# Software Process Improvement Case Study

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**Ireland No. 003 (English)** **October 1998**

***Progressive Systems Enterprise Limited***

*One of the unique properties we bring to the market place is the marriage of technology and business skills. We pride ourselves on our ability to understand business problems as well as technical issues, and to bring technology to the solution of business problems.*

## *Overview*

*PROSE is an Irish software company producing quality applications packages and bespoke software for the Irish and UK markets. The objective of our project was to recast our GUI software development procedures to take advantage of the technology now becoming available.*

*As a result of this project we have moved significantly towards Component Based Design and are taking advantage of the n-tier architecture now available to us. The key lesson for us from the project is that the component-based approach has huge advantages, but that one should not under-estimate the effort required to make the transition.*

## *PROSE and its Environment*

PROSE was founded here in Dublin in 1981 to produce and deliver quality applications software. We produce our own software packages, and also carry out bespoke software development. Over the years we have grown from the initial 4 staff to a current 18 staff, with a current annual turnover of just over £1M per annum.

As a company we are focused on the development and implementation process and at present 13 of our 18 staff are directly involved in production or implementation tasks.

Over the years we have continuously reviewed the software tools we use. At present our two prime development tools are the PROGRESS 4GL and ORACLE Developer 2000.

*One of our key business requirements has always been to produce software solutions that are **reliable, cost effective and maintainable, a**nd to do this in the most **efficient** way possible, making use of the most **appropriate current technologies**.*

We have three specialist application areas - Government Accounting, Retail, and Media. Our FMS accounting package is currently running in the majority of Irish Government Departments, giving us a significant presence in that market.

In the retail area we have a suite of modules designed for non-food multiple outlet department stores. In the Media market we have carried out significant bespoke development for RTE, Independent Newspapers, and the Irish Music Rights Organisation.

While most of our business is based in Ireland in the past few years we have been working with some success to establish an export market in the UK.

The rapid changes in the software development industry have made the objective of using current technology difficult. It has also been difficult to ascertain if we are using the most productive procedures.

## *Project Starting Point*

Our starting point was:

- Awareness of the need to update our processes
- Awareness of the technology available
- Positive perception of process improvement
- Industry strength tools in use
- Management backing for process improvement

Our need was for:

- Applying focus to process improvement
- Resources for the project
- A driver to add urgency to the task

In recent years we have been moving forward with an in-house software improvement process. This project was targeted to provide a focus for a significant move forward for our GUI development.

As part of our R&D program we have been maintaining an awareness of developments in the areas of systems design, development, and the delivery technology for application software. This had led to awareness that the pace of change was such that we needed to take some significant action to keep our processes and procedures at the forefront of useable technology.

The specific objective of this project was to formalise and improve our development procedures for GUI software development. In developing these procedures we were aware of the need to take into account the n-tier architecture now available to us, the move to object oriented design, and the growth of the WEB as a user interface.

Within the timeframe of the project our expectation was that we would have the new processes and procedures identified, specified, and implemented. We also intended to do a small, contained sample development to test the new procedures. A large development project was always regarded as outside the project timeframe.

We have had development standards in place from the very formation of the company. These focused heavily on certain areas such as the coding and user interface. Of late we have started on the process of broadening these to cover the full life cycle. We have a definition of the life cycle model as we perceive it and are now looking to consolidate existing standards / procedures and fill in any procedural gaps.

The development environments (PROGRESS/ Oracle) that we use come with their own associated tools. In addition we have tools such as the ER-Win case tool, Microsoft Project Manager etc. to supplement them.

Alongside our traditional development we are working on combining a number of new technological developments to enhance our development procedures. The three key elements to this are:

### *Key Elements*

- ***Web transaction processing*** *- enabling us to provide a thin GUI client*
- ***n-tier architecture*** *- allowing us to separate the User Interface from the processing etc.,*
- ***Object Oriented Application Development Methodology*** *– reducing development / maintenance and increasing robustness etc.,*

All of the above are now available from our main tool providers (PROGRESS and ORACLE) for use in conjunction with their existing core technologies. Our current task is defining how we can best use these in conjunction with one another in our development model - from design and build to deployment.

"The Spire initiative has provided a focus for a significant step forward."

Says Mike Morrissey (Technical Director)

We have been pushing forward an in-house software improvement process over the past few years, and there is a positive feeling among staff towards the process.

Our objective was to develop procedures for the new technical environment we are now moving into. While in some respects the new environment (Web/GUI, n-tier, and object orientation) is building on existing skills, it does bring with it a new set of challenges.

We expected a number of business benefits including:

- **Increased productivity** by streamlining the process (without inhibiting innovation)
- **Improved efficiency** through use of the learning process
- **Recognition** in sales situations, through external accreditation particularly in the export market
- Additional **job satisfaction** and skills enhancement for staff
- **Better positioned** to take advantage of the newer technologies

Part of the improvement process was to try to identify how best to measure the benefits that flow from the improvement process. The initial ideas included staff surveys, bug count measurements, state of readiness for ISO 9001, and a technology position review.

# *The Results*

## *High Level Procedures*

*Our improvement focus is to develop our quality system to the next level so as to gain benefits in terms of quality, efficiency, predictability and order leading to increased customer satisfaction, job satisfaction and profit growth.*

As a result of this project we have in place procedures for developing GUI applications that reflect today's technology, and have the structure in place to adapt to the emerging GUI technologies.

