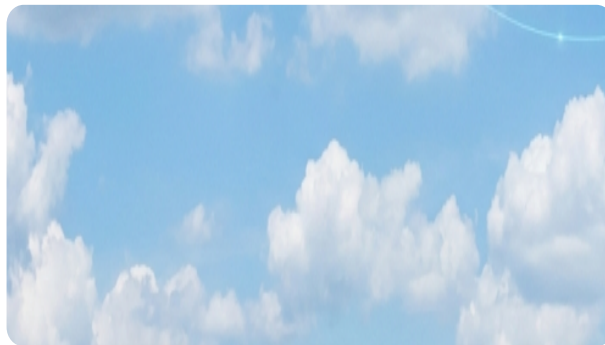
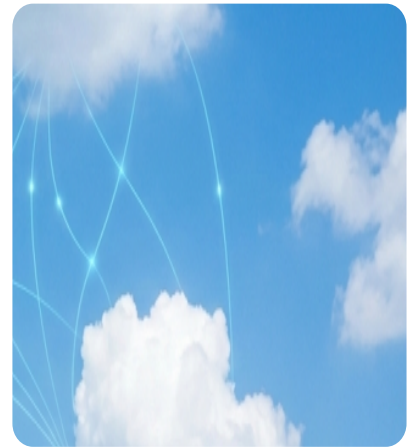




Crown
Commercial
Service



DATA ARCHITECTURE

GCloud Service Description Document

Bringing Ingenuity to Life.
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DATA ARCHITECTURE

1.1 Short Service Description

Our service creates the foundations that give you greater confidence in and control of your data and information, to enable you to realise its value. We work with you through project-delivery and data lifecycles to design and communicate your data and information architectures, enabling efficient implementation, management and data exploitation.

1.2 Key Service Features

1. Data architecture development, current assessment, target definition, innovation, roadmap
2. Data governance operating model, process design, roles & responsibilities
3. Transition approaches, data migration, RRDS, archiving and managed deletion
4. Data modelling, subject area, conceptual, logical and physical models
5. Metadata management, business glossary, cataloguing and data dictionary development
6. Enterprise master data management and reference data management design
7. Lineage, lifecycle, flow mapping, interface specification and integration architecture
8. Data strategy development, vision, goal and objective setting
9. Data quality management, data audit, profiling, cleansing and remediation
10. Privacy, data protection, GDPR and record retention management approach.

1.3 Key Service Benefits

1. Understand your landscape: Business data assets mapped to systems
2. Managing complexity: Complex, high volume, structured/relational and unstructured data
3. Governance: Control against legislative, regulatory, GDS and policy requirements
4. Insight: AI-enabled exploitation to support data driven decision making
5. Quality: Measured and reported, driving focussed improvement and enhancement
6. Meaning: Data is understood and used confidently in context
7. Effort: Reduced overhead of finding data, managing unnecessary flows
8. Prioritisation: Identifies critical/architecturally significant data sets and entities
9. Cost: Driving efficient data infrastructure to minimise cloud spend
10. Risk: Identification and articulation of data risk and mitigation.

1.4 Service Definition

The role of data architecture and management has changed from being a low-level, technical back-office function to a critical capability of a modern enterprise that touches all aspects of the business.

Organisations are increasingly aware of the value of their data, the need to exploit it fully to make robust decisions and to protect it carefully, to maintain the trust of customers and service users. Expectations of what can be done with data and how quickly it can be executed are rising. This places greater demands on the underlying architecture to provide access to data of known provenance in efficient ways and with the associated metadata that enables confident manipulation and analysis.

The widespread adoption of artificial intelligence (AI) significantly reshapes data architecture, introducing both opportunities and challenges for organisations. AI-driven workloads require robust, scalable and flexible data infrastructures that can efficiently support processes like real-time analytics, automated data classification and intelligent data lifecycle management. As organisations adopt AI-powered services, the need for advanced data storage solutions, high-throughput data pipelines, and sophisticated access control mechanisms becomes paramount. Moreover, leveraging AI demands more careful attention than ever to data governance, privacy and compliance, ensuring that the architectural design facilitates secure and responsible AI deployments at scale.

