

# Software/System Reliability

Pete Rotella  
Cisco Systems, Inc.

## **Abstract**

This tutorial begins by describing the use of three types of software metrics: In-process, customer experience, and customer sentiment. Each metric type characterizes an important part of the software lifecycle, and the sequence circumscribes much of what concerns us in software engineering and reliability. For example, an important use of in-process metrics is to construct and use mathematical models that predict software reliability and other key quality attributes. The tutorial session will describe the process of collecting, scrubbing, and transforming in-process data to build models and simulations that predict customer experience and sentiment.

Models are needed to enable software practitioners to identify deficient (and superior) development and test practices. Even in environments having standard practices and metrics, software teams often vary substantially in practice adoption and effectiveness. Therefore, one challenge is to develop and implement generalized models that adequately characterize the health of individual practices (such as code review, unit test, function testing), to enable process and quality assurance groups in assisting engineering teams in repairing broken practices or replacing them with more effective and efficient ones.

In this tutorial session, we will describe our experience with model building and implementation, and attempt to describe the domains within which certain types of models perform well. We will also address how to balance model generalizability and specificity in order to integrate the findings into the everyday engineering workflow.

Also, we will describe how to in practice use the models and other analyses we create – how to implement the changes and then track progress over time and over subsequent software releases and new products. Developing analyses and models is only the first step in an often arduous journey to full acceptance and use.

## **Bio**

Pete Rotella has a degree in Physics from Duke University in North Carolina. For the past 15 years at the corporate level in Cisco Systems, he has been investigating ways to improve software quality, including work in software reliability and availability, security, and customer perception. He also leads the corporate implementation of a number of improved development and test practices. Much of this work involves analytics, including mathematical modeling, statistics, metrics creation and implementation, and the trending and goaling of corporate, business unit, product, and release metrics. Mr. Rotella at many software engineering conferences including ISSRE, ICSE, MSR, and FSE.