2012 IEEE Seventh International Conference on Global Software Engineering

Setting up a stochastic model for teams working in a follow-the-sun environment

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***Abstract*—Project management is an important aspect of global software development. Companies and institutions can obtain benefits by the use of performance evaluation of teams working in different sites. The objective of this work is to discuss a stochastic model definition to performance evaluation of Follow-The-Sun (FTS) projects.**

***Index Terms*—Global Software Development; Projects Simulation; Performance Evaluation; Follow-the-Sun; Stochastic Modeling.**

Follow-The-Sun (FTS) is a type of global software development which focus on projects that search for velocity by the reduction of project life cycle (*time-to-market*) [1] and share many challenges and issues of global software development such as coordination, cultural factors and communication issues [2].

FTS challenges can be mapped through the use of analytical models for analysis of projects behaviors in order to facilitate companies and institutions decision-making process, providing a better understanding of possible issues that can occur in geographically distributed projects.

Related works for stochastic modeling and simulations are developed through the dynamic specification of software projects [3], [4], as the usage analytical modeling for variability performance analysis of software development teams [5], [6], [7]. *Stochastic Automata Networks* (SAN) [8], [9] is a formalism based on Markov Chains [10] that provides an abstraction of the model description. Using the SAN formalism it is possible to describe a global model of a system composed by subsystems, defined as stochastic automata, which have three primitives: *states*, *transitions* and *events* [8].

This work describes an analytical model of software development teams using members located in three different sites. The idea is to instantiate multiple sites (composed by team members) having a central FTS project controller responsible for overall control of project activities at model level. Each site is composed by a team of N members. On this perspective, we consider a team composed of one single member to a maximum size of N members attached to a site. Each site has a group of members that could be used to simulate different development velocities *per* site, helping the decision making process to be more efficient in terms of resource management. Team site automata represent a number of people working at a given shift and has its allocation defined by parameters.

In this work, we have presented a conceptual foundation that can be used to model development teams in Follow-The-Sun (FTS). The approach adopted here allows a FTS setting that can be extended to cover other behaviors or to test novel configurations. We understand that this work does not capture all important aspects of Follow-The-Sun projects such as different cultures, different languages, communication barriers and teams coordination challenges. The motivation of a future stochastic modeling exercise is to explore more scenarios and numerical analysis. Finally, it is important to keep in mind this model could be extended/modified for analysis of GSD projects in a generic point of view.

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978-0-7695-4787-9/12 $26.00 © 2012 IEEE
DOI 10.1109/ICGSE.2012.21