Agile delivery and user-centric design methods have disrupted the way that data requirements are thought about while microservices architecture uproots traditional concepts of data stores and data access. New digital services and devices provide the opportunity to capture a volume and richness of data that was until recently unthinkable. Cloud services have changed the landscape of infrastructure and the array of services available for storing, processing and analysing data beyond recognition.

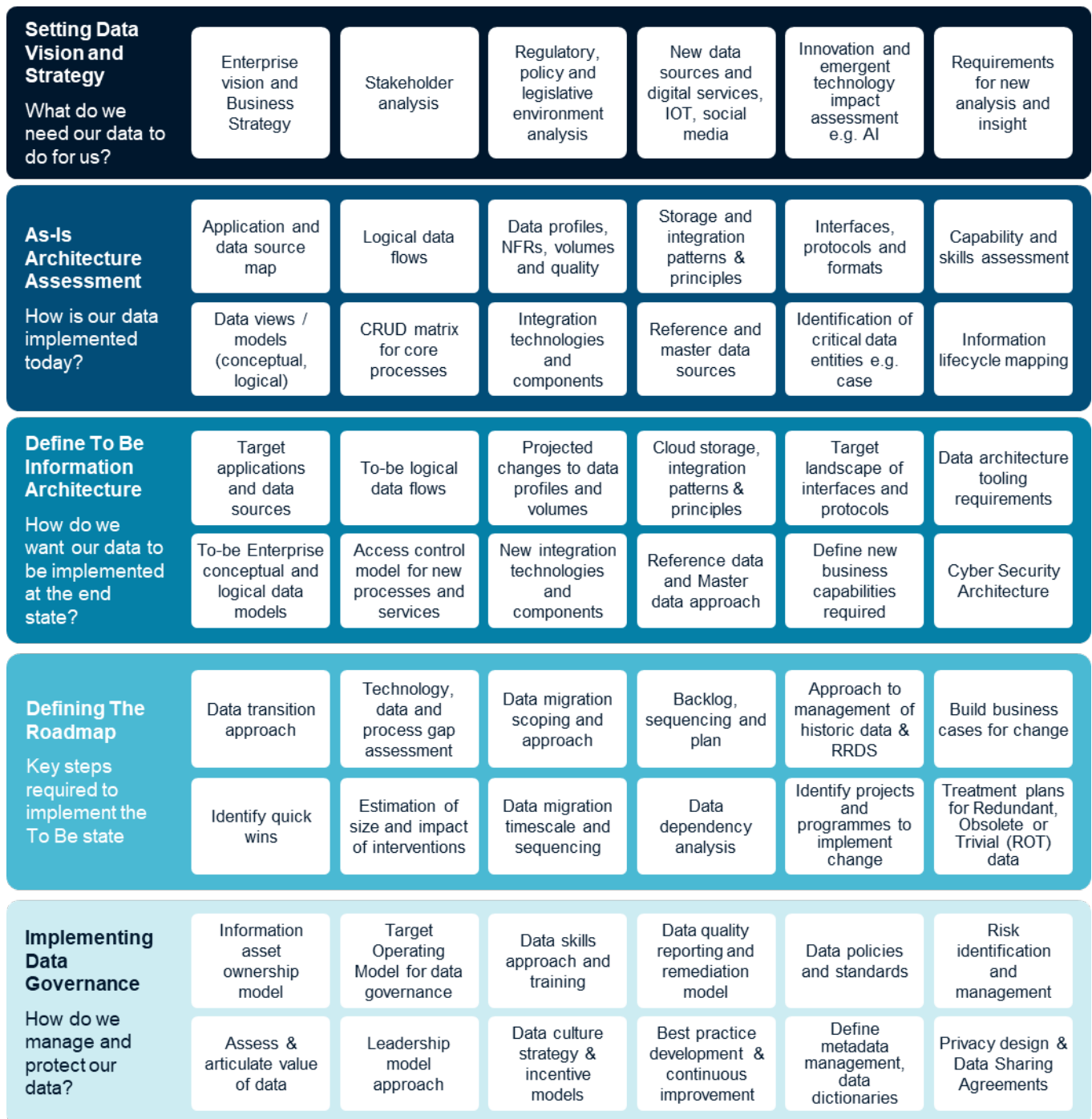
However, the need to describe, understand and manage the landscape remains absolute and fundamental. The ability to understand the data that digitally represent real-world concepts such as Customer, Case or Product is a fundamental foundation of the analysis that brings insight. Intentional data architecture develops the standards, patterns and guidelines that create coherent and usable data. Knowing how and where data is stored and managed is a vital part of meeting the privacy policy and regulation that has moved centre stage. Well-designed data flows reduce unnecessary movement and processing of data, reducing usage charges.

