One Approach to the Metric Baselining Imperative for Requirements Processes

Roy Chardon Merlin Dorfman
Cisco Systems, 170 West Tasman Drive, San Jose, CA 95134
rchardon@cisco.com mdorfman@cisco.com

The success of development projects in customer-oriented industries depends on reliable processes for the definition and maintenance of requirements. With the sustained, severe reduction in the rush to new technology, this widely accepted fact has become increasingly evident in the networking industry. Customers now focus on high product quality as they strive for economy of operation. In the past it was practical to add resources (i.e. staff) late in the development process to support massive testing and debugging; this cannot be done in the current economic climate.

Enhancing product quality necessitates enhancing processes, which in turn can necessitate applying more accurate (and precise) measures. Finding process deviations and identifying patterns of product deficiencies are critical steps to achieving high quality products. For example, Cisco is expanding its standardization of products and processes, including increased emphasis on requirements management, change management, and traceability (RMCM&T) as a foundation for product quality. Determining phase-specific baselines of the process metrics for RMCM&T, and bringing them under control are essential to achieving the product quality and project development efficiencies needed. We cannot afford to wait until an error is detected by testing, since impacts from early insertions of requirement errors escalate throughout successive development stages.

This talk describes the application of quantitative process control (QPC) during early development phases to establish and maintain baseline distributions characterizing RMCM&T processes, and to monitor their evolutions. Particular focus is placed on lessons learned during metric baselining.

Metric baselining as described in this talk includes key metric identification, and data normalization, filtering, and categorization. Suitable data collections can be transformed into empirical density functions that define the demonstrated population accurately. This talk discusses techniques relating to these distributions. It provides examples of the roles of these distributions in qualitative and quantitative analyses of metrics and processes, and in bringing them under control.

The systematic tracking of critical requirements process metrics provides a basis for detecting significant changes, whether desired (e.g. resulting from process improvements) or not (i.e. caused by process errors). An organization can avoid requirements errors (or remove them) only when it knows errors have been (or are) present in a product or process, and when it understands in what development phase(s) these errors could have been avoided. Empirical baselining provides the statistical sensitivity to detect requirements process problems, and to support targeted identification of particular requirements-related patterns in defects.

Proceedings of the 11th IEEE International Requirements Engineering Conference
1090-705X/03 $17.00 © 2003 **IEEE**