

Managing Multi-Billion Dollar IT Budgets using Source Code Analysis

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Abstract

We present a quantitative approach for IT portfolio management. This is an approach that CMM level 1 organizations can use to obtain a corporate wide impression of the state of their total IT portfolio, how IT costs spent today project into the budgets of tomorrow, how to assess important risks residing in an IT portfolio, and to explore what-if scenarios for future IT investments. Our quantitative approach enables assessments of proposals from business units, risk calculations, cost comparisons, estimations of total cost of ownership of entire IT portfolios, and more. Our approach has been applied to several organizations with annual multi-billion dollar IT budgets each, and has been instrumental for executives in coming to grips with the largest production factor in their organizations: information technology.

Motivation

It is known from extensive research conducted by the former CIO of the US Department of Defense, Paul Strassmann, that there is no relation between profits and annual IT spending [2]. The only vague correlation that Strassmann ever found was that when from two comparable enterprises one is spending slightly less than the other, the less spending organization is doing slightly better.

The bad news for many executives is that the area of software development is fairly immature. The failure rates of software projects are high: about 30% of software projects fail, 50% are twice

as expensive, take twice as much time, and deliver half the functionality, and only 20% of the software projects is on time, within budget, and with the desired functionality. This points to the need for models that predict costs of IT portfolio changes and better tools support for transforming IT portfolios to meet changing requirements.

Our approach to quantitative IT portfolio management provides you with insight in an IT portfolio, even in the case of level 1 organizations [2]. We developed a set of mathematical formulas based on public benchmark information to quantitatively manage IT portfolios. Initially, a level 1 organization has to compensate for the lack of historical information by utilizing and deploying benchmark information. When they have historical data it can establish internal benchmarks, you can use these to instantiate our formulas.

An excellent example where financial/economic aspects of an IT portfolio meet the deep technical aspects of an IT portfolio is the nine-to-ten (9210) problem faced by Dutch banks who are running out of 9-digit bank account numbers and need to convert to 10-digit numbers [3]. Like the Euro conversion, this change will require significant effort.

Basically the boardroom issue is: what are the cost, duration, risk, return, and financing aspects of the 9210 problem. And the answer is found by performing an IT portfolio analysis using source code analysis and modification technology. Analysis to measure the impact, and modification to perform a benchmark to estimate the cost of change.

A rule of thumb cost of outsourcing the Y2K-problem and Euro-conversion ranged from \$1.00 to \$2.75 per physical line of code. The estimates for making such changes in-house are lower: between \$0.25 and \$1.25. For the 9210 problem, the estimate that we have seen most is \$1.00 per physical line of code. A typical large international bank's IT portfolio contains about 48 million Cobol statements. According to the rule of thumb, this institution will spend in the order of 50 million dollars on 9210 for the cost of change alone.

Using a sufficiently similar benchmark project called the 223 project, tool support reduced change cost by a factor of 4. For 9210, a factor of 4 reduction is conservative as we assumed that not a single error would be made if all changes were done without using automated support. For an international bank, the savings of a factor 4 on the cost of change, reduces this cost to the order of \$12.5 million. Incorporate the \$1.00 release costs per physical line of code (another 50 million dollar cost) [3], and the total cost of a 9210 project for a large international bank amounts then to \$62.5 million. In this case, tool support leads to a cost reduction of at least 37.5% for a 9210 project.

IT Portfolio management is a new and promising area of research [1, 2], giving the boardroom the means to rationalize decision making about valuable IT-assets and IT-projects. SCAM-like technology is the tool to understand the underlying assets and to evaluate the project plans, making it the bridge between boardroom strategy and IT reality.

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