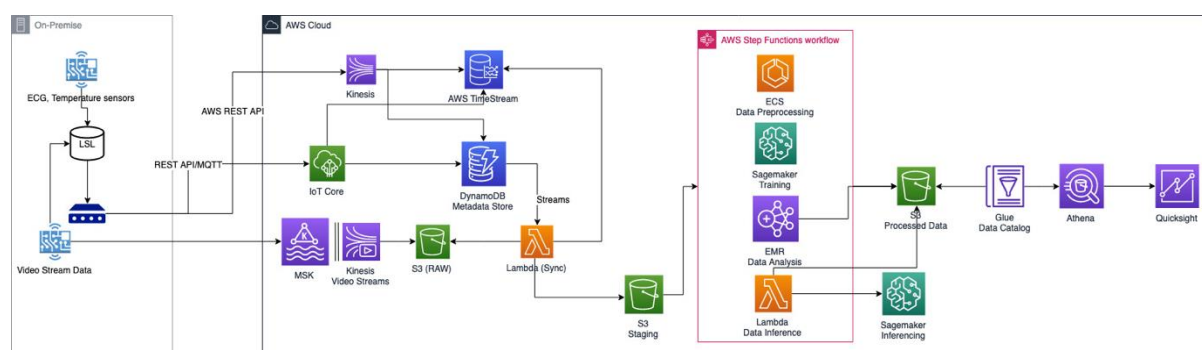


## AWS Professional Services September 2022

### Summary

AWS Professional Services is delighted to offer support for the Imperial MAESTRO project. Further to the AWS Letter of Support the AWS professional Services team has reviewed a preliminary architecture design which meets the requirements set out for the MAESTRO project outputs. The architecture high level design was initially devised following a discovery workshop session held with an AWS Solutions Architect in April 2022:



In order to meet its goal, in tandem with AWS skills training and certification, the MAESTRO project team will participate an AWS Data Labs Design lab. Activity will focus on designing the optimum MAESTRO solution using services in the AWS Cloud, meeting the needs and requirements of the MAESTRO project, so that the required outputs can be delivered by AWS and the MAESTRO team. Following review and successful completion of the Design Lab the AWS Build Lab is proposed, enabling the MAESTRO team to work under guidance from the AWS Data Labs Architect to produce a working prototype of the MAESTRO AWS solution designed in the first phase lab. Subject to successful funding award and recruitment of the MAESTRO Research team the AWS Design Labs phase is planned to commence circa September 2023.

The preliminary architecture designed in August 2022 has enabled the AWS professional Services team to estimate the rough order of magnitude costs (and associated investment) for assisting and guiding the MAESTRO team to deliver a non production MVP pilot of the MAESTRO solution in AWS Cloud. The AWS Professional Services Consultants will be carrying out tasks using an ‘enable as we work’ principle to collaborate with the MAESTRO team and accelerate the delivery of the MAESTRO MVP. Combined with the AWS training, skills enablement, knowledge transfer and expert assistance, this will equip the MAESTRO team to carry out the final Production migration and deployment itself. (AWS Professional Services do not work within production customer environments or work with live production data.)

This proposal estimates AWS professional Services costs and investment using the preliminary architecture design, accepting the assumptions that

- the preliminary design is anticipated to broadly reflect the future Data Labs design.
- the SoW, costs and any investment committed will change dependent on the agreed design produced at the Data Labs. For example, in 2023 the Data Labs MAESTRO design may be enhanced or include new Services not currently available.

Following completion of the Data Labs Design Lab the AWS Professional Services team will review the design and propose a Statement of Work (Sow) describing the AWS tasks and effort required to support the MAESTRO Data Labs Design/Build and ensure the MAESTRO team can build and scale out a minimum viable product. AWS Professional Services Consultants will begin by engaging with the MAESTRO team during the proposed Build Lab to ensure a smooth transition beyond the Build Lab phase through to MVP operational readiness (pre production), with the MAESTRO team performing the production migration.

