

The Impacts of Handoffs on Software Development

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Introduction

- This years COCOMO conference deals with software sizing issues.
- Many of the failures of software cost estimation have been because of the difficulty in measuring the size of a software development system (Verner and Tate 1987).
- Lines of Code has been shown to be a poor measurement. Function Point Analysis is an improvement.
- Fundamental flaws in the construction of function points prevent them from being valid measures (Kitchenham, Pfleeger et al. 1995, Kitchenham 1997).

Software Sizing

- Calibration using historical data is a methodology to solve the software sizing problem.
- Results of calibration are equivocal. For every study that had success in using calibration, another study showed failure using the methodology.

Team Size

- “While the Boeing Model and other contain team size as an explicit software development attribute, it is surprising that neither the Walson-Felix study nor Boehm’s COCOMO Model directly identify team size as a significant factor in productivity assessment. Undoubtedly, its effect is included indirectly in other factors that may be closely correlated with team size. For example project size is usually considered a significant factor which is highly correlated with team size.” (Conte, Dunsmore, and Shen, 1986 p.258).

Testing Conte's Assumption

- A correlation was conducted between max team size and system size (in lines of code) on a large data set.
- No significant correlation was found.
- The correlation was $+0.07$.

Analysis

- If there was a significant correlation between team size and project size, then current software sizing problems can be solved by replacing team size for project size.
- But team size and project size are not significantly correlated.
- In addition, Braint (1998) found that KLOC, team size, and RELY, STOR, and TIME best explain costs of military projects.

Team Size

- From the literature on software cost estimation, team size is an important metric left out of COCOMO.
- The Cooperative Program Model (COPMO) (Thebaut and Shen 1984) modeled team size with some success, but the model had limited use.

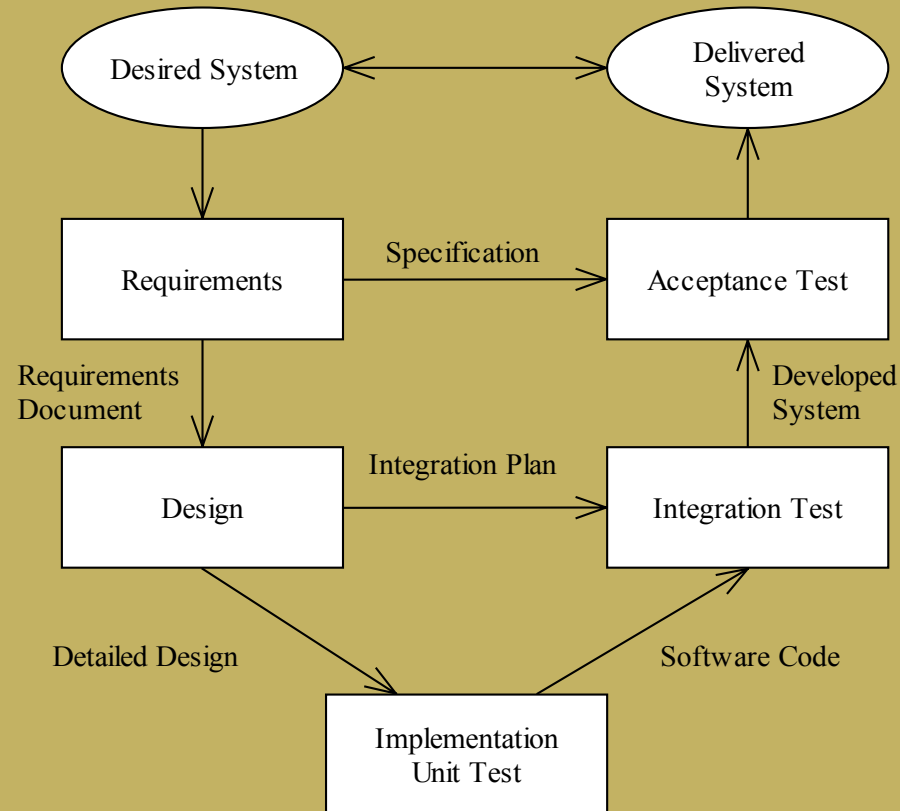
Reformulating Team Size

- Based on the work of Brooks, Abdel-Hamid, and the idea of COPMO, an extension to COCOMO II was created.
- Theoretically, the effects of team size are reformulated as inter-group coordination and intra-group communication.