PA's Data Strategy & Architecture approach is our proven methodology that provides an integrated approach to strategy, architecture and implementation which recognises that becoming a data driven organisation is not a one-off investment, but rather, an incremental process of change. Our approach has delivered data strategy at project, department and enterprise scale, always leading to actionable next steps and incremental capability development.

Our comprehensive approach enables you to progress from any starting point

Our approach recognises that organisations require data architecture support for a broad range of reasons and start from different levels of maturity. We offer services from initial vision and strategy, through development of core data architecture views to governance and management of data in steady-state.

The following diagram provides an overview of PA's data framework that provides a comprehensive approach to strategy, architecture and implementation.



Our approach has helped us to successfully address common challenges that clients are facing, including:

- Understanding and managing the impact of the opportunities and challenges brought by the rapid adoption of AI
- Creating the ability to quickly generate new insights, metrics and measures that support agility
- Balancing the need for control and consistency of data architecture with the flexibility and responsiveness of Agile development
- Optimising the move to cloud and operation in a hybrid environment of new and legacy platforms
- Managing proliferation of new data sources of new types and unprecedented scale
- Building the case for change and the need for investment in data foundations and services
- Dealing with a long history of uncertain data quality in legacy and heritage platforms.

Our approach sets out to build a view of what the business wants to achieve with its data and how architecture supports and drives those aims. This is achieved by:

Defining how and why the business will benefit from improved data - Expressing data strategy in simple terms with vision, goals and focus areas for strategy work set out to describe how the business can gain new insights, demonstrate regulatory compliance or make better decisions with improved data and how this links to wider enterprise aims and objectives.

Building a sense of shared endeavour - Working with a range of stakeholders, business and technical, who work with data throughout its lifecycle to map out the different viewpoints, pain-points and needs. By ensuring that the business stakeholders feel ownership of the data we build support for a case for change and ensure that this is not thought of as a purely technology-driven initiative.

Based on our proven framework to bridge the gap between business and IT we rapidly establish a set of lightweight as-is views of the current state. This is achieved by:

Focussing our effort on the most critical data – Defining the most important data entities against the main business processes and profiling these to capture the type, scale and quality of data that supports the current operation.

Developing and gathering the core architecture views and artefacts – documenting conceptual, logical and physical data models, high level flows through key systems and interfaces to build a shared understanding of the current world and the key challenges to be addressed by a future state.

We define the To-Be Data and Information Architecture that delivers against the vision. This is achieved by:

Putting data at the centre of design and architecture work – Data requirements are often not considered explicitly in design work, leading to gaps, inconsistent delivery and rework. Our approach puts a focus on data as a critical architecture domain – both in business and technical architecture – with the necessary artefacts being delivered throughout the delivery lifecycle of projects and programmes and particularly shaping the early stages of design. Business-focussed views and close engagement with data owners and users ensures that the implications of design choices are tested early.

Building the cross-cutting enterprise views and artefacts – through the development and sharing of reference logical data models, standards / patterns, documented data flows and data dictionaries we ensure that programmes, projects and business units share a common view of data architecture and that they are aligning with these to deliver systems and data with coherent structures and consistent, clear definitions.

Thinking through the whole information lifecycle – the rise of Agile and the increased use of the concept of the Minimum Viable Product can lead to important data requirements such as reporting, analytics and retention management being pushed down the backlog to the point where they are considered as an after-thought or may even never be delivered. We build views of the end-to-end lifecycle to ensure that Business and Product Owners make conscious choices on prioritisation and don't lose sight of the broader set of needs.

