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Chapter XV

Project Maintenance

Maintenance is a phase that is usually placed after project completion when problems start to arise. Agile development changes this approach in depth, since maintenance is always the current status of the project. In this section, after a short introduction about maintenance model, the application of these models in classical and Agile methodologies will be discussed in order to highlight differences and focus the reader on the different approaches to this activity that can cost a lot if not well realized.

The last part of this section is dedicated to metrics for the estimation of maintenance effort and on metrics for the prediction of faults in order to guide the reader in this very complex environment. All of you can select the metrics that seem to be well suited for approaching the problem of effort measurement or fault proneness detection.

Maintenance Models

The three main maintenance models and activities usually are referred to as corrective maintenance, adaptive maintenance, and preventive maintenance. In the following, a brief description of all of them will be reported. In the next sections, the suitability of each model with respect to the methodological approaches that have been presented will be discussed.

Corrective Maintenance

Corrective maintenance usually is referred to as maintenance, since it is the universally recognized reason for which a program is maintained. As we will discuss, it is actually not the sole maintenance activity that can be carried on.

Corrective maintenance is applied each time the customer finds an error in your program and you change the code in order to solve the problem. The error detection is often present during the internal testing phase or during the first deployment of the system, at least in a spiral-oriented life cycle. To this end, this phase is considered an extra project activity to be performed after the deployment of the product on the customer site. On the other hand, it is possible to apply corrective maintenance in the daily activities of the team, if you find the error before the customer does.

Corrective maintenance usually is performed on code, and therefore, it is a low-level activity and rarely implies strong modifications in the architectural aspects of the project or in the requirements. The impact of the single maintenance activity is usually small and limited to a bugged class or part of the code that, once fixed, will allow the disappearance of the error.

Adaptive Maintenance

Adaptive maintenance is a very different maintenance phase, since it impacts the code, but it originates not by an error but by a change in the requirements or in the adopted technologies.

If not correctly managed or supported by a methodology that allows changes in the requirements, it can have a large impact on the code and on the time to deliver the maintained product. This is caused by the fact that the changes in the requirements usually impact the architecture of the system, and the changes in technologies impact a large part of code or even an entire subsystem.

An example of adaptive maintenance can be the change of the input file of the system that from a raw ASCII format becomes a structured XML. This can happen when your system interfaces other systems you do not control. For this example, you have two choices:

- The new XML format contains the same data of the ASCII file, and the change has been performed for embedding a semantic in the configuration

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