

**Full Name**                    **Graham Patrick Morgan**  
**Role:**                            **GIS Enterprise Architect / Implementation Lead**



### Professional Qualifications

- MSc (with Distinction): Geographical Information Systems, University of Edinburgh, 1991
- BSc (2:1, Hons): Geology, Royal Holloway and Bedford New College, University of London, 1988
- LEAD Business Leadership, University of Lancaster / Cumbria, 2010
- FME Certified Professional, 2019
- MSCE Azure Cloud Platform and Infrastructure, 2017
- BCS CISMP Information Security Management, 2017
- TOGAF 9 Certified, 2016
- Certified ScrumMaster, 2012
- MBCS CITP (Chartered IT Professional), British Computer Society, 2009
- GISP (GIS Certified Professional), USA, 2004, Analogous to RGS CGeog (GIS), UK
- MCP (Microsoft Certified Professional) MS SQL Server Enterprise Edition, 2002
- Smallworld GIS World Class Partner, Accredited Application Developer, 1998

### Professional Associations

- **Association for Geographic Information (AGI)**  
Former Chairman of the AGI Northern Group
- **British Computer Society (BCS)**
- **Scrum Alliance**
- **Association of Enterprise Architects (AEA)**

### Awards

- AGI Director's Award 2011
- AGI Student of the Year Award (Runner up) 1991
- NERC Postgraduate Scholarship 1990

### Personal Qualities and Motivation

An expert in spatial system architectures, GIS, data management and business intelligence, Graham has worked around the world and has enjoyed leading projects for a wide range of organisations from Defence to Natural Heritage. Graham has also climbed, skied, biked and trekked extensively; he is a qualified mountain leader and occasionally instructs for his family's mountaineering business in the Lake District.

### Recommendation

*"Graham worked as a senior GIS architect on my team of IT Strategy architects for more than a year. Graham brings with him an extensive understanding of Geospatial technologies and his expertise of enterprise systems integration. He brings with him a deep experience of IT consultancy, strategy and architecture working across many industries and that adds a lot of value and perspective to the business problem. Graham is a leader, very approachable and provided guidance to other junior members of my team. It has been a pleasure to work with Graham and I would absolutely recommend his service to anyone wanting to achieve great results."*

- Chirag Mehta, Enterprise Architecture Lead, Transport for London

## Career History

August 2007 to present	<b>Spatial Consultants Ltd, United Kingdom</b> Managing Director/Geospatial Architect Member of Geomatics Industrial Advisory Panel for Newcastle University
August 2004 to July 2007	<b>Forte Consulting Ltd, Canada</b> Managing Partner/Solution Architect
January 1999 to July 2004	<b>Atos Origin, USA</b> <b>(SchlumbergerSema, Convergent Group thru acquisition)</b> Solutions Architect/Project Engineer
May 1997 to October 1998	<b>Perot Systems Europe, United Kingdom</b> GIS Applications Developer
September 1995 to December 1996	<b>Ontario Ministry of Natural Resources, Canada</b> Senior GIS Systems Analyst
March 1995 to September 1995	<b>Royal Institute of Technology, Stockholm</b> GIS Teacher/Researcher
July 1993 to December 1994	<b>Callahan Fox &amp; Associates, Australia</b> Senior GIS Specialist
July 1992 to May 1993	<b>Travelling through SE Asia</b>
September 1991 to June 1992	<b>Sperry Sun Drilling Services</b> Senior Logging Geologist (North Sea, Denmark)
October 1990 to October 1991	<b>Undertaking GIS Masters Degree, Edinburgh</b>
September 1989 to October 1990	<b>Sperry Sun Drilling Services</b> Logging Engineer (Middle East)
May 1989 to September 1989	<b>UNOCAL (UK)</b> Technical Assistant, Exploration Department: Europe

## Relevant Experience and Roles

**National Grid Development Plan Monitoring System (2019):** Graham is currently completing the implementation of an ArcGIS Online-based solution to enable Avison Young to deliver to national monitoring service for National Grid gas and electrical assets.

**Sellafield Cloud Collaboration Platform (2019):** Working Arup (UK) Graham was responsible for the architectural assurance and compliance aspects of a new Azure/O365-based collaboration platform to support Sellafield and its supply chain partners within the Infrastructure Strategic Alliance.

**Hong Kong Built Environment Application Platform (2017-2019):** Working with Arup (HK) and UK partners Fox & Associates, Graham lead the on the creation of a development framework for an enterprise-wide Urban Information Platform to support the HK government's mission of becoming Asia's leading Smart City. The project involved reviewing selected smart city initiatives from around the world and developing an implementation roadmap for Hong Kong.