We reduce delivery risk by building a roadmap that is focussed on practical delivery and in manageable increments. This is achieved by:

Following an iterative delivery approach – We use our “just enough architecture” approach to ensure that we get started with the right things, making it specific, tangible and sizing the improvements in small blocks of 6-8 weeks to ensure focus on impact.

Developing the data-centric view of transition – Our framework for data transition supports the development of a clear approach for how each data set will be managed through the changes driven by projects and programmes. We focus on providing the business with access

to the data they need to support successful business decision-making and technical operation of processes, working through how to establish the desired to-be data state from clearly defined and authoritative sources. We also consider how to manage the archiving and treatment of data that is at the end of its lifecycle to support decommissioning and reduction in size and complexity of the estate.

We apply our structured approach to data governance to develop a complementary data management architecture to support our clients in ensuring that improvements in data are sustainable and will build into long-term capability. This is achieved by:

Building a lightweight but structured operating model for data governance in steady state – we develop an organisational model that fits the scale and situation of the client, selecting from a range of options that we have developed over time. We ensure that this spans all levels of the organisation, ensuring that senior sponsorship and steering of strategic data initiatives is aligned with practitioner level knowledge and ‘coal-face’ experience to deliver operational data improvement.

Building the concept of true data asset ownership supported by appropriate resources – like any other asset, data suffers when it is not actively managed and maintained. Ensuring that asset owners not only understand their responsibilities but are fully engaged, trained and have structures, resources and escalation routes in place is a key part of our approach, providing strong ties between the strategy and the champions and stewards who deliver it.

1.5 Why PA Consulting Group (PA)?

A trusted partner for cloud, AI, and digital technologies

PA Consulting Group (PA) is a leading technology and innovation consultancy and one of the UK government’s most trusted advisors, combining strategy, delivery assurance and deep engineering to turn complex ambition into assured outcomes. We bring end-to-end capability across cloud architecture, data and AI, cyber, and advanced technology R&D, backed by a track record of scaling innovation in the public and private sectors.

Our UK work is anchored by secure, standards-led delivery. PA maintains ISO/IEC 27001 certification across global operations, demonstrating disciplined information security and operational control, and applies UK government good practice (GDS, NCSC CAF) across cloud and digital programmes.

We combine consultancy with real engineering. At our Global Innovation & Technology Centre (Cambridge), 300+ scientists, designers and engineers operate extensive labs and studios to prototype and industrialise solutions, bridging physical and digital from concept to production.

1.5.1 Why PA for cloud, data and AI

- **Hyperscaler alliances without vendor lock-in.** PA is Premier Tier with **Google Cloud** (13+ years; 150+ certifications; specialisations in infrastructure, data analytics, app dev and security) and holds deep **AWS** and **Microsoft** credentials, accelerating secure data foundations and generative AI at scale while keeping advice independent and outcome-led.
- **Responsible AI you can trust.** Our Responsible AI framework, governance toolkits, and risk policy make AI adoption transparent, auditable, and compliant, embedding lifecycle controls, model documentation, and human-in-the-loop safeguards aligned to evolving regulation.
- **Impact beyond pilots.** We help organisations become *intelligent enterprises*, using data and agentic AI to create and protect value, with pragmatic roadmaps from use-case selection to scaled operations.
- **Proof through delivery.** Our client stories span enterprise data platforms, IoT and analytics (e.g., Rentokil Initial), and product innovation at scale (e.g., Unilever) where PA has put data and AI at the heart of continuous, market-leading improvement.

1.5.2 Cloud capability (assess, design, build, assure, run)

PA applies an assured cloud delivery approach to complex government and regulated environments, blending client-side delivery assurance, multi-cloud architecture, and resilient operations:

- **Strategy & readiness.** Maturity assessments, target operating models for hybrid/multi-cloud, and cost/benefit modelling; proportionate GDS compliance and ISO 27001 controls embedded upfront.
- **Design & architecture.** Secure, well-architected patterns across Azure, AWS, and Google Cloud; data platforms, identity and access, and cross-domain solutions for sensitive estates.
- **Build & deploy.** Cloud-native engineering, DevSecOps (CALMR), CI/CD, infrastructure-as-code; automated testing and quality assurance to accelerate safe release.
- **Migration & modernisation.** Legacy transformation, platform reviews, and workload migration tuned to resilience and cost; pragmatic FinOps to keep spend predictable and efficient.
- **Operate & optimise.** Observability, incident management, performance tuning, backup/restore, and change management, maintaining business continuity and reducing total cost.
- **Client-side delivery assurance.** Forward-looking, risk-based assurance that keeps complex programmes on track, covering governance, architecture, testing, migration, service readiness and cutover. See our *IT Delivery Assurance* service.

