

Data architecture for cloud-based digital services

Equal Experts' highly experienced Data Architects bring understanding and experience of implementing big data and artificial intelligence solutions for cloud-based digital services into production environments at scale. Specific skills include machine learning, data warehouse and data lake architectures, and patterns for the optimal exploitation of data in these environments.

Data Architecture for cloud projects includes identifying analytical needs, managing data security, integration with legacy systems and external data sources, structured and unstructured schema design and close integration with development and business stakeholders. We design and build data APIs to create contracts between source and consumer systems. We iterate solutions rather than engaging in big design up front.

Features

- Experts with practical experience of big data cloud solutions
- Working with all cloud platforms, AWS, GCP and Azure
- Advice on data architecture solutions and effective enterprise data modelling
- Working with both large and small organisations, public and private
- Experience with data ingestion, transformation and exploitation tools and patterns
- Focused on providing value-added services to the organisation
- Solution agnostic experts providing the right solution for business problems
- Effective knowledge and skills transfer to client teams
- Maturity assessment of current technology, processes, people and skills
- Data integrity and security implementations

Benefits

- Specific expertise with DataVault, Kimble and Inmon approaches
- Providing leadership to data analytics and big data teams
- Establishing correct data transformation and exploitation patterns
- Building production-scale big data solutions on premises and cloud
- Expertise in all aspects of data science
- Practical application of deep learning and AI in the SDLC
- Specific expertise in TensorFlow, Keras, Theano, scikit and deeplearning4j
- Experience in building production auto-scaling solutions and automated workflows
- Experience of working with node-dense GPU environments
- Skilled in remote working, on-shore, near-shore (South Africa), off-shore (India)

Our data architecture service aligns the data and digital strategies of an organisation to support the desired outcomes of the business. We start small and add value by implementing specific use cases that immediately benefit the company. This links the business to data programme objectives, ideally with data scientists seated within engineering teams.

We design and implement the right data infrastructure and tooling for the right use case. We choose the most appropriate architectural solution, relational or unstructured, to deliver data capability across different use cases.

Our approach to data architecture

Our approach and principles relating to data architecture and machine learning are:

- understand key metrics that drive business value, such as content uptake, net promoter scores, conversion rates, and how these relate to data pipelines and ML outcomes
- evidence-driven decisions - understanding current customer and user segmentation, traffic and usage patterns
- understanding event and data sourcing to derive value from ML platforms and pipelines. Timely access to source data is a prerequisite
- event sourcing and ingesting into data, analytical and ML platforms is key
- start small and iterate - prove pipelines for simple models before adding sophistication
- develop a data processing pipeline, cloud infrastructure and a Minimum Viable Product (MVP) that proves an engineering tracer end-to-end, while providing business value
- API first philosophy - features, predictions, and recommendations are surfaced via reusable APIs

Our approach to data optimisation

Our approach to data optimisation usually starts with exploring barriers to data sharing across organisational silos, for example, different source systems, data quality, completeness and frequency of update, unclear ownership and lack of documented knowledge. We help organisations break these barriers down by:

- understanding KPIs integral to delivering business value, via stakeholder workshops and surveys

- conducting a focused data audit across the business, including what the data is, what it is used for, source systems, who maintains it, frequency of updating and known quality issues
- mapping existing data flows, the current source system landscape, data linking mechanisms and barriers to data access

Incompatible legacy systems are often common barriers. We use API approaches to data interchange, so data formats are easily understood by users, developers and analysts. Data is easily consumable by any application, whether proprietary, commercial, or open source. This facilitates experimentation by users and the ability to change data analysis and visualisation tools quickly, easily and cheaply.

Secure and usable data

Creating the right linking keys ensures data from disparate sources is brought together robustly and is part of any data audit. Addressing confidentiality and security concerns ensures that personally identifiable information (PII) required for match keys is handled consistently within data protection policy and the law.

Managing data access rights ensures employees have access to the data needed for their jobs, without exposing data to people who do not need it. We map user roles and use role-based permissions to make management of data access quick and easy.

