Code Generation Network Interview with Tony Clark

CGN Tony, thanks for the interview. Would it be possible to begin by asking about your background, how long have you been involved in software development?

Tony I started my career with Marconi in 1985 developing Artificial Intelligence systems and worked on applications including data fusion of submarine sensor data and visual recognition of aircraft behaviours. At that time there was a great deal of interest in languages like Common Lisp and Prolog that encourage developers to take a declarative approach to applications: developing general purpose engines that run over all aspects of an application represented as data rather than a mixture of application code and application data. I was lead developer on a commercial A.I. toolkit produced by Marconi called KERIS that provided many of the leading edge techniques of the day including rule-based programming and object-oriented data representation. Later, I researched the OO languages field at Bradford and subsequently London Universities.

CGN You're Technical Director of Xactium Ltd. Can you tell us a little about your work with Xactium? How and when did you get involved?

Tony I was doing work at King's College London with colleagues at York and Kent Universities. We got heavily involved with the Object Management Group standards organisation, in particular with the UML 2.0 revision. We were surprised that the standard was being revised without reference implementations and looked around for tooling that would support the development and validation of the new standard. After being frustrated with the functionality of the current crop of modelling tools at the time and their lack of support for meta-modelling we decided to take a language driven approach to the definition of UML 2.0.The result was a series of modelling tools based on very high-level programming concepts and the definition of model driven execution engines.

In 2003 my colleague Andy Evans (*Editor's note see our interview with Andy here*) from York and I decided to set up Xactium to develop a commercial version of an environment for this approach – the aim was to produce a fully integrated meta-circular executable model based IDE (XMF-Mosaic). Since the start of Xactium, my role has been architecting the IDE, implementing the core engine technology (XMF) and designing model engines based on it. Currently I am involved in productising two engines; this involves taking prototypes from our IDE and implementing them as Eclipse plug-ins.

CGN Where do you get your backing?

Tony Initially the company was funded through consultancy contracts. Our main customer in the early days was a large Aerospace company. They were an early adopter of the technology, for which we were very grateful!, and used it very successfully on a number of model driven projects. On the back of this success we decided to expand the business by bringing on board experienced architects and developers. In 2006 we were successful in acquiring VC funding and an EU grant that allowed us to expand further in terms of business development expertise.

CGN You're based in the UK. In your experience do you find that people there are getting more interested in model-driven approaches?

Tony There is huge interest in model-driven approaches. People have been sold on the idea of modelling for some time as it structures and clarifies the way they design systems. However, there is an increasing awareness of a 'brick-wall' whereby models are developed by system architects and then thrown over the wall to the developers, never to return. Companies are interested in getting more return on their investment in modelling. MDA is one way in which this can occur whereby models can be transformed into program code and there is certainly a high degree of awareness of MDA.

We are involved in the EU Framework 6 Modelplex project that aims to apply model driven techniques to real-world problems. As part of this project we have found a huge interest in Domain Specific Modelling Languages whereby the modelling notations are tailored to the application domain. This is attractive because the tools use modelling technologies but their user interfaces are oriented towards the user rather than the modelling technologist. For example telecomms engineers want to work at the level of switches and devices rather than classes and objects.

There is an increasing interest in modelling techniques whereby model-based engines are used to directly execute the models. The removal of the translation step from models to code is attractive because it does not involve any third party implementation technologies and the brick-wall is totally removed. A good example of this came directly from a customer: they were using a proprietary modelling notation for business goals and wanted to be able to update and view the models in real-time whilst interfacing the models to other applications including management reporting systems and project planning systems. Using our technology and approach we were able to quickly produce a model based execution engine for their meta-models and show how it could run as a server connecting to a variety of client applications.

CGN What types of organisation typically use your tools?

Tony Up to now our products have been very general and have provided an IDE that supports sophisticated model-driven engine development. We have had success with this product with large organisations who introduce it into their advanced technology facilities and have worked with a number of them to produce model driven applications in areas such as code generation for networks, product-family configuration and business data report generation.

In general our technologies and approach aims to leverage significant commercial value from models. Companies have embraced modelling, but are still trying to place models into an end-to-end business solution. Essentially this is where we come in: liberating models from being just documentation and diagrams. For example we are working on solutions right now that allow standard databases to be connected to UML models with an engine that performs complex configuration checks over the data. Another example allows standard business motivation models to be connected to business information models to guide and inform business change such as acquisition and mergers.

