Graham Stuart ROWAN

PERSONAL
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Nationality: British
Health: Excellent
Languages: French - good

EDUCATION

Masters:		**MSc Astrophysics** (awaiting results) Queen Mary College, University of London
Degree:		**BSc HONS FIRST CLASS** **Computer Science / Electronic Engineering** University College, University of London
'A' Level:	4	Pure Maths, Applied Maths, Higher maths, Physics all A grade

Skills Summary

C# (10 years) / .NET 4.0 / LINQ / WinForms / WPF
Python
C++ Background
Multithreading
Agile Development
Test-Driven Development

Business Knowledge

FX / Risk / Options / Equities / Commodities (energy / base / precious / ags)
First hand trading experience

Anz, FX and Commodities *Contract*

July 2011 – March 2013

Skills Summary:
WPF / C# / .NET

I was recruited by Anz in to provide technical leadership in London for their drive into investment banking. Anz has recently made a commitment to expand into a global investment banking business from their successful retail banking base in Australia. They have recently built up a significant trading team in FX and commodities in London but had no in-house trading tools. I am the sole developer in London and was tasked to provide pricing, market data and risk systems working with their existing technical teams in Singapore and Sydney.

In the first 6 months we delivered market data and pricing systems to the FX business. These were then extended into commodities to service the oil, base metals and ags desks driven from London. I produced a realtime P&L explain system for the energy desk to show realtime position and risk. This included curve and vol surface display and scenario generation.

All systems are developed using .NET 4.0 WPF and C#.

Citi, FX Options *Contract*

June 2008 – July 2011

Skills Summary:
C# / .NET / XML / WinForms / Visual Studio.NET / NUNIT

I was recruited as technical lead on a new project to implement a complete pricing / volatility publishing / risk system for the global FX Options business. I helped recruit a team to replace a 15-year old legacy system. The design brief for the new system was to produce a flexible pricer where new trade types could be added simply by changing configuration data. The previous Black-Scholes pricing model was replaced by a full smile-based pricer. I worked closely with the business to help spec the system and provide incremental deliveries.

Being the first to be recruited onto the team I was responsible for system design and early implementation of the core model which formed the cornerstone of the flexible pricer design. I also implemented a distributed, scalable multi-processor Vol Publishing Server farm which is responsible for distributing Vol Surfaces to all users and to perform pre-processing to apply spreads and correlations and surface integrity checking. This was designed around a Gemfire cache system. The system has since been expanded to include other market data including ticking spot updates with the original multi-processor design being easily expanded to cater for the higher processing throughput. Hundreds of complete market data sets are now published each second.

The first complete pricer / vol publisher was released within 6 months and is now fully functional. The system has been integrated into existing data feeds and downstream trade feed and risk systems. It is deployed across several geographic regions and has a user base of several hundred. This user base will grow ultimately to several thousand.

Recent additions to the system include a real-time CME exchange-based options feed which I implemented to form the basis of an automated trading system, and a parametrically-defined volatility surface for an e-trading platform.

Merrill Lynch, Commodities, City *Contract*

June 2005 – June 2008

Skills Summary:
C# / .NET / XML / WinForms / Visual Studio.NET / NUNIT

I was recruited into the newly created Commodities department at Merrill's, formed from a purchase of a large commodities company (Entergy-Koch). I was initially the sole technical resource in setting up pricing and volatility publishing software for this new division.

Working very closely with the quant team I developed a package of analytics software for modelling and pricing oil swaps and derivatives. I built upon my experience in the Fx division and adapted and extended this software in a very short time to provide the sales team with the essential tools they needed.

Using the same analytics package I then developed from scratch a position and P&L reporting program that is used by the Oil Desk on a continuous basis to manage their risk and positions in real-time. This interfaces to an Openlink system that produces end of day risk and P&L and acts as a trade repository for my program.

This position/P&L reporting tool provides delta position for the swaps/futures traders and full greeks for the option traders. The trade populations are several hundred thousand in total and this tool is relied upon to provide accurate information on which they form trading decisions. The tool also produces VaR numbers on demand throughout the day.

I was responsible for the complete development of this product which included gathering requirements from the traders and other users (eg Middle Office personnel), designing the system architecture and liaising with the quants for analytics functionality. An early version of the system was available within a month of starting and releases with improved functionality have been produced on typically a 4 week cycle.

