FastFix

The overall goal of the FastFix project is to provide software developers with a mainten- ance environment that combines time efficiency with low cost and high precision. FastFix will develop a platform and a set of tools that will continuously monitor customer envi- ronments, while collecting information on application execution and user interaction. The overall objective is to identify symptoms of execution errors, performance degradation, or changes in user behaviour. By using correlation techniques, the platform will also support failure replication in order to identify incorrect execution patterns and, in particular cas- es, automatically generate and deploy remedial patches.

At a glance

Project title (full):
Monitoring Control for Remote Software Maintenance

Project coordinator:
Miguel A. Juan
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Partners:
Technischen Universität München (DE)
Lero (IE)
Instituto de Engenharia de Sistemas e Com- putadores, Investigação e Desenvolvimento em Lisboa (PT)
TXT e-solutions (IT)
Prodevelop (ES)

Duration:
June 2010 – November 2012

Total cost:
€3.480 M

Programme:
FP7-ICT-2009-5 – Objective 1.2

Further information:
www.fastfixproject.eu

Improve software maintenance

Software maintenance and support services are key factors in a customer's perception of software product quality. In addition, main- tenance and support services constitute a growing percentage of the software business market. Business models for software vendors are changing from license-centered to servic- es-centered.

Currently, customers are demanding higher quality from software maintenance services. At the same time, they are trying to reduce maintenance contribution to the total cost of ownership.

Customers have a growing demand for shorter response time, higher availability, virtualized environments, business-critical systems, as well as other advanced services, such as on- site support. Therefore software vendors are offering these increased levels of support at a higher cost. Software maintenance and sup- port costs are high because these tasks require the time of highly qualified personnel.

In the FastFix project we will develop a plat- form and a set of tools that will continuously monitor customer environments, gather in- formation on program execution and user interaction, so as to identify execution error symptoms, performance degradation, or

changes in user behaviour. By using correlation techniques, the platform will replicate failure, assist maintainers to identify incorrect execution patterns, and in a subset of cases, automatically generate and deploy remedial patches.

The primarily goal of FastFix is to facilitate more time and cost efficient maintenance services for software applications.

Monitoring software execution

We will develop and set up mechanisms to acquire all the necessary information about an application's execution including errors, context and user behaviour. These mechanisms will be applicable to both new and existing applications. The monitoring will also be non-intrusive and impose a minor, acceptable burden on performance.

The gathered information will be sent in real time to a support centre while protecting user's privacy. Once this information is available in the support centre, it will be used to replicate errors, taking into account all the gathered context information and, using correlation techniques and error ontologies. FastFix platform will then identify behaviour patterns and possible causes of error.
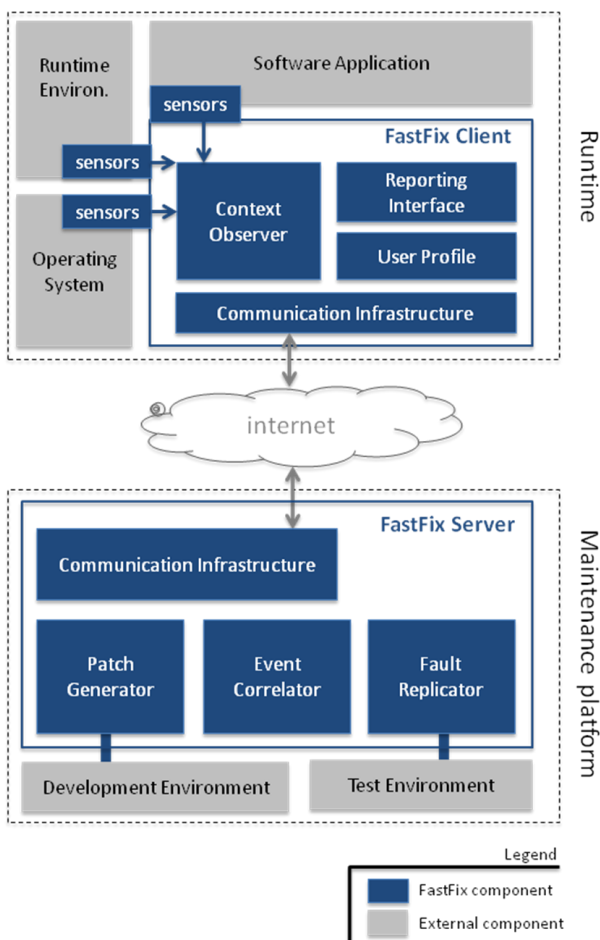
Self-healing

In some cases, the platform will be able to automatically generate patches for errors. These patches will consist of application modifications, changes in system con-figuration, parameterization, or even functionality limitation in order to avoid system or application crashes. Patches will be sent back to the application's execution environment and will be applied automatically, resulting in a self-healing software application.

Research lines

FastFix's innovation is centered on four fundamental research activities:

Context elicitation and user modeling: determines exactly which and how information on an application's execution and user interaction is going to be gathered and pre-processed independently from the application and its environment.

Event correlation: determines how the gathered information is used to draw conclusions about the kind of problems the application is facing and what the possible causes are. Event correlation has been widely applied to ITC processes and Business Activity Monitoring, but significant research is needed on its application to software maintenance

Fault replication: provides a platform that allows the replication of errors in as close to the real context as possible.

Patch generation and self-healing: determines which patches are going to be generated, and how they will be deployed to the application in the execution environment.

Impact on software market

FastFix will provide a platform for software maintenance and support, which will be applicable to software application, regardless of their execution environment. Using FastFix will significantly reduce time for failure cause identification, patch generation, and patch deployment.

Even when FastFix will not be able to automatically identify causes or generate patches, it will provide valuable, semantic context information, about both the execution environment and user interaction. This will significantly facilitate maintenance tasks of the software engineers.

FASTFIX: Monitoring Control for Remote Software Maintenance.