Software Process Improvement Case Study

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DATANORD MULTIMEDIA

Overview - **DATANORD MULTIMEDIA,** since its foundation in 1987, has been operating both in the marketing-oriented multimedia market, as well as in the interactive publishing market.

During the past years, the company has developed partnerships and ventures with the most important players in the Italian market.

Based on the growth rate of the company, starting from 1995 the software development process had to be improved, by using a component development model. The reuse of developed and tested components in the software development projects allows to increase the quality and robustness of the realised applications.

The results obtained from the first analysis after the project delivery were encouraging and satisfactory in terms of development time reduction.

Such results have demonstrated the effectiveness of the initial approach and have contributed to the personnel motivation.

The Organisation and its Environment

DATANORD MULTIMEDIA is a full service new media marketing firm based in Milan, Italy, with a full range of creative, design and technology competencies and outstanding clients and projects in the following areas:

- Interactive multimedia projects
- Internet, Intranet and Extranet communication projects
- audio-visual content production
- marketing and media research
- event organisation
- communication, media and strategic consulting.

In 1998, Datanord Multimedia is the leading and biggest New Media Agency in Italy, with 55 employees and a turn-over in 1997 of more than 7 millions US$.

The company uses a consulting approach to its projects and customers. When a new project has to be developed, the client manager collects the customer requirements and transmits them to the operational Datanord Multimedia division managers, in order to initiate the development activities (software, graphics and networking). Division managers allocate then the human and technical resources, based on the priority schedule and core competencies of the division members.

Web-based and new media software development is still in its infancy and often it is hard to manage it. It is vital for the company's effectiveness to count on tested and reusable components in order to optimise the development effort.

"In this context it is evident – Dario MELPIGNANO, Chief Operating Officer Operations and Technology, says – that number and complexity of the new media projects requires the usage of innovative, advanced development technologies and control tools".

Igor NEVERNOV is the Design and Development Manager for TDD (Technology Development Division). *"Often I heard complaints of my colleagues about the necessity to re-develop the same things, that where made by others for other projects"*.

As an additional requirement, the company's time-sheet system was too generic and was entrusted to the good will of the personnel. It was not so easy to evaluate at any moment the state and profitability of a project.

Starting Point

The first step of the project consisted in the assessment of company operational processes from which emerged the following problems emerged:

- dispersion of energy in the software development,
- lack of metrics and indicators for project measurement,
- limited support for some project management aspects (i.e. quality management)

These weaknesses were referred to the following processes:

- human resource management,
- project management,
- quality management,
- risk management

Apart from these elements, the company demonstrated some strong capabilities:

- great ability and technical skills
- constant relation with widely supported customers
- good level of documentation and configuration management
- enthusiasm, determination and staff attitude

Starting from this situation and taking the opportunity offered by the participation in the SPIRE project, Datanord Multimedia decided to undertake in a rigorous and systematic manner, a project focused on the following objectives:

- Development time reduction.
- Robustness and quality improvement for developed applications, by a component design approach and high quality code reuse.
- Improvement of identification of requirements and possible implementations by creating components models.
- Human resources management enhancement, in particular by attributing and monitoring specific implementation responsibilities to development team's members.

The metrics selected for the estimation of the project results - software development time reduction - required to redefine the criteria of the working time assignment for each project.

The Improvement Project

The overall approach

The reusable software components had to be defined in a special object-oriented modelling language, not linked to the specific programming language used for the implementation. To make the software components available for different projects it was necessary to create a centralized repository, containing component definitions and implementation libraries. Such a repository had to be accessible to all software development team members. A relevant condition for an efficient repository usage was the production of technical documentation for each component.

The software tools involved in the management of the repository had to support the so called "round-trip" engineering process. That way, the improvement in the development of each software component could be reflected in the component model and vice-versa.

Application of reusable patterns would even result in better integration between analysis, design and implementation phases.

The component repository was based on a relational database installed on the company LAN server. The access to the component definitions, documentation and implementation code was granted from any computer used by development team members via company's Intranet.

Since almost any commercial project developed by Datanord Multimedia is based upon a set of software components, the adoption of the software repository has a critical impact on the project management activities. At the same time, this modular approach allows a better distribution of the workload among the development team members and improves the project scheduling control.

Steps and how it was organised

The projects were assigned an internal code and were split into the following phases:

- Project Management
- Analysis
- Design
- Development
- Testing and Integration
- Deliver

For each phase were defined in detail:

- scheduling
- resources
- objectives
- approach
- key issues/risks/dependencies
- associated deliverables

Tools and Methodologies

Base tools used were:

- Microsoft BackOffice, on the Windows NT server, necessary for component repository and development activities management, using SQL Server relational database environment.
- Internet Information Server for the access and management of the repository in the company's Intranet.
- Front-end application packages, for component software design.
- Reverse engineering tools.
- VisualBasic, VBScript and ASP (Active Server Pages) for back-end development.
- Other development tools for the maintenance of the Intranet Web site.

From a management point of view, there were organised periodical meetings between Client Manager, Project Development Leader and development team members, to discuss the activities and disseminate the results.

The impact of cultural and human factors issues

Together with the assessment, the investigation of the staff attitude of the SPI activity was conducted. The obtained results gave the confidence that the project would have been welcomed with full satisfaction by the personnel.

The Results

The easiest and the most natural method to estimate the software development time reduction was to count the hours dedicated to the software development before and after the implementation of the Spire - RESCORE project.

Therefore, before the start of project development it was necessary to analyse and redefine the development activities, to build a database with significant data.

From this assumption the new activity time-sheet procedure was born and put in field on 15/7/98. Beginning with this date, all the persons compiled the time-sheet in the new environment.

At the same time, all the data from the old procedure were converted to the new one.

With reference to the purposes in the box shown before: objective 1) was surely attained, as demonstrated by analysis carried out on development times data.

Regarding objective 4), the staff attitude survey performed before and after the project implementation, highlighted a 0.88 points improvement of personnel attitude to the SPI activity.

Additional benefits are expected during the forthcoming period. Once the data will be measured in detail, the company expects the following:

Tangible benefits

1. application packages development time reduction by 15% with respect to previous situation.
2. Reduction of integration and debugging time by 20%

As a whole, the tangible benefits, in terms of reduction of project effort time, is 12%.

Non tangible benefits

1. Increase of the level of satisfaction e loyalty of customers, which is retained to be quantitatively re-qualified as increase of the Technology Development Division turnover by 5%
2. Increase of the level of confidence and motivation of the personnel.
3. Documentation and better accessibility to the precious company asset of the software components developed.

In addition to this, the assessment done at the end of the project shows a general improvement in four key areas of Datanord Multimedia activity:

- Human resources management.
- Project management.
- Quality management.
- Risk management.

Plans for the Future

The company is populating the software component repository with the components previously developed. The workload related to this activity will tend to diminish in time, up to the reaching of a satisfactory base for the composition of adequate solutions.

The fully functioning system is expected to be reached in a six months timeframe. Contemporarily, the company continues working on the targets indicated in the "Starting Point" paragraph.

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