This has been a rapid development exercise working from scratch with a sales and trading team in place without any tools. It has been a very exciting environment and has given me exposure to a new set of instruments such as oil, metals, structured notes/hybrids and commodity indices. It has also allowed me to work closely with traders and to understand their trading requirements. I am at my best in working in the front office and quants and providing solutions that satisfy the traders' needs.

I now run a team of 3 developers plus 4 developer/support personnel globally.

The system has recently been enhanced to provide realtime position and P&L (approximately 10 seconds to recalculate the entire option portfolio of around 25,000 trades). This has been implemented using a scalable multi-process architecture.

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Merrill Lynch, FX Options, City *Contract*

February 2004 – May 2005

Skills Summary:
C# / .NET / XML / WinForms / Visual Studio.NET / NUNIT
Extreme Programming techniques
Test-driven programming
Cruise Control / Nant continuous build

I started at Merrill on a 1 month fixed term contract to assess the feasibility of using C# and .NET to spearhead their development of options pricing tools. The fx division at Merrill had been considering adopting .NET but did not have the in-house expertise with which to evaluate it.

During this one month period I re-wrote their VB front-end options pricing GUI and added extra features. Subsequently Merrill offered me a 6 month extension and decided to adopt C# and .NET for all future development.

Over the year on this project I was a key developer within a team of 4 plus one Business Analyst. Within this time we have developed 2 key pieces of software – for options pricing and volatility surface publishing – within a single application. The pricer can cope with multiple leg vanilla and exotic fx options, building up complex trading strategies. The volatility publisher can cater for hundreds of volatility surfaces providing the business with a vital edge in fx options pricing. Volatility surfaces can be related through primary/offset relationships or through correlations with other currency pairs.

Within the fx options team we adopted Extreme Programming techniques to provide robust, high quality software, on a very fast turnaround with frequent releases. We utilised test-driven programming techniques to improve the robustness of our software, ensuring that new features do not ‘break’ the software already in operation. Whenever a bug has been identified, a test has been put in place to show the fault and then the fault has been fixed. The presence of this test ensures that the bug does not recur – a common problem with complex software.

We worked very closely with the business to provide software functionality required by the users, with new functionality added frequently in a manner prioritised by them. We produced a new release every 2 weeks, with a continuous build process producing highly robust code with new features on an intra-day basis.

I worked very closely with the fx options business and developed a good understanding of the fx options market.

Throughout this project I applied my experience in object-oriented development and embraced new concepts of .NET and extreme programming to provide timely, robust and highly functional applications.

Barclays Capital, Market & Credit Risk, Docklands Contract

Contract: May 2003 – February 2004
Reference available on request

Skills Summary:
VC++ V6
ATL / COM / STL
SQL
HP-UX Unix
ClearCase
VaR

I was brought in to optimise their market risk engine. It was designed as a multi-threaded C++/ATL/COM/STL project but was not providing consistent performance, nor was it offering increased throughput by adding extra threads on a multi-processor NT box.

The engine calculates Value At Risk (VAR) for a wide range of instruments, including fixed income, forex, equities, derivatives. It uses an historical simulation approach, applying daily historic changes to produce simulated future variations in portfolio valuation.

I was required to understand how the system worked from the code and little existing documentation. From this I produced a plan of control and data flow and identified the various threads at work and how they interacted.

Once the architecture was understood, I instrumented various aspects of the system that I considered to be critical to performance. I was then able to identify the threading bottlenecks and redesigned aspects of the system to enable it to run efficiently on multiple threads.

Some of the optimisations required changes to stored procedures and an improved method of bcp'ing data to the database, as data transfer was a major performance factor.

The existing code was not scaleable, with the same performance achieved on one or 8 threads. With my changes, I achieved a 4x performance increase on 8 threads and an architecture that was now scaleable.

I have moved onto their credit risk, monte-carlo based engine, implementing fixes and upgrades.. This produces risk data for a wide selection of financial instruments including swaps, bonds, equities, fx and a wide range of option types. This is a highly parallel multi-threaded COM-based system.

