Andrew K. Johnston B.Sc. – Enterprise and Solution Architect

01483 283408 / 07940 538713 cv@andrewj.com www.andrewj.biz uk.linkedin.com/in/andrewkjohnston

An enterprise and solution architect with over 30 years' experience, I have a passion for solving business problems through the creation of innovative solutions. Analytical thinking, extensive cross-domain knowledge and an ability to focus on both the big picture of a complex, connected portfolio and issue details provide insight into problems. Strong technical leadership, communication and influencing skills help drive the design and delivery of solutions which meet business needs, perform, and actively enable change.

Key Competencies

Analysing complex problems and finding innovative, enduring solutions

- ✓ Developed and promoted an integration architecture for National Grid which survived several generations of system evolution, allowing major system replacements and rationalization with minimal impact on other systems, significantly reducing costs.
- ✓ Guided Accenture to rectify early performance and reliability problems with National Grid's Field Force Solution, which then delivered business value for over ten years.
- ✓ Delivered an agile shelf-edge ticketing solution for Marks and Spencer despite severe constraints on platforms, networks and a Y2K application change freeze. New solution reduced key business process from over 14 days to a few hours.

Communication and technical leadership

- ✓ Rescued the development of TRW's idWorkshop programme from near cancellation. Analysed weaknesses in the prototype system, applied lessons and patterns from very different business and technical domains, and guided an international team to evolve it into a commercial offering with required scalability, reliability and usability.
- ✓ Provided technical leadership in the migration of National Grid's business systems to new "private cloud" data centres, co-ordinating multiple partner organisations and developing tools, standards and techniques used across the programme.
- ✓ Articulated and promoted the vision for National Grid's work and asset management portfolio, to drive a strategy of dramatic system rationalization and modernisation.
- ✓ Acted as Design Authority on that portfolio for several years, understanding and communicating multiple complex interactions, reviewing and coordinating the work of several development partners to preserve and improve the architecture's integrity.

Software development and project management

- ✓ Designed a secure but flexible network architecture for National Grid's Smart Asset Management initiative, providing an appropriate balance between strategic control, tactical innovation and long term flexibility and security.
- ✓ Ran the procurement exercise to establish the hardware solution for that programme.
- ✓ Developed working prototypes of several solutions, including innovative components in National Grid's integration environment, and the idWorkshop Knowledge Base. Repeatedly demonstrated ability to quickly adopt new technologies and environments.
- ✓ Devised a new way to document and model complex Enterprise Data Architectures.

Key Experience

The following are key points from my more than 30 years' experience. Since 1994 I have worked as an independent consultant and MD of Questa Computing Ltd. servicing multiple clients, some concurrently.

TRW Inc / id Information Systems Ltd. (May 2014 – Present)
Programme architect for web-based portal/on-line diagnostics for automotive aftermarket. Amazon Web Services, Oracle WebCenter, Microsoft, Linux and open source technologies.

National Grid Plc. / IBM (1997 – 2014)
Wide-ranging support for this major UK and US energy transportation utility, including IT Strategy, solution architecture, enterprise integration, asset, document and mobile field force solutions, portfolio design authority, architect role development, data centre migration, major systems procurement. Wide variety of technologies, including VMWare virtualisation, multiple generations of Oracle toolset, Microsoft and various mobile client solutions.

British Energy Power and Energy Trading (February – June 2007)
Requirements, future architecture and project direction for the Retail Spine (wholesale energy sales to the UK's biggest power consumers).

Marks and Spencer Plc (May 1999 – June 2002)
Development of the "Ticket Shop", an agile muti-country, multi-lingual platform for shelf-edge ticketing. Microsoft technologies including VB, SQL/Server and ASP.NET.

Faith Footwear Ltd. (May 2000 – November 2001)
Strategy study, development of a data capture network for Business Intelligence.

Oracle UK / BSkyB (June 1998 – March 1999)
Reliability review for this first interactive digital television service platform, including development of modelling toolset. Development of testing processes, training delivery.

Livingston Rental (as an Associate of Sema Group) (March 1995 – January 1997)
Legacy porting to Unix/Oracle. Stock information replication. Remote monitoring.