***Copeland Borough Council Cyber Recovery and GIS Replacement (2017-2019):*** Graham coordinated the recovery and renewal of Copeland Borough Council's entire ICT estate following a very serious cyber-attack that encrypted many council systems. This involved building an internal team, managing the long-running recovery effort and developing the strategy and enterprise architecture to support the council into the future. This work concluded with the migration of the council's legacy open source GIS to ESRI's cloud-hosted ArcGIS Online service.

***Sellafield Maps GIS Capability, UK (2013-2016):*** The project included developing the vision for the GIS capability; securing stakeholder support; and developing the business case, implementation strategy and roadmaps; whilst at the same time delivering tangible benefits to the business through useful spatial information products and applications.

Over the course of 3 and half years Graham led the technical development and delivery of the new GIS capability. Working within the client team Graham led the designs of the business and service architecture and the spatial data infrastructure (water, electric, steam, roads, etc), including the application architecture, data integration architecture and the technical platform architecture. He also developed the implementation strategy for the capability and led several Agile Scrum teams in the delivery of SDI components, including policies and procedures as well as in delivering GIS services for Master Planning, Security, Resilience, Emergency Management, Transport and Utility & Infrastructure divisions.

Sellafield's use of GIS has been recognised as 'best practices' by both the UK Office of Nuclear Regulation (ONR) and the World Association of Nuclear Operators (WANO).

***TEPCO Enterprise GIS, Tokyo, Japan (2015-2016):*** Working with the commercial division of the UK Nuclear Decommissioning Authority (NDA) and Sellafield, Graham consulted to TEPCO on the development of an enterprise GIS to support to the Fukushima Daiichi site management and recovery. Through a limited number of visits to Fukushima and Tokyo and monthly teleconferences the team delivered a series of lectures, and provided mentoring and hands-on demonstrations of open source and ESRI based components. TEPCO deployed their enterprise GIS within 15 months to support land management, hot working, traffic management, real time environmental monitoring and site planning.

***Wood Mackenzie Client Portal, UK (2012-2013):*** Graham supported SapientNitro in the design and development of a new client portal for this firm of energy industry analysts. The solution addressed the key challenges of delivering highly personalised geospatial information to a global audience clearly, quickly and securely. Graham evaluated several technical approaches to produce a recommendation and worked with the consulting team to validate the technical architecture using Google Maps API, Oracle, GeoServer, and OpenLayers/Leaflet)

***Gibraltar Enterprise GIS, Europe (2012):*** Graham consulted to Atlantic Geomatics in the design and initial development of an enterprise GIS solution to support the British Overseas Territory of Gibraltar. The project also introduced a new postal addressing solution using a mix of open source (PostgreSQL/PostGIS, GeoNetwork) and ESRI technologies

***Oxfordshire County Council, Corporate GIS Architecture, UK (2012):*** Graham consulted to this local authority to develop a corporate GIS strategy to address the council's need to improve the efficacy and efficiency of the GIS estate (particularly achieving cost savings). This involved an audit of existing spatial applications, data and resources to produce a spatial needs assessment across the Council's business functions. Options were evaluated and an implementation roadmap and migration plan for the consolidated spatial data infrastructure were developed.

**Lincolnshire County Council, Functional Geographies, UK (2011-2012):** Graham developed a web based analytical tool (using ASP.NET and SQL Server) to enable the Enterprise and Regeneration Team to explore the functional relationships between areas, based upon detailed travel data for a variety of topics.

**Hanson Aggregates, ESRI Architecture Assurance, UK (2010-2011):** Graham provided project and architectural assurance for a large ESRI ArcGIS / SAP based logistics system to support the sales, pricing and fleet management of a multinational aggregates business.

**Kent County Council, Habitat Mapping Tool Customization, UK (2010-2011):** Graham completed the development of an ESRI ArcGIS v9.3&10x/.NET tool to enable the capture and maintenance of Habitat data. The tool supports both English and French language locales.

**Forest Gardens Network, University of Cumbria (2010):** A community based web mapping application was developed using QGIS, PostgreSQL/PostGIS, GeoServer and OpenLayers.

**SpatialInfo, Telecommunication Data Migration, USA (2010):** Graham consulted to SpatialInfo of Denver, Colorado in the automated migration of fibre optic network data from an ESRI SQL Server/Geodatabase to an Oracle Spatial / Autodesk model.