I also provide support services, creating ad-hoc solutions to urgent problems and trouble-shooting problems with the live systems. This is very rewarding work and provides essential business continuity and support for the business users.

Trader ***Own Account***

May 2002 – May 2003

I have developed a great interest in the financial markets since I have been working in the banking sector and have developed my own trading strategies that I wanted to try on a serious basis.

I traded UK and US equities using options and cfd's. This has been a profitable and enjoyable experience while increasing my knowledge of the way the markets function first hand. As a full time job this has immersed me into a wide range of markets – currency, fixed income and equities – and provided me will a very real understanding of the way these markets interact. I have a particular interest in the psychology of the market and have been amazed at the opportunities provided by the market through the irrational behaviour of the market participants.

Trading using various options strategies has taught me numerous ways to make profits with very low risk. While I had previously understood the theory of option pricing, trading options first hand has brought a much deeper understanding of volatility and how to take advantage of volatility anomalies. I have learnt that managing risk is the key to success in trading.

Trading for myself has required a very high level of commitment and discipline. This was a period of great interest and enjoyment and has considerably broadened my knowledge of how the financial markets operate with first hand experience.

Deutsche Bank, Credit Risk, City *Contract*

Contract: October 1999 – May 2002
Reference available on request

Skills Summary:
VC++ V6 / MFC / NT4
ATL / COM / DCOM / STL
MTS / MSMQ
SQL Server 7.0

I was contracted as the sole C++ developer to re-architect and enhance the Credit Risk system that I had previously co-developed. The system was enhanced to incorporate the valuation of a wide range of **fx options** using a **Monte Carlo** technique. Option types ranged from simple European and American options to Asian, Barrier and Window Barrier options. Each trade was valued over 1,000 paths and around 30 time points to produce the PFE risk profile.

To facilitate the use of different option types a flexible COM model was developed whereby the various parameters of the different trade types could be generically defined and which could be easily extended with the future addition of new trade types.

The original system was streamlined with performance as the key requirement due to the enormous increase in computations involved. The multi-threaded approach was continued and extended in order to perform the large number of computations required in real time. However, large parts of the original system were used, in true COM fashion, with little or no modification.

The multiple server architecture was modified and enhanced to use **Microsoft Message Queue** which provided enhanced reliability and recoverability compared to the original raw DCOM approach.

In the production system a single Calculation Manager controls 8 Calculation Engines using **MSMQ** for communication. The system is easily extensible and is resilient to server malfunction. The system can recalculate multiple risk values and statistics for over 2,000 counterparties with a total of over 130,000 trades of mixed type in under 2 hours. It also re-calculates risk values for counterparties on demand every half hour as intraday trades are fed into it and can perform **pre-deal trade valuation enquiries in real time** (sub-second response).

A COM interface is provided for automation-compatible clients, such as VB, to value single or multiple trades in real-time to provide a pre-deal inquiry function.

The system was developed within the allotted time and performs with little or no maintenance on a daily basis. Each of the servers runs 8 processors running at 600MHz with 8 Gbytes of memory.

Daiwa Europe Limited, Fixed Income F/O, City Contract

Contract: May 1999 – October 1999
Reference available on request

Skills Summary:
VC++ V6 / NT4
ATL / COM
Excel / VB6 / VBA

Working in the front office liaising directly with the traders I was responsible for the continued development of a number of Excel spreadsheets and an underlying Fixed Income Engine developed using VC++ and COM / ATL. The development included all aspects of programming from creating spreadsheets to developing the Excel VBA code and through to the underlying COM components that comprise the fixed income engine.

The spreadsheets covered a wide range of fixed income instruments including Government Bonds, Gilts, Corporate Bonds and Convertibles. I was involved in Yield and Price computations and the implementation of new types of Yield calculations. Information was retrieved in real-time from both Reuters and Bloomberg and contributions were made back to Reuters pages. All calculations were verified against Reuters and Bloomberg. To assist me I received training on the use of Bloomberg.

I am familiar with the use of Benchmark curves and swap curves and the use of futures contracts to track the price of the underlying bonds while overseas markets are closed.