We often publish the enhanced data and insights back for reuse by others. This reduces waste by eliminating the need for multiple people to create the same data summaries, freeing up users for higher-value tasks.

Bringing data and digital strategies together

Our approach aligns the data and digital strategies of an organisation to support the desired outcomes of the business. Our recommendations include:

- start small and add value by implementing specific use cases with the highest value for the business
- implement the right data infrastructure and tooling for the right use case
- focus on small teams, with embedded data experts, delivering specific business goals in short increments, rather than rigid implementation of formal agile practices. Delivery of business value is the key measure of success. We believe in agility in delivering business success as opposed to Agile

- be a key enabler, providing control over environments. Teams can't deliver incremental value without access to production via automated build pipelines implemented by DevOps specialists using continuous delivery principles
- provide low-cost opportunities for data scientists to experiment easily with interesting new technologies, for example, making open source datasets available via open source tooling

Examples of data architecture in action

Equal Experts has helped design and develop cloud-based data processing and statistical learning pipelines for various clients.

Knowing your users

We deliver user-behavioural analytics, insights and processing pipelines. Understanding users' behaviour across various channels informs what is presented to them in the future.

We process and mine clickstream events and user actions from online and API channels to derive user-behavioural features. Our clients have used these to detect fraud and to inform marketing campaigns and product recommendations.

We use Google Analytics (GA) and BigQuery to mine cross-channel traffic. This delivers insights into user behaviour and content preferences that drive personalisation services.

Cloud data processing and machine learning

We have extensive experience designing cloud-based processing pipelines and data platforms. We have worked with clients with sensitive data requirements and helped them realise the agility and flexibility which cloud data and processing services afford.

Orchestrating data pipelines is an often overlooked concern, but it is fundamental to the continuous delivery of predictions and insights.

Model performance and evaluation

We have helped clients build model selection platforms and develop feedback loops in active and semi-supervised learning domains. Feedback and identifying appropriate performance metrics are fundamental to model agility. Building feedback loops into pipelines is critical to iteratively improving ML performance and experimentation.

We engage user experience and content experts to understand the factors driving improvement. Capturing ML pipeline metadata, such as what features were used, which models and their hyperparameters and training results, is key.

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Tagging and entity extraction

Classifying and accurately tagging unstructured data and media is critical to understanding relationships between content and personalisation. We use natural language processing, sentiment analysis and information retrieval technology in unstructured data pipelines to build network models and understand the relationships that are key to requirements.

How we've helped

Fraud detection

Equal Experts has worked with HM Revenue and Customs (HMRC) to develop a fraud detection and monitoring platform for all online and API transactions. The platform processes around 2,000 events a second and provides near-real-time risk insights and fraud prevention capabilities. Data from over 300 microservices, APIs and GA is processed, transformed and enriched to feed risking pipelines built upon AWS infrastructure and services.

We deliver user behavioural features, population and segmentation statistics to assess the risk of transactions. The system uses AWS data storage and processing services like Amazon EMR and Apache Spark to compute metrics, which are then queried as part of real-time risk assessment.

Risking models are regularly retrained, and feedback signals are built into the processing pipeline. The Equal Experts team has developed a robust model fitting and evaluation pipeline service, which tracks the efficacy of models over time, features used and performance data.

Natural language processing

We've also helped HMRC develop a platform for ingesting and processing large volumes of unstructured and natural language data, including PDFs, images and emails. The Equal Experts team developed an innovative entity extraction and tagging pipeline using natural language processing techniques. The derived and extracted data and tags are indexed and used to drive graph-based analytics and visualisation.

Data Engineering

We also helped to establish HMRC's in-house data engineering capability, whilst advising on the implementation of a new data lake aimed at consolidating multiple legacy data warehouses. These are coming to the end of their life and cost tens of millions to maintain and run. In addition to the high running costs, a lot of the data is siloed, making it hard to

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maximise yield by better understanding the status of individuals and corporations across HMRC functions.