AWS Professional Services estimate a total of 214 FTE delivery days for this project (based on an 8 hour working day) at a total cost of £380,640 (\$455,852). Based on the current design and estimate AWS Professional Services has committed an investment amount of up to \$115,000 in a Letter of Support. Following agreement of the MAESTRO AWS design at a later stage, AWS Professional Services will be pleased to submit a detailed SoW and costs.

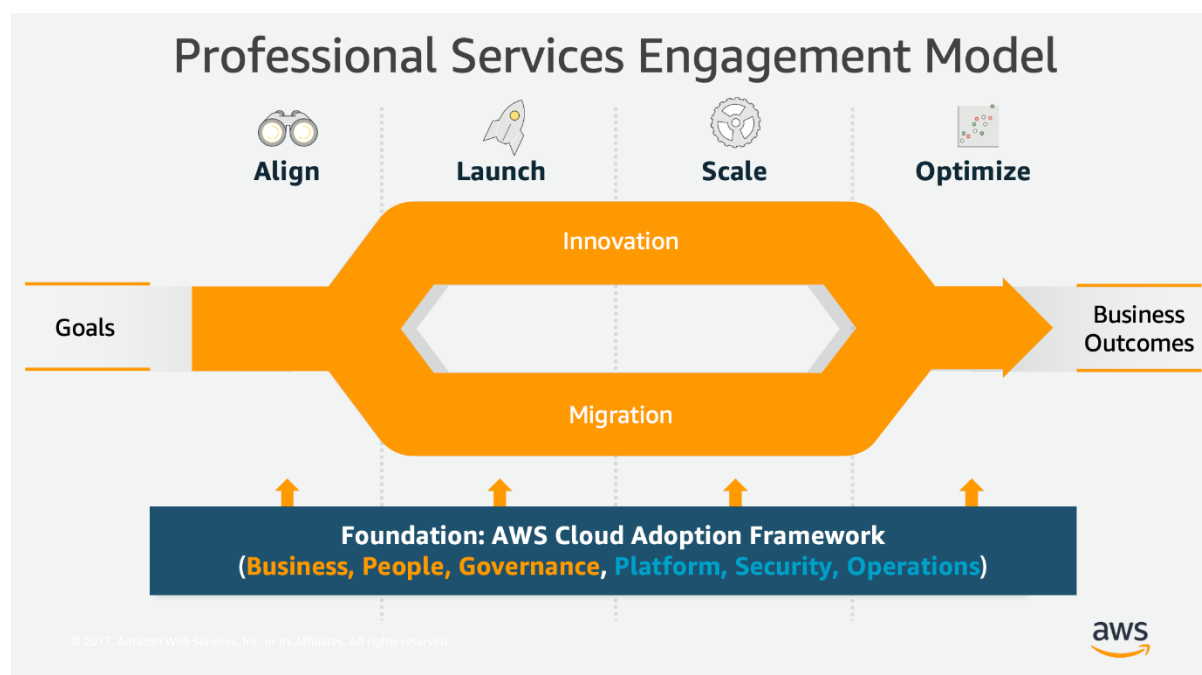
**Delivery Team: AWS Professional Services and Maestro team**

Every delivery begins with a pre-kick off planning stage (in this instance - in line with the Data Labs phase) which will ensure outcomes for each phase and for the final solution are well defined and understood and what the success criteria will be to sign off the MVP. Our aim is to focus on your business outcomes and then utilize the technology to enable these.

As well as using the inputs from the Design/Build Labs phase we will use inputs from each project ‘sprint’ to iterate the design and outcomes as required and to do so with minimal impact to the timeline of the project. We anticipate running two-weekly sprints with MAESTRO team involvement across each sprint. Each sprint will be planned, user stories will be developed, and as the sprint progresses, we will conduct retrospective reviews and end of sprint demonstrations for continuous stakeholder feedback and agile iteration as required. At regular milestone intervals, the delivery teams will report back to a senior stakeholder steering committee for additional review and sign-off.