National Power (July 1994 - March 1995)
Introduction of code control & automated test tools, development standards update.

Eurotunnel Plc. (1989 - 1994, Permanent, Development Support Manager)
Development/QA standards, IT procurement and contract negotiation/management, supplier and internal QA reviews, creation of integrated development environment.

Digitus Ltd. (1986 – 1989, Permanent, Managing Systems Engineer)
Development of shipping, treasury, property management and oil trading systems.

Racal-Decca Advanced Developments Ltd. (1982 – 1986, Permanent, Senior Engineer)
Study and development projects in satellite communications and navigation.

Education

1979 - 1982: Lancaster University. B.Sc. (Hons) 1st Class in Physics.
1972 - 1979: Chepstow School. 10 'O' Levels, 4 A Grades at 'A' Level.

Other Clients

- ✓ Coleman Research Group (2014 – Present): Consultancy to potential investors in IT
- ✓ Legal Marketing Systems Ltd. (2004): Architecture review for conveyancing business
- ✓ Barclays Sales Financing Ltd. (1999): Intranet for development documentation
- ✓ Addison Wesley (2003 – 2007): Regularly reviewed book proposals and manuscripts for this major technical publisher

Key Skills and Knowledge

Technologies

- ✓ Visual Basic, VB.NET, ASP.NET (all versions), Basic4Android, C++ and Nokia QT
- ✓ XML, XSD (XML schema), XSLT, and their use in EAI
- ✓ Java and various java-based technologies including JMS, JAXB and others
- ✓ VBA, VBScript, Active Server Pages, PHP, CSS, WordPress
- ✓ EAI tools including JCAPS, BizTalk, JMS, MSMQ and bespoke messaging
- ✓ Oracle, including distributed databases and various tools (SQL*Forms, PL/SQL)
- ✓ Unix, including C, Bourne Shell, Perl, Awk and X-Windows
- ✓ Windows, including the 16-bit, 32-bit, 64-bit and .NET APIs
- ✓ Virtualisation and cloud hosting including VMWare and Amazon Web Services

Architecture and Design

- ✓ Design and development of enterprise-level and individual system architectures
- ✓ Creation of innovative solutions in technically or commercially constrained contexts
- ✓ Development and review of EAI integration schemes and data architectures
- ✓ Trouble-shooting architectural, performance and reliability problems
- ✓ Reviews and audits of designs and supporting documentation
- ✓ User interfaces and user interface standards
- ✓ Development of design standards, including for complex multi-tier architectures
- ✓ Responsive website design and mobile application development

Procurement, Testing, QA, Training and Documentation

- ✓ Preparation of Invitations to Tender and evaluation of proposals and supplier quality practices. Negotiation and drafting of supply and licensing contracts
- ✓ Test standards, choice and implementation of test tools
- ✓ Delivery of training, with existing course material for testing, analysis and design
- ✓ Development of user documentation, training materials and help systems
- ✓ Selection and implementation of documentation and knowledge management tools
- ✓ A good working knowledge of French

Publications

- ✓ "A Hacker's Guide to Project Management" – light-hearted project management advice for the technically minded, now in its second edition
- ✓ Conference papers include "The Benefits of EAI" (Enterprise Architecture Conference 2011), "Agile Architecture" (EAC 2006), "Modelling the Enterprise Data Architecture", "Communicating the Enterprise Architecture", "The Pragmatic Approach to Quality" and "Getting the System Sizing and Performance Testing Right"
- ✓ I run AgileArchitect.org exploring the use of agile methods in architecture, and the role of the architect in agile developments

Case Studies

TRW Inc / id Information Systems Ltd. (May 2014 – Present)

Summary	Development of a web portal for the automotive aftermarket
Key Outcomes	Rescuing programme from the point of cancellation and delivering a complex system ready for commercial exploitation
Key Challenges	Complex technologies and supplier structure, split between UK and Germany. Dysfunctional relationships with initial customer and some members of the wider team
Key Technologies	Amazon Web Services, Oracle WebCenter, Microsoft stack, Linux and open source technologies

TRW is seeking to establish an innovative web-based capability for the automotive aftermarket, fully integrating cloud-based vehicle diagnostics, technical workshop data, a knowledge base and distributor parts catalogues.