**Transport for London, Geospatial Platform Architecture, UK (2007-2009):** Graham consulted to TfL to assist in the establishment of an Enterprise Architecture practice encompassing the design of spatially-enabled common IT platform services, together with supporting standards, policies and governance structures. He was involved as a Solution Architect in several projects including: the IRIS incident reporting system – a web based extranet application composed from BMC Remedy, Hyperion/JasperReports Business Intelligence, Oracle Spatial/Maps and Microsoft Intelligent Application Gateway (IAG); Prestige MCS – providing the infrastructure to support the expansion of Oyster cards across National Rail; and the TfL geospatial Data Management Framework.

**BC Base Mapping & Geomatic Services, Geodatabase Management Services, Canada (2005-2006):** A consulting engagement to provide specialist support to the Cadastral Base Mapping Section in the development and publishing of land parcel geospatial information products from their operational system to the BC government's central geospatial data warehouse for distribution to government, partners and the public. A logical data model of the operational and warehouse environments were developed and a framework based upon Oracle, FME, ESRI ArcSDE Geodatabase and ArcGIS Server toolsets was established to support quality assurance and acceptance of contracted data sets.

**Government of the North West Territories, Spatial Data Warehouse, Canada (2005):** Graham supported the design and application development of a Spatial Data Warehouse and web portal for the North West Territories. The warehouse enables spatial data and imagery to be shared among government agencies and with the general public via the Canadian Geospatial Data Infrastructure Geoconnections Portal

**BC Ministry of Agriculture and Lands, Integrated Land and Resource Registry, Canada (2005):** Graham was engaged to provide specialized spatial data management, design and application development services to the Integrated Land and Resource Registry (ILRR) Project. The goal of the ILRR Project is to provide a single source for querying land and resource related rights and interests on crown land in British Columbia. This project involved integrating data within 20 operational government systems managed by 19 different Interest Granting Agencies across the province.

Graham participated as a Senior Business Analyst and Team Lead for the Data Management Stream, providing technical management of project resources and business consulting.

***RWE Thames Water UK Integrated Asset Repository, UK (2004-2005):*** Graham was contracted by Atos Origin UK, to support the development of an Integrated Asset Repository for RWE Thames Water. The IAR will rationalize numerous asset data stores and applications to provide a cross-departmental geospatial platform (based upon Oracle Spatial 10g) designed to support end-to-end business processes. Graham provided specialist consulting support, initially in the development of the winning proposal and presentation, and subsequently as GIS Solution Architect in the development of the solution roadmap.

***City of Kansas City New GIS, USA (2002-2004):*** A multi-phase project to streamline business processes across the City whilst supporting interoperability between Departmental GIS. This solution comprises an Oracle Spatial data warehouse supplied by near real time data feeds from local GIS systems, which in turn aggregate related data from other business systems. The resulting data integration architecture forms a fundamental service within the City's Enterprise-wide Technology Architecture. Messaging and Workflow management middleware orchestrate communication between business tasks that are exposed as Web Services in a citywide Service-Oriented Architecture. Data and derived services may be provided through the City eCommerce Portal supporting a cost recovery model to fund shared IT services.

***SchlumbergerSema Integrated Criminal Justice Management, USA (2003):*** Working with the SchlumbergerSema Public Sector practice, the National Centre for State Courts and FileNet Professional Services, a comprehensive model for justice management was developed. This model leveraged the emerging capabilities of J2EE application platform suites and rules engines to provide for event-driven case flow management, whilst providing for a common set of IT services across Texas County government. SchlumbergerSema received the ValueNet 'Innovative Solution in Government' award for this solution.

***State of North Dakota Enterprise GIS, USA (2001-2002):*** A consultancy to design the system architecture for a state-wide geospatial data distribution system modelled on the ESRI Geography Network concept. Working closely with the State Coordinator, Departments and IT staff a secure and highly scalable architecture was developed and proven. The State's existing IT standards and infrastructure including IBM WebSphere J2EE application server and 'Shark' SAN storage were leveraged. The State received a 'Special Achievement in GIS' award for this program.

***City of Portland Enterprise GIS, USA (1999-2003):*** A 3 year project to develop an enterprise GIS platform for the City. ArcGIS data maintenance environments were developed for City Bureaus; transactional replication technologies were used to synchronize the central warehouse each evening with current data. Sophisticated locational-specific data integrity rules were enforced through a custom validation harness. Deployments covered the management of Address, Transportation, Parcel, Water and Sanitary facility data. Spatial data translation services were used by an ETL mechanism to populate an SDE data warehouse. SQL Server replication facilities were customized to distribute data to remote data centres. A web portal provided access to all City users.