Deutsche Bank, Credit Risk, City *Contract*

Contract: October 1998 – May 1999
Reference available on request

Skills Summary:
VC++ V6 / MFC / NT4
ATL / COM / DCOM / STL
SQL Server 6.5

I worked in a team of 2 designing and devloping a complete Calculation Engine for the generation of **risk analysis for FX trades** with all of DB's counterparties. The system was developed in a highly modular fashion using **Visual C++ under Visual Studio V6.0 with extensive use of COM** technology and the **STL**.

The calculation engine interfaced with a **SQL Server** database through **ADO**. It produced Mark to Market, Current Credit Exposure, Potential Future Exposure and Settlement risk data in real-time. The calculation engine ran on a multiple processor NT4 server making optimum use of all processors by **extensive use of multi-threading**. Care was taken in developing the threading model to reduce critical sections wherever possible avoiding unnecessary loss in performance.

Daily data feeds were accepted to update market data. Trade feeds happened on a continuous basis from around the world and credit risk data recalculated in real-time.

The system was extended by the addition of a Calculation Manager which distributed processing to many Calculation Servers. The original Calculation Engine required minimal changes and the existing COM interfaces were controlled through **DCOM** by the Manager. The Manager was able to control many Calculation Servers (up to 5 were implemented) with a linear increase in processing performance. This architecture was conceived with a view to moving to a high performance Monte Carlo-based system for adding **Options** to the system in the future.

The COM model was further extended to provide an externally accessible Object Model which made controlling the Engine and extracting results possible through a simple VB or Excel front end. This made system debugging and analysis simple as well as providing the possibility of remote system control and monitoring for a highly resilient system.

VB6 and **Excel** were used throughout to provide test harnesses for the COM objects as they were being developed and to produce test programs to verify the business logic and computation results. Various smaller applications were written in **VB** to provide data feeds and other utility programs.

The system was developed on time and achieved all of its design goals. It is a highly resilient system requiring minimal maintenance. The system is currently being used in a 24x7 live system providing DB with all of its FX counterparty risk data in real time.

Natwest GFM (Global Financial Markets), City Contract

Contract: April 1998 - October 1998
Reference available on request

Skills Summary:
Visual C++ V5.0 / MFC
Windows NT 4
NT Services
ActiveX
C++
UNIX / Solaris 2
Sybase SQL Server 11
TransactSQL / Stored Procedures / Triggers
Front Office

I worked in a small team of 4 on a rates distribution system. This suite of software delivers real-time FX spot and forward rates to a dealing floor of several hundred traders. The system allows head traders to input rates and computes future direct and cross rates in real-time. The system is of a **3-tier architecture**. The database is **Sybase SQL Server 11** with an Open Client interface running on a Sun Solaris. This feeds a suite of processes, also running on Solaris, writen in C++ which access the database and compute the real-time rates. These are then distributed to the floor using a **Publisher / Subscriber** architecture specific to NatWest. This finally feeds to the floor traders running a client application written in VC++ implemented on NT workstations.

I was involved in all aspects of system development from developing software in VC++ on NT platforms, to developing and implementing C++ processes on the Solaris platforms to writing stored procedures and triggers for database management. I was also involved with the development of NT Services and ActiveX interfaces.

The system was required to run without problem throughout the trading day. This required the software to be written with resilience and a high degree of error detection and recovery. The floor traders needed to be able to rely confidently on the information distributed by the system.

I was required to get up to speed on the system architecture very quickly while developing from day one. I was able to understand the system architecture in a very short time and provide a valuable contribution to further system development as part of a small but dynamic team.

Sabre Decision Technologies, Knightsbridge Contract

Contract: February 1998 - April 1998
Reference available on request

Skills Summary:
Visual C++
Windows 95
MFC
Sybase
SQL Anywhere

Sabre is a $300million global company developing solutions for the travel industry and are the owners of American Airlines. I was taken on as part of a small team of 3 core developers to customise their product for a London travel company. The software, written in VC++ / MFC, consisted of several hundred modules and utilised a very large database. The system used a very large relational database containing over a hundred related tables. I was required to get up to speed with the software in an extremely short time and help to make some of the many changes that were required involving code modifications, some new code and many database changes. The development included a considerable amount of database queries using SQL on a Sybase SQL Anywhere database.