1.5.3 AI, ML and data (from strategy to scale)

- **Strategy & governance.** AI blueprints, operating models, and policy; enterprise data governance; regulatory readiness; centre-of-excellence setup and change adoption.
- **Engineering & MLOps.** Data platforms on Azure/AWS/GCP, pipelines and feature stores; robust ML lifecycle with monitoring, drift detection and auditability.
- **Generative & agentic AI.** Secure integration of LLMs (including Copilot) into workflows for measurable productivity and quality gains, using guardrails, system cards and ROI framing.
- **Responsible AI.** Lifecycle controls and assurance tooling to manage bias, security and transparency.

1.5.3.1 Quantum and emerging technologies

PA's applied physics and quantum engineering teams help clients unlock near-term value, combining quantum techniques with classical systems for decision support, advanced sensing and secure communications:

- **Decision support & optimisation.** Hybrid quantum/classical algorithms to accelerate complex planning, routing and resource allocation where speed and quality of decisions matter.
- **Quantum sensing & RF.** Novel quantum radio and Rydberg-based sensing to enhance spectrum use, detection sensitivity and resilience in contested environments.
- **Commercialisation insight.** Advisory at the “whole-stack” level, hardware, supply chain, interfaces, and ethics, to move from lab to market within national strategies.

These capabilities are industrialised at our Cambridge centre, turning concepts into robust prototypes and pre-production systems across sectors like defence, energy and transport.

1.5.4 Cyber security and digital trust

Digital trust is central to PA's approach. We design security into architecture, operations and culture, aligning to NCSC CAF and GovAssure, and delivering testing, red-team, SOC design and OT/IoT security:

- **Transformation & architecture.** Secure-by-design patterns, cloud security, identity, and cross-domain data protection (including NCSC-approved Oakdoor data diode products).
- **Assurance & regulation.** CAF/GovAssure alignment and pragmatic remediation plans for government organisations.
- **Testing & resilience.** CREST-aligned penetration testing, red-teaming, incident readiness, and operational resilience.

1.5.5 What PA will bring

Ideation & Strategy

- Cloud strategy and advisory services
- Cloud readiness assessments
- Cost/benefit and ROI modelling
- Security and compliance by design.
- AI/ML and data strategy (blueprints, operating model, governance) with Responsible AI policy and guardrails.
- Quantum opportunity framing and whole-stack commercialisation roadmaps.

Design & Architecture

- Bespoke enterprise and cloud architectures
- Integration with existing IT infrastructures
- Hybrid/multi-cloud design
- Continuity and disaster recovery
- Data platforms and MLOps patterns
- Security, privacy and resilience embedded by design in technical designs
- User-centred-design
- Secure cross-domain solutions and high-side/low-side integration where required.

Development & Deployment

- Cloud-native engineering
- Containerisation, microservices and serverless
- DevSecOps (CALMR) with CI/CD and automated testing
- Generative AI and Copilot enablement with measurable productivity outcomes and run-controls.

Implementation & Migration

- Data migration and legacy modernisation
- Vendor selection and management
- Infrastructure-as-code with progressive, low-risk cutover.

Operations & Management

- Observability, incident management, SIEM/SOC design
- Performance optimisation and cost management (FinOps)
- Backup/restore
- User training and change adoption.

Innovation & Scaling

- Scalable cloud infrastructure to support growth
- AI/ML implementation and scaling
- IoT integration
- Ongoing innovation sprints and R&D, supported by our Cambridge engineering labs for rapid prototyping and pre-production.

1.5.6 PA is fully equipped to manage any challenges or requirements you may present

Across strategy, design, build and run, PA blends independent advice with hands-on engineering, operating to ISO 27001 and UK government standards, and backed by hyperscaler partnership depth. Whether the brief is modernising a sensitive cloud estate, industrialising AI responsibly, or de-risking a quantum-adjacent programme, we bring the multidisciplinary team to get from idea to reality, safely, quickly, and at scale.