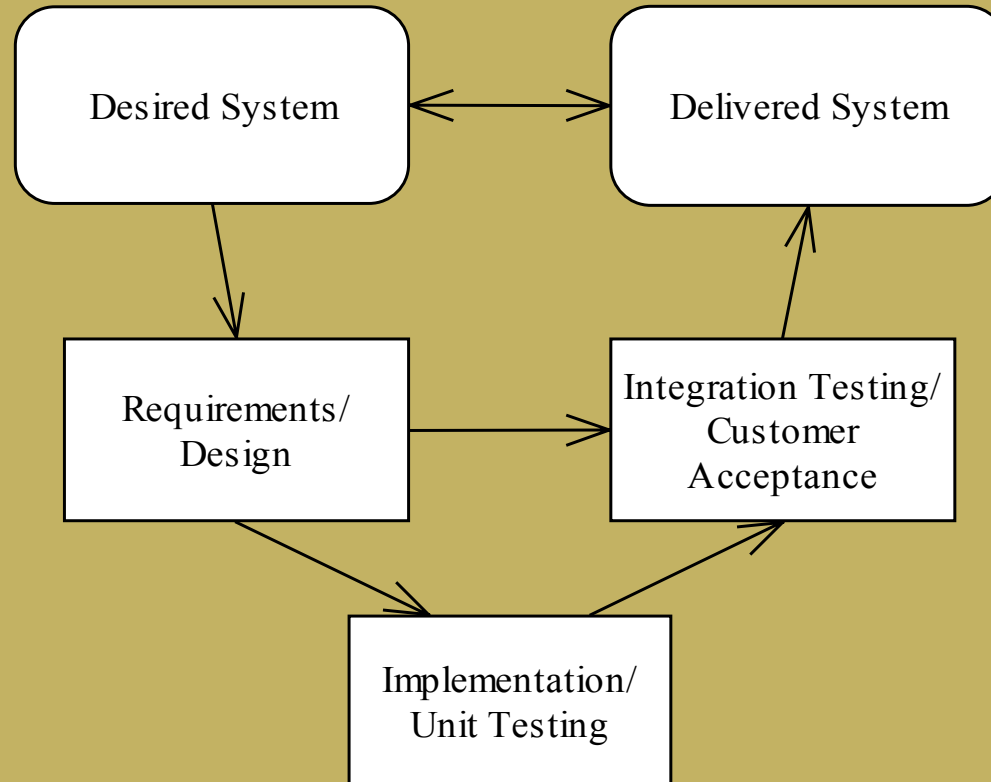
Process Structure

- Different process structures will affect the amount of inter-group coordination. We investigate the impact of three different process structures.
- Three-Tier, Two-Tier, and One-Tier

