Project Report

Methodology to Benchmark Performance of New IT Implementation

Project Sponsor

TDS Telecom

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TDS is currently engaged in an extensive IT implementation to improve many of its vital business processes. Though TDS has mapped out the business process flows (BPFs), they do not yet have a robust methodology to measure and predict the performance and success of the IT project. In considerations to process modeling, there are two different industry approaches: function-centric and performance-centric. TDS already has excellent function-centric BPFs, which allowed the student team to approach the IT project from the performance-centric perspective. The student's research findings will enable TDS to have a balanced and complete approach towards its IT implementation.

The student team considered four different performance-centric mapping tools:

- Value stream mapping
- Monte Carlo simulation in Excel
- Monte Carlo simulation with Excel add-ons (@Risk)
- Discrete event simulation (ARENA)

VSM is useful in that the methodology lists key process characteristics, such as cycle time and process throughput, next to the process nodes to allow users to graphically represent the whole process and calculate the lead time. The methodology is easy to learn and can be used as the backbone of more advance analysis. Albeit the convenience, the methodology can only provide rough estimate of performance and has limited relevance in reflecting real world scenarios due to its deterministic nature.

The next option considered by the student team was Monte Carlo simulation in Excel. Monte Carlo simulation takes into account the variability of processes in the system. As such, the methodology provides a better representation of system performance. However, performance distributions of processes are hard to determine, especially for IT processes that has not yet been rolled out. One way to improve the Monte Carlo simulation is to install Excel add-ins such that the distribution can be better identified with testing data. Be as it may, the Monte Carlo simulation works best under the independence assumption. In other words, the accuracy of the methodology deteriorates if process performances within the systems are correlated.

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The fourth and final option considered by the student team was discrete event simulation, and in particular, discrete event simulation in ARENA. Given accurate input data, this powerful computational tool allows users to perform extensive what-if analysis among other deep and meaningful analysis. The major limitation of this approach includes cost and the extensive trainings required to properly explore the full potential of the software.

The student team evaluated and scored the four methodologies in terms of cost, training, capabilities, accuracy, illustration, availability, and model construction time. The evaluation results show that VSM is the most attractive methodology for beginners while discrete event simulation offers the most comprehensive analysis.

With the project goal of "develop a methodology to establish performance targets that can serve as a baseline for confirmation of benefits upon project deployment" in mind, the student team constructed a VSM based on the DSL BPF and used processing time data and error probability assumptions provided by TDS. According to the VSM, the overall lead time of the DSL process is approximately 2 hours. Though the VSM provides interesting information, it is not a complete analysis. To make the analysis more fruitful, the student team also constructed a more accurate simulation using ARENA. Resource utilization, bottleneck, and potential areas for improvement were determined through the analysis with pre-determined assumptions.

To gain a better understanding of the industry approaches to IT projects, the student team also conducted interviews with four companies who are members of the UW E-Business Consortium. These companies have recently completed major IT projects, and the relevant experiences are beneficial to TDS. The purpose of the interviews was mainly to understand industry standards for analyzing project effectiveness. Key insights gained from each company are organized and presented in the report.

As a conclusion to the student's research findings, the students recommend TDS to adopt VSM and apply the methodology toward the remaining 139 business processes. The methodology will allow TDS to analyze their current BPFs and identify particular processes worth deeper analysis with ARENA. Armed with analysis results, TDS can better validate and determine whether or not the new IT processes will achieve the larger business goals. With a better understanding of the process performances, TDS can further modify the IT processes to better capture future business growth.

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