

Agile Development Environment for Programming and Testing (ADEPT) – Eclipse Makes Project Management eXtreme

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Abstract. Genesys Solutions is a bespoke IT company, first of its kind, run by MSc and fourth year students of Department of Computer Science, University of Sheffield under the supervision of Prof. Mike Holcombe and Dr. Marian Gheorghe. Genesys follows the eXtreme Programming (XP) methodology for software development based on client requirements. The commitment towards XP and its ‘good software practices’ can be considered as the greatest strength of Genesys.

Agile Development Environment for Programming and Testing (ADEPT) is our contribution towards supporting the XP methodology by adopting the Eclipse platform along with its associated tools and frameworks within Genesys Solutions. It aimed to teach good software practices in Genesys to support XP by providing a software development life cycle management tool that will encompass the best practices of XP. It comprises of tools based on the principles of XP such as story cards, system metaphor, estimations, testing and quality assurance. ADEPT was the result of the IBM Eclipse Innovation 2004 awarded to the University of Sheffield. Also, based on the previous year’s performance and more innovative ideas to implement more principles of XP we have been awarded another grant under the IBM Eclipse Innovation 2005 programme.

Keywords: project management, software life cycle, extreme programming, eclipse

1 The Foundation – Genesys Solutions

Genesys Solutions is a commercial IT company specialising in bespoke solutions for business. It is the first of its kind that is run by university students as part of their degree. The MSc and fourth year students of the Department of Computer Science, University of Sheffield operates the company under the supervision of Prof. Mike Holcombe and Dr. Marian Gheorghe. It is a self-funded company that also provides high quality IT consultancy and training at highly competitive rates.

Genesys has existed for 8 years and has received very favourable comments from Industry and the UK Government. The main reason for this is due to the fact that this company provides students with invaluable experience in modelling business processes and the engineering of high quality software solutions, which has proved to be its key strength in close collaboration with their business clients.

Genesys has followed the eXtreme Programming (XP) methodology for software development over the last 5 years. This requires the company to work closely with the client to ensure that the client will receive a solution, which fits their requirements. Any teaching required by the students is a mixture of formal lectures and presentations, tutorials and demonstrations, supervision and group project management. Thus,

the commitment towards XP and its ‘good software practices’ can be considered as one of the greatest strength’s of Genesys.

In Genesys we place much emphasis on using and supporting Open Source initiatives. Therefore, as far as possible, we run Linux both on our servers and workstations and use Java in the majority of our software solutions. The Eclipse IDE is used within Genesys for software development.

2 The Eclipse Platform

Eclipse is an open framework to integrate different types of application development tools. It is a platform on top of which an integrated development environment (IDE) can be created to work on almost any programming language or resource. A software developer can use Eclipse to combine different tools to design, compile, debug and analyze code to get a single integrated development environment. Eclipse achieves this with an open, extensible architecture based on plug-ins.

Eclipse is the initiative of the Eclipse Foundation. It is built by an open community of tool providers that uses an open source model. Eclipse was originally an IBM project. In 2001, IBM released the source code and the Eclipse Foundation was started by a group of companies including IBM, Borland and RedHat. Since then its membership has grown to include HP, Intel, Ericsson, SAP and many other companies. Now, the Eclipse Foundation is an independent, not-for-profit corporation that will steer the evolution of Eclipse. Thus, IBM supports the activities of Eclipse and does not possess it.

The Eclipse project has three main components.

- the Eclipse Platform
- Java Development Tools (JDT)
- Plug-in Development Environment (PDE)

3 IBM Eclipse Innovation Grant 2004

The *IBM Eclipse Innovation Grant 2004* was awarded to the University of Sheffield to encourage the active use of the Eclipse open source software for academic curricula and research. This was achieved by adopting the Eclipse platform along with its associated tools and frameworks within Genesys Solutions.