HMRC wanted to create a data engineering function with the vision of an internal client-controlled delivery group. This new delivery group has responsibility for building and supporting analytical capability across legacy and new services. It provides the management and optimisation of all datasets, data security, technical design and governance, BAU support, user management, reporting and business intelligence.

Our work included devising and building the data engineering operating model. We designed the team structure, including roles, responsibilities, skills, experience, grades, and initiated recruitment activities. We helped define the governance structure, reporting regime and service levels. We built a knowledge centre to help HMRC transition to the new model and processes. Equal Experts supported the cultural transformation to allow a shift to new ways of working and data exploitation.

Services

We have four core UK-based teams that provide expertise and advice to the organisation, our clients and our partners:

Data and AI

The Data and AI service helps clients make better use of data and create powerful AI solutions that improve and transform any business. We use our deep expertise in data engineering to improve the quality of data that flows through the organisation, providing better insights into customers and operations. Applying our expertise in MLOps, Generative AI, AI in the SDLC and algorithms, we help upskill client teams, automate key services and create new ones.

Design and Product

The Design and Product service helps clients increase adoption and user satisfaction by designing exceptional digital products and services. We use our expertise in user-centred design and product management to discover and solve the most valuable problems, aligned to a client's digital strategy. We help to create delightful customer experiences that deliver real business value, increased user engagement, better brand reputation and additional revenue.

Technology Strategy

Our Technical Strategy service helps teams to confidently navigate the technology landscape and make decisions that will sustain long-term value. Our expertise covers all aspects of technology strategy, including architectural choices, operating model changes and the adoption of emerging technologies. Using our extensive industry and technology experience, we help to plan the practical steps clients need to be ready for the future.

Modernisation and Platforms

Our Modernisation and Platforms service helps to accelerate time-to-value and reduce total cost of ownership, while scaling digital products and systems. Using modern engineering practices, we help to build and run cloud-native services and improve heritage systems. We bring deep expertise in cloud architectures, secure delivery, “you build it, you run it”, and platform engineering on AWS, Azure and GCP clouds.

Team

Our core culture and business model prioritise providing value and doing what is best for all our stakeholders, particularly our clients, rather than maximising short-term profits and shareholder returns. Our founders sold the business to an Employee-Owned Trust (EOT) in May 2024 to secure the long-term future of our collaborative approach, highlighting this commitment. The EOT trustees include the founders and representatives of our employees, Associates and clients, ensuring the interests of all stakeholders are considered and balanced in our operations.

Equal Experts is a worldwide network of technology experts who are dedicated to driving innovation. We have Business Units in the UK (London and Manchester), USA, South Africa, Germany, the Netherlands, Australia and India. Our resourcing model is based on a core of permanent senior consultants and a supply chain of 4,000+ carefully selected, expert, independent SME consultants - our Associate network. On a typical engagement, we pass ~£2 in every £3 of our contract income directly to this network, creating opportunities for entrepreneurship and helping new SMEs to grow.

90% of our consultants have more than 12 years of experience (average more than 18 years) in the development, delivery, operation and maintenance of digital services using agile methods. Many have significantly more and, in some cases, are global influencers, authors and presenters. Their maturity and pragmatism mean they are highly collaborative, happy to transfer knowledge and keen to help clients build internal capability.

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We have grown organically, mostly through personal referrals, prioritising quality, experience and cultural fit above all else. After a rigorous selection process, experts are added to our network, whether we need them immediately or in the future.

We select the most suitable people for any contract role from this large pool, not just from a bench of off-charge employees. Our model is resilient and efficient; we form small expert teams, reducing cost and risk for our clients, while achieving outcomes faster than less experienced teams. Our experts train and upskill the whole supply chain, including client staff and those of other suppliers. We have delivered many public and private sector systems (e.g., for HMRC, HMPO, Defra, DWP and MoJ), including CNI, over the past 17+ years using this model. Our approach is data-driven, user-focused and sustainable, allowing us to deliver results quickly and efficiently, using small teams of real experts.