***East Midlands Electricity Asset Management System, UK (1997-1999):*** A large long-term project to develop a Smallworld based GIS to manage the distribution assets of a large electrical utility company in the UK. The database models the equipment and plant that constitute the distribution network, permitting network simulations to be performed. Records are held in a variety of 'views',



including actual position (geographic view) and topology only (schematic view). The project involves, not only building a system to maintain this information, but also a data capture system, and a large 24 hr/day data capture operation.

**Development of the OMNR NRVIS System, Canada (1995-1997):** A contract with the Ontario Ministry of Natural Resources to design and build a province-wide natural resource information system to assist the Ministry in its mandate to preside over the sustainable development of forestry whilst protecting associated eco systems. The Natural Resource Values Information System (NRVIS) architecture comprises Arc/Info and Oracle, with ArcStorm managing transactions and historical archiving. Jam is used to provide an interface between Oracle and the user. Data is modelled as user objects and classified into an object hierarchy, reducing the coding effort and producing a more natural environment for end users.

**Royal Institute of Technology, Stockholm, Sweden (1995):** Graham taught GIS principles to Civil Engineering MSc students. Practical programming and analysis exercises were developed for a variety of engineering scenarios using open source GIS toolsets.

**A Comprehensive Mapping and Database for Potential East Coast Armament Sites, Australia (1993-1994):** A consultancy for the Project Director Base Development, Australian Department of Defence, Navy. To undertake user requirements studies, functional analysis, leading to system design and specification, for an information system to support and expedite the environmental assessment process of the proposed armaments site at Point Wilson in Victoria. Included a Cost-Benefit Analysis to determine the economic validity of the proposed ECAC Information System which had to be relocated from Sydney in preparation for the 2000 Olympic Games.

**The AUSLIG Incremental Update System, Australia (1993):** A consultancy to design and build an Arc/Info application as part of AUSLIG's MainTools digital data production and maintenance system. The new AML modules compare current and previous versions of data, isolate differences and produce Incremental Update files for client databases.

**Oil Industry Experience (UK, Denmark, North Yemen) (1990, 1992):** Graham also has extensive oil Industry experience of working on rigs throughout the North Sea, Denmark and the Middle East; and with many well types from wild cat exploratory to horizontal production in a wide range of geological provinces.

**Masters Thesis (1991):** Submitted to the University of Edinburgh. This 6 month research project, initiated through the British Geological Survey, examined the management of geographical information. A PRO\*FORTRAN application was developed to automatically document datasets produced within Arc/Info.

## Publications & Presentations

- "Are we there yet? Recent developments in GIS" Croner Environment Magazine, Spring 2012.
- "The Dark Art of Data Migration", Presented at the SPATIALInfo user conference, Denver, June 2011
- "Geospatial technology and how it is changing the way tourism uses the web" – keynote address to Inventorium, South Wales, February 2011
- "Where Next?", Presented at Spatial Thinking, University of Newcastle, November 2010

- “AGI Foresight Study – The UK Geospatial Industry in 2015”, Presented at the SPATIALInfo conference, Denver, June 2010
- “Passport to Travel – A view of GIS from 30,000ft”, Presented at GIS Update, University of Edinburgh, June 2008
- “Geospatial Service Architectures”, Presented at The Open Group’s Enterprise Architecture Practitioners Conference, Glasgow, April 2008
- “Advanced Oracle Database Tuning for ArcSDE Spatial View Performance”, <http://forums.esri.com/Thread.asp?c=2&f=59&t=46493&mc=46#569012>
- “The Integrated Land and Resource Registry of British Columbia”, R. Munzer, ESRI User Conference Proceedings, San Diego, 2005. Contributing author.
- “Portland Hub Facilitates Access to Public Information.” Presented at the ESRI South West User Group Conference, Telluride, October 2004
- “Lessons in Geospatial Data Warehousing – A Proven Approach to Enterprise Data Integration.” Presented at GITA Conference, Seattle, April 2004.
- “Leveraging GIS Investments through Integration – Case Studies from City and State Government.” Presented at the City of Houston GIS Day, 2003.
- “Facilities Inspection and Maintenance.” Presented at the ESRI User Conference, San Diego, 2003.
- “Realizing Benefits in High Volume Court Systems through well Architected Business Process Management, Content Management and Decision Support”. Presented at the FileNet Developer’s Conference, Newport Beach, 2003.
- “Creating the Data Hub.” Co-authored with B. Elliot. Published in GIS Vision Magazine, August 2002.
- “Rapid Implementation of an Enterprise GIS Warehouse for the State of North Dakota”. Co-authored with Bob Nutsch (State GIS Coordinator) and presented at the ESRI Users Conference, San Diego, 2002.
- “Architectural Issues in the Implementation of Arc 8 based Enterprise Solutions” Presented at the ESRI Users Conference, San Diego, 2001.
- “The Government Gateway eGovernment solution”. Co-authored with B. Meardon. Presented at the ESRI Users Conference, San Diego 2000.
- “The Portland Hub – a technical overview” Co-authored with B. Elliot. Presented at the GIS in Action GITA conference, Portland 2000.
- “City of Portland’s GIS Hub Provides Enterprise Data Sharing” Co-authored with R. Schulte and B. Elliot. Published in ArcNews, Fall 2000.
- “The Portland Hub, integrated access and maintenance”. Co-authored with T. Helmer. Presented at the ESRI Users Conference, San Diego 1999.
- "Taking the Pain out of GIS Implementation - Spatial Information to Support the East Coast Armament Complex Environmental Assessment." Co-authored with Shawn Callahan, David