At the top level our development procedures have been revised to include the best practice as we now see it. In doing this we have been conscious of the need from an ISO perspective not only to do the work, but also to make it easy to show that the correct procedures have been followed.

***Business Benefits***

- More efficient development process
- Even greater quality assurance
- Ready for ISO certification

## *Architecture*

In architectural terms our GUI development process has been reworked to reflect the use of Component Based Design. This should help to significantly reduce our exposure to the rapidly changing user interface models. As this has significant ramifications for how we build systems it will take some time before we have fully moved over to this model. The important thing is that we are on our way, and can see a route forward. From a business perspective this will help protect all future investments in building software.

***Business Benefits***

- Reuse of business logic
- Investment protection through state of the art design
- Future-proofing (to a degree)

## *Code Development*

At the development level we have produced a trial application to test the process and help us assess issues such as the feasibility of the process, the benefits accruing, and the problems we may encounter.

It is difficult to quantify the benefits at this stage. The indications are that there are significant long-term gains to be made. These will come from faster development, easier enhancement, and more powerful functionality. However there is a learning curve to be overcome first. In our trial application it was impressive how easy it was to incorporate some additional functionality suggested during the development.

Because of the timing of the availability of development software we ended up building our small test application twice – the second time being with a far more "component based model" than the first. This experience helped highlight the benefits of component based design but also the significant work that can be involved in moving from one development environment to another.

***Business Benefits***

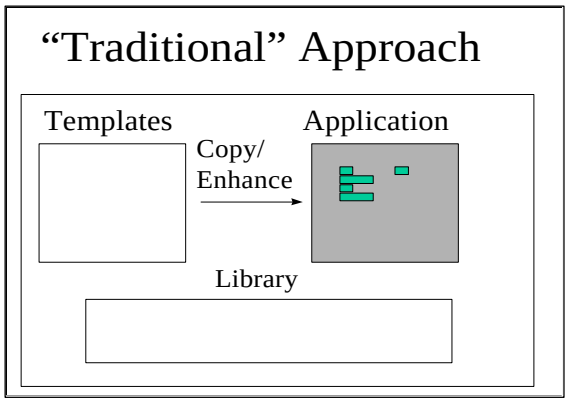
- Experience – cost savings through avoiding pitfalls
- Model on which to build – greater payback from future work
- Demonstrable benefits to justify future investment

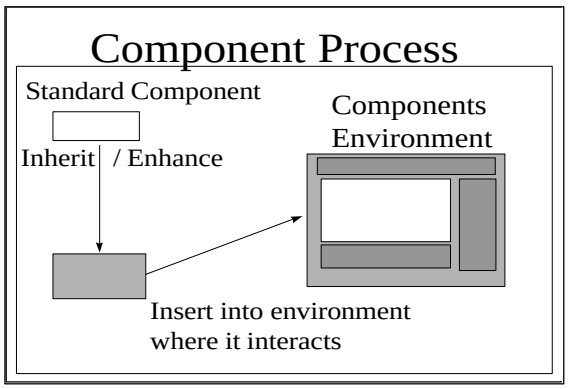
## *Problems*

We encountered a number of problems during the project. The time-scale was tight, and included the summer holiday period. When we encountered a minor delay in acquiring the software for the trial application it exacerbated the problem.

Our initial prototype for the trial was 'conventionally' built. Translating this into a component based environment proved to be more complex than we thought at first.

Perseverance, additional resource, and a curtailing of the scale of the trial application enabled us to complete the task.




## *Summary*

We have achieved our main objective of putting in place advanced GUI development procedures to help us deal with emerging technologies. More work remains to be done at the detailed technical implementation level, but as that is largely software development (building standard components etc.) it was outside the scope of the current project.

> *"Our industry requires us to continually innovate and improve – Spire can help us surmount these challenges"*
>
> *Says Padraig Murphy (Development Manager)*

The heightened awareness of the pace of change has caused is to look critically at our processes, and increase our level of exposure to new technology.

## *Lessons Learned*

It is a time of significant change to the process of developing GUI systems. There are major changes happening both to the GUI delivery mechanism (e.g. the emergence of browser based GUIs and their impact on the traditional Windows GUIs), and to the underlying architecture (e.g. the use of n-tier architectures involving application servers etc).

Moving from the traditional GUI model to one of interacting components is a far from trivial exercise as we discovered in attempting to move our prototype test application. We found it easier to start again, restricting any reuse to copying in occasional pieces of self-contained logic.

It was reassuring to realise that most of our high level development procedures remain valid and valuable in the changing GUI environment, despite the fact that at the more detailed levels dramatic changes are happening.
Reassessing the available software tools that can be used during development periodically is a worthwhile task. As part of the project we have replaced two relatively primitive ancillary tools with new off the shelf software.

An important issue to emerge during the project is how we blend the traditional applications already in use with the emerging directions in the software industry. We are fortunate in that both of our prime tool suppliers are providing a roadmap, which will facilitate this task.

## *The Future*

Our next step is to complete the detailed technical software component production to support our new processes. Then we will apply the new processes to a medium scale project over which we have significant control.

This should provide significant additional practical experience to enable us to further refine our processes. As part of the project we kept in mind the possibility of using Java in the future, and its implications. Our component approach fits well with a move to Object Oriented development with Java.

We hope at this stage to use Java for a trial application within the year. We also intend to pursue the applicability of the processes to development for the WEB. We are hoping for significant synergy here, and that our processes remain largely the same for the WEB focused development.

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