Our standard working model for teams is hybrid remote/on-site, with a core generally based close to client offices, minimising travel costs and environmental impact. This ensures they can be on-site for workshops, meetings and onboarding activities, and can work collaboratively with client team members, stakeholders and other suppliers. In the words of one client, *“your consultants truly leave their Equal Experts badges at the door”*.

Our focus on senior talent means that all our consultants have the skills and experience required to thrive in dynamic, challenging client environments. It means we can focus on work that adds real value, rather than micro-managing more junior consultants. Our non-hierarchical structure also allows us to operate with lower overheads. For our teams, this creates a mature, pragmatic and innovative working environment, where they can implement the best solutions of their already distinguished careers. And for our clients, it translates to better services, delivered faster and at lower overall cost. We were ranked 2nd in Glassdoor’s UK Best Places to Work 2025, up from 4th in 2024, and 15th in Newsweek’s Most Loved Workplaces 2022.

For more information and case studies, please visit <https://www.equalexperts.com/> or contact us at solutions@equalexperts.com.

Roles

Collectively, our consultants have the multi-disciplinary experience and expertise needed for successful transformation to cloud-first delivery, live service maintenance and new operating models. Our network gives us fast and flexible access to the DDaT skills our clients need. We have specialists in all areas required for digital success, including:

- Delivery managers

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- Change managers
- Product managers
- Engagement managers
- Strategic advisors
- Security specialists
- Data scientists
- Data engineers
- Data architects
- Technical leads
- Technical architects
- DevOps consultants
- Developers
- Testers
- Business and performance analysts
- Accessibility experts
- Service designers
- User experience designers
- Content designers
- User researchers

When a client needs specialists or niche skills, we can rapidly and confidently engage with other organisations in our established ecosystem of proven partners. EE interviews each partner consultant to ensure a high level of knowledge and cultural fit before we assign them to clients.

Public sector clients

We're proud to be one of the top suppliers to the public sector via the G-Cloud and DOS frameworks. Our services are also available through RM6190 Technology Services 4, RM6195 Big Data and Analytics (the only supplier on all 6 capabilities), RM6335 DALAS (Lot 2a) and DPS Frameworks including RM3764 Cyber Security 3, RM6173 Automation Marketplace, RM6094 Spark, RM6200 Artificial Intelligence and RM6235 Space-Enabled and Geospatial Services.

The Equal Experts approach has a successful track record of delivery across the private and public sectors. Some recent award-winning deliveries include:

- HMPO's passport renewal service,
 - ranked #1 public service with a score of 81.2/100 in the July 2025 ICS customer satisfaction survey.

- Winner of Public Sector Project of the Year and Development Team of the Year at the UK IT Industry Awards 2024.
- HMRC's Data Platform Services Core Engineering Platform, winners of Computing DevOps Excellence Awards 2025 Best Implementation of DevSecOps.
- John Lewis & Partners Best Implementation of DevSecOps at the DevOps Excellence Industry Awards 2023

We know what it takes to implement and support cloud-based applications within complex public sector organisations and across large multi-vendor programmes. We understand and adhere to the GDS digital service standards for delivering solutions and handling and securing data within critical national systems. We have experience in consulting, deploying and supporting security-accredited solutions and have passed numerous GDS assessments. Many of our consultants hold current SC clearance (some have DV) as they have previously worked with public sector clients.

Equal Experts has helped implement digital services to government digital service standards (including passing many formal GDS service standard assessments) for:

- His Majesty's Revenue and Customs (HMRC)
- Department for Environment, Food & Rural Affairs (DEFRA)
- The Home Office and His Majesty's Passport Office (HMPO)
- Ministry of Justice (MoJ), His Majesty's Prisons and Probations Service (HMPPS) and His Majesty's Courts and Tribunals Service (HMCTS)
- Department for Work and Pensions (DWP)
- Department of Health and Social Care (DHSC)
- Department for Business, Energy & Industrial Strategy (BEIS)
- Border Force
- Department for Education (DfE)
- Registers of Scotland
- Office for National Statistics (ONS)
- Intellectual Property Office (IPO)
- States of Guernsey
- Cabinet Office
- Government Digital Service (GDS)
- Valuation Office Agency (VOA)

Planning

To build detailed knowledge of the context and domain for any project, an initial phase of planning, definition and knowledge transfer will generally take place at the start of an engagement.