A small team of consultants was engaged at a point where the project was under imminent risk of closure, having spent a large investment with relatively little result. We first assessed that the project was worth saving, and were then challenged to do so.

A crude Proof of Concept had been developed without any effective unifying architectural viewpoint, and fell well short of commercial expectations in terms of usability, performance, reliability and scalability. As Programme Architect I worked with the existing developers in London and Berlin to progressively develop unifying architectural principles, and then to re-engineer the system to a point where we had confidence of its ability to perform as a commercial product. Alongside this I provided input to colleagues performing similar reworking of the programme's commercial, management and procedural structures.

With the main development secured I also undertook the prototype development of the system's knowledge base. This can synthesise information from a number of external sources to guide mechanics from a diagnostic trouble code through to a parts recommendation which can then become a query in the distributor's parts catalogue.

Data Centre Migration for IBM / National Grid Plc (2012 – 2013)

Summary	Migration of National Grid's business systems to a new "private cloud" at CSC data centres
Key Outcomes	Successful migration of the majority of systems, leading to reduced IS costs and a better alignment with the new regulatory funding regime. Modernisation or rationalisation of several legacy systems.
Key Challenges	Complex multi-party supplier structure. Aged legacy systems with unsupported technologies and limited documentation / knowledge
Key Technologies	Various Windows and Unix server OSs and hosting arrangements. Virtualisation and physical migration. Wide variety of application and client technologies. Networking including firewalls and extranet.

National Grid contracted with CSC to re-host the majority of their systems in new CSC data centres. I worked as the lead architect for the IBM team supporting that programme, planning and assuring the migrations from an application perspective. This required building a comprehensive understanding of around 50 complex and legacy applications to identify an appropriate migration approach, required remediation work and appropriate testing for every application. I also had to ensure that the preparations being made by IBM,

CSC, networking partners and third party application vendors would provide for a "joined up" and low risk migration of each application in the IBM support portfolio.

It became apparent early on in the programme that there were few established processes and templates suitable to the National Grid situation, and I led a multi-partner exercise to progressively develop a suite of guidelines, documents and processes which could be repeatably applied by various teams to develop the required understanding for each application in turn.

During the actual migrations I took an active coordinating and troubleshooting role, on several occasions identifying the source of issues and their likely resolution.

Responsive Web Site Design for Private Clients (2012 - 2013)

Summary	Web site modernisation to support mobile clients
Key Outcomes	Successful modernisation of multiple websites with legacy bases dating back up to 20 years
Key Challenges	Elimination of legacy client-side technologies e.g. Java and prior browser and client platform dependencies
Key Technologies	Responsive grid design, media queries, HTML5, CSS, PHP, WordPress, JAlbum

I maintain websites for both my own endeavours and for some other private clients. It had become apparent that these needed a substantial update to properly support the modern plethora of devices and browsers. I therefore undertook a major rewrite to ensure that all aspects of each website are now fully device-independent, mobile-friendly and responsive, in the process eliminating prior dependencies on specific browser capabilities and client-side Java. All now use a single unified and highly modular architecture, with all core logic moved to server-side.

Smart Asset Management for IBM / National Grid Plc (2009 – 2012, 2014)

Summary	Consolidation and analysis of multiple sources of management data for National Grid's transmission assets
Key Outcomes	Overall strategy for "Strategic Asset Management". Underlying infrastructure for collecting detailed asset information from source. Optimised, innovative asset maintenance and replacement planning.
Key Challenges	Designing a secure but flexible network architecture. Articulating a vision providing an appropriate balance between strategic control, tactical innovation and long term flexibility and security.
Key Technologies	RuggedCom RX-series industrially hardened cyber security appliances. JCAPS integration.

The National Grid "Strategic Asset Management" initiative aims to create an environment in which traditional asset data can be combined with data collected directly from assets in near real time, subject to novel analyses and presented through graphical composite applications to enable a move to condition, risk and criticality-based asset maintenance and replacement planning. As such it will form a major plank of Transmission's strategy to meet their obligations through to 2020.