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The first step towards incorporating Eclipse within Genesys was to ensure that it is being used as the primary IDE for software development. This was achieved by having shared networked installations of versions 2.3.1 and 3.0.0M8 for both Linux GTK and Windows. Additional facilities for the Eclipse framework was provided in the form of PHP, code colouring and database plug-ins.

As part of the proposal, teaching material was developed to introduce Eclipse along with the role of Java in Eclipse. Also, principles such as source code manage-

ment, test first programming, continuous integration and code refactoring were covered as other tutorials.

The research conducted for Eclipse and its practical implementation can be seen through the Eclipse plug-in developed. The endeavour of the ADEPT plug in, a suite of computer aided software engineering plug ins, is to ensure that the software development life cycle (SDLC) incorporates the best practices provided by XP. The following diagram represents the complete project management tool:



Fig. 1. Block Diagram for ADEPT: Shows all the plug-ins that constitutes that project management tool along with their dependencies representing the complete SDLC cycle

The practices and its corresponding plug-ins are as listed below:

- **Story Card Editor**

This plug-in has been designed keeping *the planning game* principle of XP in mind. It supports gathering the client's requirements and documenting them for the use by the other tools.

- **Software Metrics Management**

This plug-in has been designed considering the importance of *software estimations* in project management. It uses story cards to estimate the time, effort and cost, using the function and feature.

- **System Metaphor Management**

The development of this plug-in is attributed to the system metaphor principle of XP. It will translate the story cards into X-Machine diagrams.

- **Test Management**

The *test first programming* principle of XP has lead to the development of this plug-in. It will help in planning and managing system test cases. The tests will be generated based on story cards.

- **Quality Assurance**

Though, quality assurance is not as highlighted as it should be, it is a vital requirement of the XP project management life cycle. A *quality check* for any software is an imperative prerequisite before its release. Thus, this tool supports tracking and monitoring of the quality aspects of the whole system. It assures consistency between story cards, X-Machines and the generated test cases. It also generates checklists to support the inspection process.

A section on the Genesys website (<http://www.genesys.shef.ac.uk/eclipse>) comprises of all the information related to Eclipse within Genesys. This includes the documentation produced till date and the download of ADEPT plug-in with a provision to report bugs in any of the plug-ins.

4 IBM Eclipse Innovation Grant 2005

On the basis of our performance and our innovative ideas to implement more principles of XP we have been awarded another grant under the *IBM Eclipse Innovation 2005* programme. This year we intend to make further enhancements to the current version of ADEPT. Teaching material on the process of plug-in development will be created based on the experiences gained and problems faced during the same.

As a part of the Eclipse Innovation Grant 2005, we are progressing in the direction of implementing XP more practically by:

- improvising on the current version of ADEPT
- developing tools on other principles of XP such as coding standards
- to help new students in the understanding of the agility required in software development we aim to develop a planner tool
- with new innovative ideas like mind maps we intend on understanding in depth the current principle of system metaphor

The following diagram represents the second version of ADEPT with all the new additions.

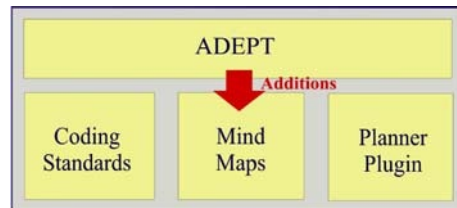


Fig. 2. Block Diagram for ADEPT ++: Continuation of ADEPT supplemented with additional tools to improve software development that follow other XP practices

5 Conclusion and Future Work

ADEPT along with new additions will result in a far more comprehensive and robust project management tool for use in Genesys and other software houses following XP. It is aiming to be a stepping stone for software development companies and developers who are using XP, by automating project management following XP practices as much as possible.

ADEPT has laid foundation for a project management tool that can be enhanced through an iterative process year after year within Genesys Solutions. ADEPT is our contribution to the Eclipse Community and marks its success by being the first ever project management tool in Eclipse using XP.

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