CGN What's unique about your approach?

Tony Our products are unique in terms of our approach to modelling. We were one of the first companies to embrace domain specific modelling techniques whereby the user experience of the modelling technologies can be tailored to their domain of experience. Furthermore, when modelling an application we attempt where possible to model the complete domain, including the components that are to be executed. The model of a system then consists of a description of its data, its executables and an engine that processes the models. From this point, we can choose to implement the models using standards such as UML and programming languages or we can just run the models directly by implementing the engine.

Whilst we believe that our approach is unique, it is consistent with other technologies and approaches. Modelling technologies are becoming widely available, often for free. For example the Eclipse framework supports technologies such as EMF and GMF and there are a wide variety of tools based on these. It is becoming easier to construct a model-based solution by constructing a user interface using GMF, using standard meta-data formats using EMF and constructing a model based engine using either XMF or a standard implementation technology such as Java. Our approach can be applied to standard UML modelling too especially since there are now free UML tools available on Eclipse.

CGN How receptive are people to your approach?

Tony We have had very positive feedback on our technology and approaches from both organisations and developers. Organisations like the idea that they can leverage much more value from their modelling activities. Developers see the value of the approach and the technologies that underpin it.

CGN can you share the immediate and longer-term plans?

Tony Commercially we have found that our products to date have been very widely applicable. This has been very good for validating the approach, but as a business we plan to focus in the near future on a couple of key application areas: model based configuration checking and support for business motivation and change. We are currently discussing whether we make our engine technology XMF and approach available to all via an appropriate licensing agreement within the Eclipse framework.

CGN Can you take us through an example of one of these application areas?

Tony Here is an example of a model-driven business solution that we are working on right now. We are developing Eclipse tools based around the Business Motivation Model (BMM), which is a standard currently being developed by the Object Management Group and is due to be finalised in June.

The BMM helps Organisations answer the following questions: Why is a particular business decision being made (the business drivers), and what is the intended impact on the Enterprise (the business objectives).

The interesting thing about the BMM is that it provides an overarching architecture for the many different aspects of business modeling that have become very popular over the last few years. For example business process modeling, business constraints and business data are all facets that are ultimately driven by Business Motivation:

By combining the BMM with our model-driven technologies, we're looking to build a powerful model-driven framework for Enterprises to connect their business models to the key drivers of their business.

For example, imagine an organisation looking to restructure their business. The BMM is an excellent framework for modeling the motivation behind the restructuring in terms of specific business drivers: policies, strategies and objectives. However, what's missing is the connect between this view and the impact of the change on the Enterprise itself. By connecting the BMM model to models of the Enterprise, for example, to business models of the Organisation's current and desired structure, it is possible for the Organisation to measure and validate the success or failure of the reorganisation in terms of clearly expressible and measurable targets.

A core part of our solution is what we call a Business Motivation Engine, which can be used to simulate the fulfilment of specific Business drivers, or directly plugged into an existing business data platform, to provide a monitoring tool for stakeholders.

Over the next few months, we're looking for beta-testers for the solutions, so if anyone reading this is interested then let me know via tony.clark@xactium.com!

CGN How easy is it to get started with the toolset?

Tony Our products aim to provide standard interfaces wherever possible, for example the use of UML-style class models and the OMG Business Motivation Language in the business motivation solution above. Our XMF engine technology uses a high-level language based on the Object Constraint Language OMG standard. In other solutions we use DSL techniques to tailor the languages to suit the application domain so that the interface is familiar to the developer.

CGN Thanks for the interview Tony.

Tony Clark is Technical Director of Xactium Ltd., a company that provides model based business solutions. He has over 20 years experience of software development and research. He developed a number of advanced applications for Marconi Ltd. that were turned into products. As a lecturer in software engineering at Bradford and London Universities, he developed research in the areas of software modelling and programming languages, leading a team that contributed to a number of OMG standards and undertook consultancies with companies including GEC, Tata, IBM/Rational and Compuware. In 2003 he co-founded Xactium and is lead architect of Xactium solutions including the XMF-Mosaic model based environment, supplying solutions to customers who include Citigroup, BAE Systems, Lockheed Martin and BT.

For more information on Tony's work follow the links below:

www.xactium.com