The initial stage delivered an enabling communications and security layer, allowing flexible but secure access to network enabled assets directly from appropriate business systems. I led

the procurement of this solution from a technical standpoint, preparing the majority of procurement materials and driving much of the evaluation process.

In parallel I helped the business to develop their overall vision for the solution, and created a data management and application architecture which will progressively exploit the new infrastructure capabilities.

I have now been re-engaged in this programme to help deliver the required data to an IBM Cloud Analytics solution, and to establish how the new solution can integrate with the mobile solutions for the Transmission workforce.

Integration Architecture Development for National Grid Plc (2002 – 2012)

Summary	Development and evolution of a powerful and flexible enterprise integration architecture
Key Outcomes	Delivery of a flexible integration architecture which has delivered continuous business value as well as significant reduction in cost and complexity for several major system upgrades.
Key Challenges	Wide range of systems to be integrated. Multi-party delivery environment. Continuous pressure to "shortcut" good design.
Key Technologies	SeeBeyond, BizTalk and JCAPS integration, JMS, MSMQ, web service integration, XML, XSD, canonical data modelling

In late 2002, working with external consultants and the business, I articulated a new vision for the systems supporting Nation Grid Transmission's asset and work management. This was based around a central asset repository, with a document management system, a field force solution, and a comprehensive data warehouse with Business Intelligence tools, all integrated by a shared EAI backbone.

In subsequent years I acted as National Grid's lead architect as this vision was progressively implemented, providing guidance and supervision to internal and external service and solution providers, maintaining a "hands on" approach.

I was actively involved in the design of the integration architecture. In order to provide maximum flexibility and isolate different systems from the complexities of one another we developed a scheme based around a canonical "common message model", which has proven very capable particularly during a number of subsequent major system replacements. When the core asset management system was upgraded and restructured in 2007-9 we avoided any downstream impact on the field force, GIS, document management or data warehouse systems. Subsequently a number of other systems have been integrated, but it has frequently been possible to re-use existing flows, minimising the costs of new integration development.

I personally invented the solutions to a number of key problems, including a mechanism to track asset changes by comparing messages passing through the integration layer, and a rule-based "transformation engine" which transforms between the common message model and a very complex proprietary model doing away with a very large number of complex hand-coded transformations.

The benefits of the canonical integration architecture formed the subject of a paper I presented at the 2011 Enterprise Architecture Conference in London.

Asset Management Systems Evolution for National Grid Plc (1999 – 2009)

Summary	Development and evolution of a rationalised strategy for Asset and

	Work Management systems for National Grid Transmission
Key Outcomes	Consolidated strategy based around a core asset management system. Initial delivery of the vision leading to significant business savings. Key upgrades achieved within limited budgets and with minimal "knock on" costs thanks to strong integration architecture.
Key Challenges	Fragmented and disparate legacy systems before rationalisation. Complex integration requirements. Differing business views on requirements and potential solutions.
Key Technologies	ABB/Ventyx Ellipse, AMT-Sybex FDCS/FieldReach, Open Text LiveLink, Oracle, SeeBeyond/JCAPS/JMS and MSMQ integration

For several years I worked with successive IS Strategy Managers to develop a formal IT Strategy for Asset and Work Management, aiming to deliver increased business value while reducing inefficiency, fragmentation and duplication. I innovated popular ways to document and communicate the strategy - the acclaimed "roadmap" representation was my own invention.

In late 2002, working with external consultants and the business, I articulated a new vision for the systems supporting the Transmission business's asset and work management. This was based around a central asset repository, with an integrated document management system, a field force solution, and a comprehensive data warehouse with Business Intelligence tools, all integrated by a shared EAI backbone.

By 2005 this was almost fully implemented through a major programme of IS and business change, and delivered business benefits to the tune of 25% of previous annual maintenance costs. In my role as Solution Architect for that £34M programme I provided guidance and supervision to internal and external solution providers, maintaining a "hands on" approach. In particular I was actively involved in the analysis and resolution of a number of integration, performance and reliability issues.