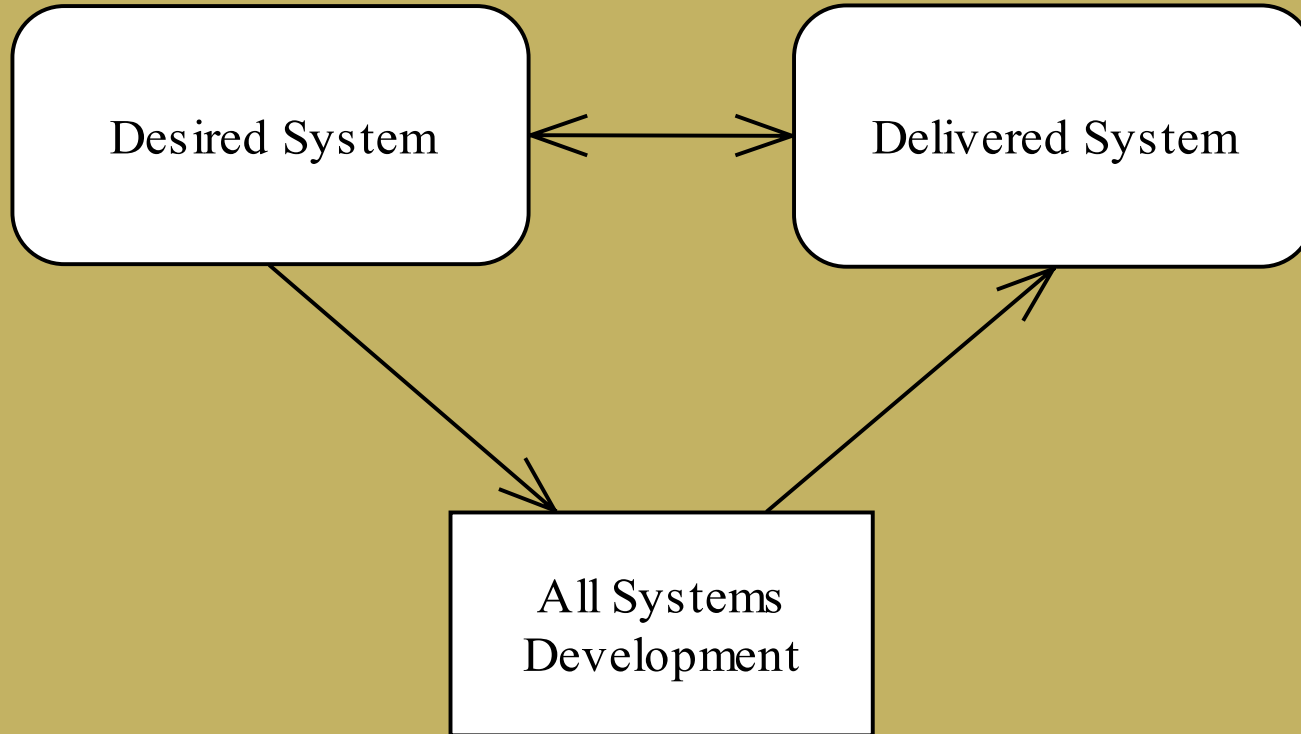
Three-Tier



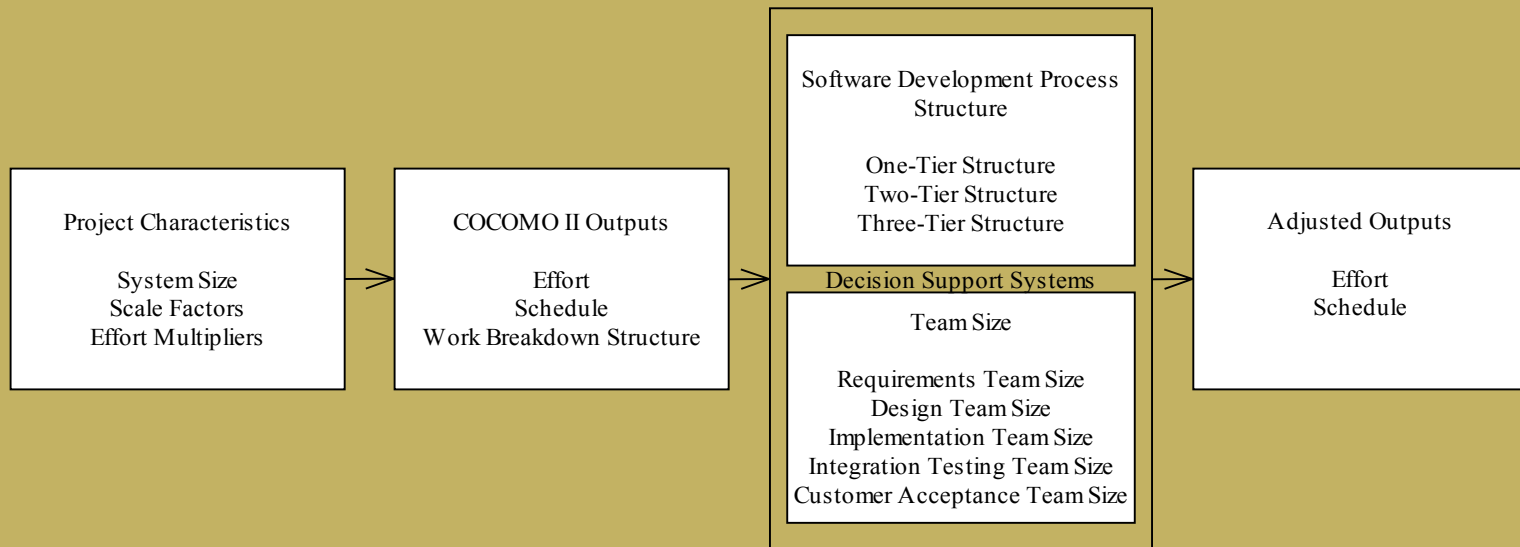
Two-Tier



One-Tier



COCOMO II Extension



Project Tool

- At this point a DSS project that performs the calculations will be demonstrated.