Cardinal Technology Solutions

Abstract

This document provides information on the strategy that Cardinal Technology Solutions follows when entrusted with the job of bringing performance enhancements to its client's applications. When a client reports a performance problem, Cardinal Technology Solutions sends out its best-trained application engineers who are extremely adept at tuning web applications.
A typical project having a variety of performance issues may take any where between two weeks to four weeks for problem identification, cause determination and resolution.

Initial Assessment

The first priority of the tuning team is to assess the nature of the problem, its impact and the probable causes that may have contributed towards the bottleneck. This may include an assessment of the technology being used, assessment of the problem at hand and review of the process followed during the engineering of the application.

Technology Assessment

This includes an assessment of the environment in which the application is deployed.

The following system constraints are identified and their impact noted down:

- Hardware and operating system constraints
- Software constraints
- Database constraints
- Application server constraints
- External dependency constraints

A number of times we have seen that problems have arisen because of incompatibility between the components. Our performance tuning team does the due diligence and prepares a matrix of such incompatibilities that are present in the system.

Problem Assessment

Once the constraints have been identified, the following are determined in the context of the application.

- Existing runtime behavior
- Desired runtime behavior
- Impact of the problem
- Hypothesis for probable causes
- Scope of possible solution

Engineering Process Review

This covers an in-depth review of the application's architecture and the processes employed during development. In particular the tuning team reviews the following:

- Application Architecture
- Application Code
- Components of Application Startup
- Testing methodologies
- Engineering processes

Tuning Strategy

Following steps are employed as part of this. A prerequisite to this is that the problem use cases have already been identified and the problem is repeatable in nature.

Problem Isolation

This involves the following

- Problem reproduction – this may require simulating expected application load
- Identifying the location of bottleneck through memory profiling
- Generation of test cases to isolate the problem

Cause Determination

Once the problem has been isolated, the next step is to determine the cause. The following areas of the application are analyzed and the cause is determined.

- Application Server layer
- Persistence layer
- Database Queries
- Dependencies on external systems
- Application Code

Tuning Report

Following the cause determination, the tuning team generates a report that lists out the following

- Application tier responsible for problem degradation
- Detailed explanation of the cause
- Resolution Strategies and their impact
- Suggested Steps

Fix and Patch

As per the client's needs, the tuning team chooses the most appropriate solution for the problem and provides it to the client.

Post Fix

After the problem is resolved and the application starts performing satisfactorily, CardinalTS proposes to perform regular maintenance on the application in the context of performance tuning.