From 2007-9 National Grid engaged in a major programme of systems replacement and rationalisation, starting with their core Asset and Work Management system and extending to almost the entire landscape. This included refreshing the integration architecture and building comprehensive integration with a new SAP "back office". I worked as Lead Solution Architect and Design Authority throughout this programme, and can claim to have driven design decisions which have delivered innovative value or substantially reduced costs, risks and business impact. In particular by exploiting and extending the strong integration architecture developed earlier we managed at least five major system replacements with almost zero impact on other systems at each stage.

My engagement in this process has been hands-on as well as strategic. I personally invented and developed working prototypes for innovative elements which continue to manage complex client software deployment, track key data changes through the integration layer, and transform between two very different core message models.

Field Force Systems for National Grid Plc (2003 – 2007)

Summary	Development and exploitation of the field force system platform
Key Outcomes	Delivery of a stable, powerful industry-leading mobile field force system. Progressive exploitation including a satellite "point of work" inspection system
Key Challenges	Multi-vendor environment. Constraints of corporate PC platform and various vendor components. Initial stability and performance issues

Key Technologies	Accenture FFE, AMT-Sybex FDCS/FieldReach, JCAPS, Windows and Windows Mobile, mobile networking

My work on the first generation of consolidated asset and work management systems for National Grid Transmission included supporting the development of a mobile field force management system based on Accenture's FFE platform. When this suffered early performance and stability issues I took a leading role in improving the architecture and delivery of the system with its associated integration, eventually resulting in a reliable system which delivered significant business value.

I then led the upgrade of the mobile PC platforms for the various field force solutions throughout National Grid UK, replacing several disparate solutions with a solution family based on common software architecture. As part of this programme I persuaded National Grid to take an agile approach to introducing a PDA "point of work" inspection solution, which helped deliver significant business benefit much more quickly and cheaply than the normal waterfall method would have done.

Minor Development Projects (1994 –)

Summary	Minor development projects for various clients
Key Outcomes	Successful proofs of concept for novel development ideas. Various minor applications in wide public use.
Key Challenges	Need to keep track with changing target development platforms. Occasional need to learn new technologies very quickly.
Key Technologies	Basic4Android, C++, XML, Java, Visual Basic / VB.NET / VBA, PHP, WordPress

Although the bulk of my work is strategic, I have continued to engage in regular minor development work using a wide variety of technologies. Much of this is self-funded, as a combination of hobby and continuing professional development. However other instances have been funded by major clients, usually to explore and prove the viability of novel solution concepts.

I have a strong track record of both being able to invent and prove innovative solutions, and to quickly come up to speed with new technologies in order to do so. Many of my best solutions have been direct refutations of statements that a certain thing "cannot possibly be done that way".

Key examples include:

- ✓ Stash-It!, an "app" for Android to manage and secure mixed but related content and research notes. (Basic4Android)
- ✓ CAQuest, a plugin for the popular Bibble/AfterShot RAW image processing platform, providing advanced settings management and "profiling" capabilities. This was developed using C++ and the Nokia QT framework, and runs on Windows, OSX and Linux from a single code base.
- ✓ A component for National Grid's EAI architecture which compares and enriches related XML messages as they flow through the system, enabling better downstream routing depending on what has changed. (Java)
- ✓ Another component of the same EAI architecture which translates between two very different core message models, using a "reflection" approach and a rule table to replace a very large number of hand-coded complex transformations. (Java)

- ✓ A testing tool to drive like for like performance testing across several generations of National Grid's enterprise content management system, and allowing simulation of the expected load (for 5000 users) from just 6 PCs. (VB.NET)
- ✓ ConQuest, a prototype Container Yard Management system which (in 1994) provided drag and drop visualisation and optimisation of container moves. (Visual Basic)
- ✓ RelQuest, a fault tree analysis addin for Microsoft Visio originally developed to support my reliability study for Oracle / BSkyB. (Visual Basic / VBA)
- ✓ A "Heat Mapping" addin for Excel developed to help British Energy visualise a complex multi-dimensional requirement set. (VBA)
- ✓ WordPress plugins to enable effective integration of WordPress into a larger site with substantial non-WordPress content. (WordPress, PHP)

"Ticket Shop" Development for Marks and Spencer Plc (1999 – 2002)