1.6 A Genuine commitment to Social Value

At PA, we believe in the power of ingenuity to create a positive human future. Central to this ambition is our commitment to developing high-quality opportunities that enable individuals to acquire leading-edge skills, all within an environment that supports personal wellbeing and growth. We invest in our people through comprehensive training and development, ensuring they are fully prepared to tackle our clients' most complex challenges and advance their own careers.

We recognise that diversity drives innovation. Therefore, our recruitment practices are inclusive, welcoming individuals from all backgrounds. Every member of our team is empowered to reach their full potential through inclusive policies, processes, and a culture that is continuously improved using robust data.

We are passionate about creating genuine opportunities for those facing significant barriers to employment. Since 2023, our Digital Apprenticeship Programme has offered a Digital and Technology Solutions Degree through the University of Roehampton or Northumbria University. Our apprentices typically include first-generation professionals, college leavers, and individuals from ethnic minority backgrounds, many living in deprived areas. Additionally, we offer summer internships for undergraduates entering their final year, hosted at both our central London office and the Global Innovation and Technology Centre in Cambridge.

Economic responsibility is integral to our purpose. PA is accredited as a Living Wage employer, and where relevant, we ensure that our suppliers and subcontractors are paid at least the minimum living wage. We are also a signatory to the Prompt Payment Code, demonstrating our commitment to fair and responsible payments to suppliers.

Our carbon reduction targets have been validated by the Science Based Targets initiative (SBTi). We have a published carbon reduction plan and are committed to achieving carbon net zero by 2040, in alignment with PPN 06/21 criteria for UK public sector contracts exceeding £5 million. In 2024, we achieved a silver EcoVadis rating, reflecting our ongoing progress in sustainability.

We are dedicated to delivering targeted social value and will collaborate with you to determine the most effective approach for you, ensuring our efforts have the greatest possible impact.

1.7 Security Clearance

PA are fully compliant with industry best practices for information security, which includes compliance with the UK MOD Industry Personnel Security Assurance (IPSA) standard, against which we are independently audited every three years. PA also has multiple sites with FSC (previously List X) where our dedicated in-house Security Vetting team are based. This allows PA to achieve security vetting of its employees in a time effective manner ensuring the correct processes are always followed (In accordance with the Security Policy Framework/GS007). As a matter of standard process, PA puts all its eligible employees through the Baseline Personnel Security Standard (BPSS), set out by the Cabinet Office. Those employees working on, or planning to work on, government projects are automatically put forward for SC clearance which are processed via UK-SV (formally the Defence Business Services – National Security Vetting). PA also process DV vetting through the UK-SV and other agencies, these are generally client sponsored.

PA currently have a large pool of cleared individuals (80% of UK Staff). Should a resource be identified where clearance is needed, the PA Security Vetting team will then process the individual through the relevant clearance procedure. The team will also be able to validate all existing clearances held by PA employees when requested.

1.8 Next Steps

This service is intended to help customers develop and deliver successful outcomes regardless of the life cycle stage they are at. PA prides itself on working with clients and helping them to deliver outcomes whilst also providing them the ability to 'stand on their own' so that they can move their solutions forward without future involvement. Please contact us on GCloudFramework@paconsulting.com to discuss your needs further.



About PA.

We believe in the power of ingenuity to build a positive human future.

As strategies, technologies, and innovation collide, we create opportunity from complexity.

Our diverse teams of experts combine innovative thinking and breakthrough technologies to progress further, faster. Our clients adapt and transform, and together we achieve enduring results.

We are over 4,000 strategists, innovators, designers, consultants, digital experts, scientists, engineers, and technologists. And we have deep expertise in consumer and manufacturing, defence and security, energy and utilities, financial services, government and public services, health and life sciences, and transport.

Our teams operate globally from offices across the UK, Ireland, US, Nordics, and Netherlands.

PA. Bringing Ingenuity to Life.

Discover more at paconsulting.com and connect with PA on [LinkedIn](#) and [X](#).

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