Johnson, and Phillip Stephens. *Proceedings of the 22nd Annual Conference of AURISA*. ACT: AURISA, 1994. 1:607-612.

- “Access or Reliability: A Fresh Approach to the Management of Geographic Information.” Master’s Thesis, Department of Geography, University of Edinburgh, 1991.

Graham did occasionally blog on the subjects of GIS and Enterprise Architecture at <http://enterprisegeospatial.blogspot.com/>. Perhaps one day I’ll find the time to drop some more thoughts.



## Professional Training

Firebrand	Azure Cloud Platform and Infrastructure	2017
GeoEnable	BIM for Geospatial Professionals	2017
KnowledgeAcad	BCS CISMP Information Security Management	2017
KnowledgeAcad	TOGAF Enterprise Architecture	2016
Accelebrate	Introduction to JavaScript	2013
FOSS4G	Free and Open Source Software for Geospatial conference	2013
1Spatial	FME Desktop and Server	2013
Aston Business	Strategic collaboration: Leveraging Relationships	2012
Microsoft	Windows Azure Bootcamp	2012
SkillsMatter	Martine Devos Certified Scrum Master (Agile) and Estimation	2012
Javaconsult	C# .Net Enterprise Application Development	2010
ESRI	Developing Applications with ArcGIS Server .NET	2010
Uni of Cumbria	Business Leadership (LEAD)	2010
Anecdote	Narrative Technique to solve Complex Problems	2009
ESRI	ArcGIS Geoprocessing; Python Scripting and Advanced ModelBuilder	2006
Oracle	Oracle InterConnect	2004
Oracle	Oracle Streams	2004
Kimball Uni	Building a Data Warehouse: Roadmaps for Success	2004
FileNet	P8/Brightspire Programming for Enterprise Content Management	2002
FileNet	P8/Brightspire Foundation	2002
BEA	WebLogic Java J2EE Web Application Development	2002
Oracle	Oracle Spatial, PL/SQL	2002
Dr Paul Strauss	Personal Leadership Skills	2002
Intergraph	GeoMedia Professional	2002
IBM	IBM WebSphere Application Server Advanced Ed. & EJB Workshop	2001
Safe Software	FME Data Transformation	2001
Gayle Towers	Capability Maturity Model (CMMI) Assessment	2001
ESRI	Advanced ArcObjects Component Development with VB	2000
ESRI	Programming ArcInfo with Visual Basic for Applications	2000
Rational	Introduction to RequisitePro Requirements Management Tool	2000
Rational	RUP Requirements Management with Use Cases	2000
ESRI	ArcSDE Administration for SQL Server	2000
SAP	SAP Integration	1998
SAP	ABAP/4 Application Development	1998
GE Smallworld	Accredited Application Developer	1998
Perot Systems	Successful Project Management	1997
Perot Systems	Dynamic Systems Development Method (DSDM)	1997
GE Smallworld	Smallworld Application Development	1997
GE Smallworld	Magik Programming	1997
GE Smallworld	Data Modelling with Smallworld CASE	1997
ESRI	Using ArcStorm	1995
ESRI	Customizing ArcTools	1995
ESRI	Advanced Programming with ESRI AML	1995
Jyacc	JAM Customization	1995