We have found that this takes place most effectively through a short time-bound inception to develop a shared understanding and agreement on vision and objectives across a broad stakeholder group. This covers the business, technical and user aspects of the project and the outputs may include user personas and scenarios, key user journeys, as-is and desired business processes, a prioritised backlog of user stories, technical constraints and vision, and a release roadmap and plan. The techniques and principles applied are also used on an ongoing basis throughout the course of delivery, to ensure the solutions developed are fit for purpose and meet real and changing user needs.

This initial inception phase can be contracted separately if required.

Setup and migration

In addition to ongoing development and operation of live cloud-based services, we can help with the initial set up and migration as part of a transition to cloud. We look for opportunities to automate processes (for example, test, deploy) that will yield real benefit and high ROI. Our approach helps to address integration, dependencies and risk early. We capture actionable metrics to measure and manage progress towards meeting the agreed success criteria and KPIs identified for building and operating the service. The highly collaborative, interactive processes we follow foster continual learning and improvement of services. They help to establish and evolve the overarching service design, management processes and the team capabilities.

We can ensure projects hit the ground running through our experience in designing, configuring and setup of many continuous delivery and automated cloud deployment environments. These techniques allow software to be repeatably and reliably deployed and tested through each stage into production on the cloud. We have substantial experience when it comes to the tooling required for continuous delivery and automated software deployment, greatly facilitating the software set up, build and migration process, which increases programme productivity and reduces project risk and cost.

Quality assurance and performance testing

We hold ISO9001:2015 Quality Management System certification. All our consultants have extensive experience in both manual and automated testing, including performance testing, continuous integration and delivery into production environments at scale. With all clients, we actively encourage the adoption of robust and meaningful automated test coverage, delivery and test techniques, to reduce risk and safely increase delivery velocity. We are happy to work with a client's existing quality management system (QMS) where appropriate.

Security services

We hold ISO27001:2022 Information Security Management System, Cyber Essentials and Cyber Essentials Plus certifications.

We can provide the following security services if required:

- Security strategy
- Security risk management
- Security design
- Security incident management
- Security audit services

Training

For every client, we aim to transfer and embed knowledge of technology and process innovation. Our consultants have the expertise, skills and enthusiasm to help transfer knowledge of new technologies and ways of working to our clients' team members, upskilling staff and helping to build their internal delivery competence and capability. This improves internal competencies and builds long-term sustainable capability, as clients migrate to modern cloud-based products and services. We tailor particular practices to address specific organisational constraints – we recognise that every organisation is different and there is no “one size to fit all”.

We tend not to offer classroom-based training as our consultants are happy to share their knowledge throughout a project. They take responsibility for helping individual client team members adopt new practices and ways of working.

Ongoing support

Our operational philosophy is “you build it, you run it”. The delivery team responsible for the development of a live service usually also takes responsibility for its operation. We have found that development teams which support their own products are motivated to deliver higher quality, more robust and maintainable code.

When a service is live with real users, we expect the delivery team to provide 2nd line (infrastructure, in conjunction with hosting support agreements) and 3rd line (applications) support during business hours. We can agree on an appropriate model for 24/7 on-call coverage if required - see our G-Cloud On-Call Support offering for details. We typically establish an on-call rota with delivery team members assigned weekly.

Our experience is that digital services are never really finished and that it is important to retain some level of investment to allow the addition of new features as the needs of customers (both internal and external) change. Our design of the end-to-end service can include establishing Service Level Agreements for ongoing service evolution and operational support (ensuring agreed levels of service availability).