Banqair, Hertfordshire *Contract*

Contract: March 1997 - January 1998
Reference available on request

Skills Summary:
Visual C++ V5.0
Windows NT V4
MFC / SDK
ActiveX / COM
Multi-threading
ODBC / SQL / Microsoft Access
Client / Server

I was taken on as the only in-house developer in this small company developing a new ticket OCR and processing system for airlines. I was responsible for the design and development from scratch of an application to read and validate the information from flight coupons.

The software consisted of a multi-threaded VC++/MFC application which interfaced to an Access database for information retrieval and storage. At the front end was a process to handle batch management which was responsible for sorting, processing and displaying data for several hundred flights at a time. Coupons from selected batches were fed to another process which interfaced to an OCR module which extracted information (with expected character errors) from various fields on the coupons. Using information stored in the database these fields were cross-validated and the coupon was sent to a third, User-Interface process. The UI process was responsible for displaying the coupon and results from processing to an operator for acceptance or correction.

I designed the application from a very broad top-level specification and implemented it in an initial 3 month contract period. After the successful installation at one major airline at this time my contract was extended for a further 6 months to enhance and further develop the system. The system was extended to a Client/Server architecture so that one powerful Server was responsible for the OCR and validation process and this fed many Client operators who checked the results. Because of the modular nature of the original design the Client/Server implementation took only 2 weeks even though this was not in the original specification. Other features added included statistical analysis and reporting, automatic database updating from data entered, presentation of colour coupons and many user-interface enhancements specified by the client.

The work also involved extensive customer liaison with major airlines to implement new features and maintain the software.

Real World Simulation Ltd., St. Albans *Own Business*

1984-1997
Founder / Technical Director
Note: Business was sold in 1997 with no continued involvement.

Skills Summary:
UNIX / SGI
C, C++, VC++, MFC, SDK
COM / ActiveX
Windows 95 / NT
2D/3D Graphics software. Visual Simulation.
MPEG
DTV

Markets
I founded RWS in 1986 to develop high performance graphics boards and systems. I started the company on my own with a small amount of private capital. At its peak the company had a staff of 15 and a turnover in excess of £5m. The company was a **technology centre developing state-of-the art products** for many blue-chip clients and partners.

Our core products were graphics systems which we sold to OEM's for integration in their own systems. We also took commissions from customers to write full blown applications. We were involved in the full life-cycle of these products from design through to implementation and installation.

We developed key applications in the fields of:

- **Visual simulation (land air and sea)**
- **Virtual Reality**
- **Entertainment**
- **CAD / CAE**
- **Real-time systems**
- **Imaging Systems**

My Technical Role
I was the technical driving force within the company and was the source of new product ideas and innovations. I was both the technical leader within the software development team and a key member of it. I have always maintained a close hands-on role and kept the company small to minimise the overhead of personnel management.

Technology Used
Our products were at the leading edge of the market which meant that we had to stay at the forefront of emerging technologies. We developed our software on both **SGI and Sun Unix platforms** and PC/Windows platforms (from Windows 3 through to **Windows 95 and NT** in recent years). Most of our software was written using a mixture of **C** and **C++** with C++ dominating. More recent developments were with **Visual C++** and **MFC**. Wherever possible we embraced new technologies as they emerged and recent applications were implemented using component technologies such as **COM** and **ActiveX**.

Logica Ltd., Newman St., London *Permanent*
Logica VTS Research, New St., London
1980-84

I worked on the development of the VTS2200 dedicated word processor within a 3 man software team implementing hardware driver code, a file management system and document handling system. I also became involved in most other aspects of developing a word processing system. Here I gained experience in writing large suites of software on windows-based machines.

I spent half of my time at the Research division of VTS where we studied 'office of the future' systems and operated under the management of William Newman. Using the Perq windows-based computer I spent a year developing an advanced document text and image editing package. I also implemented a full Unix-like operating system. Most of the code was written in C.

Texas Instruments Ltd., Manton Lane, Bedford *Permanent*
1979-1980

I worked in the newly established microprocessor development lab (EMTC) programming TI's microcontroller chips. Various hardware / software systems were developed in control applications such as a car dashboard controller, teasmaid, remote TV controller. I undertook the complete project starting with discussing specifications with the customer, designing the hardware and software and implementing the complete system. I was also responsible for debug and commission on the customer's site.