Summary	Development of an agile platform for a key process in foods retailing
Key Outcomes	Successful initial delivery followed by progressive exploitation. Improvement in performance of key business process from over 14 days to a few hours
Key Challenges	Tight timescales, very limited network bandwidth, no available platform and Y2K freeze preventing application changes
Key Technologies	Microsoft Office, Exchange, Visual Basic and SQL/Server. Agile development

Marks and Spencer had an urgent business requirement for a new back office system, for which several previous projects had failed. It was subject to a number of severe and conflicting constraints limiting timescales, the delivery of new software, and available WAN bandwidth. I designed a solution which met the very tight deadlines, used roughly 1% of the previous communications bandwidth, and exploited the existing Microsoft Office/Exchange infrastructure to deliver substantial functionality without any new components at the desktop. The solution reduced a key business process necessary to keep goods on sale from over 14 days to a few hours.

I provided technical leadership for two years, as the design was substantially extended in scope, including multi-country and multilingual support. Complex business and formatting rules were moved from code to a rule database, and the system migrated to a component-based architecture. I espoused and put into practice my strong belief in agile development practices, which delivered value progressively from a team with widely-varying development abilities.

Marks and Spencer cited me as co-inventor (with the key business manager) in a patent application covering several important concepts from this system, and I continued to provide consultancy for its development including the later development (in just ten days) of a working thin-client version of the system using Microsoft .NET technology.

Data Integration for Faith Footwear Ltd. (2000 – 2001)

Summary	Development of a proprietary EAI platform
Key Outcomes	Consolidated management information and various remote management capabilities across Faith's ~300 stores
Key Challenges	No scope for use of commercial EAI products. ISDN-based network with very limited bandwidth and strict constraints on call durations.
Key Technologies	Microsoft Visual Basic, SQL/Server, FTP, Afaria Excelanet

Initially I undertook a short fixed-price study to assess Faith's existing IT provision, and possible ways in which it might evolve to support new business models such as collaborative working with suppliers using eCommerce technology.

This led to my involvement in a project to establish a Management Information database, and support for new business models. I developed a proprietary transport-independent EAI messaging system running between the stores and head office supporting data warehousing, software distribution, application integration and distributed near-real-time processing.

System Reliability Study for Oracle UK / BSkyB (1998 – 1999)

Oracle's Interactive Services Project was developing the platform for British Interactive Broadcasting (later BSkyB)'s interactive digital television service. I undertook a review of the design to assess its likely reliability, which included the development of a novel Fault Tree Analysis technique for such systems. In addition, I supported the development of system test plans and technical strategies for aspects such as error handling.

Rental Systems Re-platforming for Livingston Rental / Sema (1995 – 1997)

Summary	Migration of legacy rental system to new strategic platform
Key Outcomes	Successful migration. Reduction of projected hardware costs. Data integration for previously separate European business divisions.
Key Challenges	Simultaneous outsourcing and replatforming of IT capabilities. Divergence of systems supporting different business units.
Key Technologies	Data General, Solaris, Oracle (database and forms), Windows, Visual Basic, ISDN-based wide area networking

This project centred around porting the Livingston Group's equipment rental systems from a legacy Data General architecture to a more flexible Unix/Oracle base.

I defined the overall technical architecture for the new system. Performance benchmarking and prototyping exercises saved the client several hundred thousand pounds by allowing the use of lower-specification hardware. The performance prediction work led to a paper for the EUROStar '96 testing conference.

A leading role in commissioning the new infrastructure included setting up the Sun servers, defining a disaster recovery plan and operational procedures, sorting out LAN communications and establishing new configuration control tools. I also set up a Wide Area Network between several European sites.

Thereafter I specified, designed and implemented the following:

- ✓ A system to replicate stock information between the British, French and German sites, using Oracle database services and a client-server front-end.
- ✓ A scheme for remotely monitoring numerous aspects of system performance on the various Unix and NT servers and Oracle databases, relaying potential alerts back to a single point for system administrator attention via a graphical front-end.
- ✓ A tool to automate translation so that English, French and German versions of the Rental system (written in a Unix-based legacy 4GL) could use common source code.