User support

We provide an engagement manager on all G-Cloud engagements with responsibility for ensuring clients objectives are met and for addressing any issues with service delivery. Our engagement managers act as an escalation point and can be reached via phone or email to respond to issues beyond the control of the team providing the service. Engagement management is included within our service pricing.

When a service is live with real users, we expect the delivery team to provide 2nd-line (infrastructure, in conjunction with hosting support agreements) and 3rd-line (applications) support during business hours, within the agreed service cost. We can agree on an appropriate model for 24/7 on-call coverage if required - see our G-Cloud On-Call Support offering for details. We typically establish an on-call rota with delivery team members assigned weekly.

Social Value, the Environment and CSR

Our values and ethos extend beyond our organisation and people, and we take our corporate social responsibility seriously. We are committed to working with all our clients to share our knowledge and learnings, and contribute to their CSR goals, e.g. we will

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facilitate discussions with their designated digital sustainability leads, to collaborate on environmental policy goals, discuss current practices for greening software and agree enhancements aligned with industry policies, like the Greening Government Strategy.

We willingly collaborate closely with our clients, other suppliers, competitors and the wider ecosystem to discuss, share and test innovative environmental and social value ideas and initiatives, to improve sustainable practices and create added value throughout any contract.

We will follow our proven social value methodologies for any G-Cloud 15 contract, aligned with the UK's Public Services (Social Value) Act 2012, PPN002 (PA2023) and the Social Value Model, and the UN Sustainable Development Goals, to actively create additional opportunities to develop, measure and improve social value for our client and their entire supply chain. In a recent [Government Transformation Magazine interview](#), Mike Potter, ex-UK Gov CDO recalled his HMRC experience partnering with us for transformative results. *"We didn't just buy their capability - we bought their culture,"* he said. *"Cultural alignment is key. When you pick partners who share your values and ways of working, you find areas of mutual advantage."*

We review, update and publish our Carbon Reduction Plan, Modern Slavery and EDI statements annually, are a Disability Confident employer, a member of the Business Disability Forum and a participant in the Government Digital Sustainability Alliance (GDSA). Our commitment to providing a fulfilling workplace for everyone is reflected in Glassdoor's Best Places to Work in the UK, voted for by our staff, ranking us 4th in 2024, 2nd in 2025.

We complete the [EcoVadis](#) assessment tool, which evaluates performance across four dimensions: Environment, Labour and Human Rights, Ethics and Sustainable Procurement. We complete the assessment, create an improvement plan and review and update it annually. We willingly share the results with clients and use their feedback and learnings to influence our improvement plans.

Examples of other social value initiatives for clients include:

HMRC Joint Value Initiatives: we work closely with HMRC to organise and fund JVs, e.g.:

- [School visits](#) to encourage children to pursue STEM careers & find future data engineers,
- Data Engineering Academy - supporting HMRC to onboard and upskill new starters and develop their technical expertise through bootcamps and placements on EE projects,

- Hosting the [Women in Tech & Leadership Conference 2025](#) in collaboration with HMRC's Women in Tech Network.

Hace: We co-funded a [project](#) to develop an AI-based data analysis tool to objectively quantify a company's Child Labour performance.

Médecins Sans Frontières (MSF): We staffed a pro bono project to build the [Malaria Anticipation Project \(MAP\)](#), deployed in Lankien, South Sudan and being planned for Anka, Nigeria.

John Lewis: We shifted to lower-footprint GCP cloud data centres in Switzerland to meet JL's environmental sustainability goals.

Government: We are an active member of the Government Digital Sustainability Alliance ([See more details here](#)) and are actively working with Defra to implement exemplar projects such as:

- Implementing Green coding Standards ([See Version 1 Github](#)) in our teams working with Defra to help support learnings for wider Government.
- Working with Defra and our partner [Heata](#) to develop an innovative decentralised cloud compute project. The aim is to reduce the carbon footprint of cloud workloads by 80% and heat farmers' domestic water tanks to save them money.