Adopting the AWS Cloud can provide you with sustainable business advantages and supplement your team with specialized skills and experience to achieve those results. The AWS Professional Services organization is a global team of experts that can help you realize your business outcomes when using the AWS Cloud. We work together with your team to execute your enterprise cloud computing initiatives and in this case, set up your foundational cloud environment and utilize this to build the MVP.

AWS Professional Services has a team dedicated to healthcare, bringing industry knowledge together with technical expertise. We have worked with numerous Genomics Research, NHS and UK Healthcare customers as well as with partners and teams across AWS. Leveraging this experience, our learnings and our in-depth understanding of the AWS Cloud, we have developed proprietary methodologies to help customers deploy mission-critical workloads at scale.



AWS Professional Services’ offerings use a unique methodology based on Amazon’s internal best practices to help you complete projects faster and more reliably, while accounting for evolving expectations and dynamic team structures along the way. Additionally, AWS Professional Services’ offerings can help you achieve specific outcomes related to enterprise cloud adoption. Each offering delivers a set of activities, best practices, and documentation reflecting our experience supporting hundreds of customers in their journey to the AWS Cloud.

In addition to a healthcare team, AWS Professional Services provides global specialty practices to support your efforts in focused areas of cloud computing. Specialty practices deliver targeted guidance through best practices, frameworks, tools, and services across technology, industry, and solution subject areas, such as advisory, analytics, DevOps, and High-Performance Computing. Their deep expertise helps you take advantage of business benefits available with the AWS Cloud.

Additionally, AWS Professional Services created the [AWS Cloud Adoption Framework](#) (AWS CAF) to help

organizations develop and execute efficient and effective plans for their cloud adoption journey. The guidance and best practices provided by the framework help you build a comprehensive approach to cloud computing across your organization, and throughout your IT lifecycle. We will utilise the methodology of the AWS CAF in this programme to help you realize measurable business benefits from cloud adoption faster and with less risk.

### **Delivery Methodology**

The Professional Services Engagement Delivery Framework (EDF) is a customer engagement accelerator that brings delivery mechanisms, discipline and rigor to lean operations and engagement delivery. We will incorporate the EDF in to the delivery of the MAESTRO MVP to guide the engagement and also maintain a running record of this delivery in one place including: tasks and risks identified and mitigated; decisions made; team norms and agreements; user stories; sprint reviews and more.

EDF expedites stakeholder alignment, team cohesion and risk management while ensuring feedback loops close the engagement lifecycle. This process leverages backlog and content management tooling to mechanise this acceleration. EDF is agnostic to its scenario as it can be used for both foundational platform development and MVP build scenarios.

### **Workstreams**

Following the Data Labs Build phase AWS propose to structure the work around the following workstreams:

- **Landing zone (LZ)**
  - This workstream is foundational at the beginning of the project. LZ will deliver a well-architected, multi-account AWS environment that is a starting point from which you can deploy workloads and applications. It provides a baseline to get started with multi-account architecture, identity and access management, governance, data security, network design, and logging
- **Security**
- **Data Pipeline / Data Engineering**
- **TRE environments for data science experimentation**
- **MLOps / DevOps**
- **Network connectivity between MAESTRO sites and AWS Cloud**

### **Assumptions**

The following assumptions apply to the estimate and proposal:

- The Data Labs and Imperial MAESTRO teams collaboration produces a Design and Build output as stated.
- The Data Labs and AWS Professional Services teams do not work in Production environments or handle production (or Patient Identifiable) data .
- This estimate is based on the preliminary architecture provided by AWS at the discovery workshop stage and is indicative of the likely Data Labs design.
- The MAESTRO team progresses through the Data Labs design phase successfully and gains Data Labs Team approval for the Build phase
- The MAESTRO programme has recruited and on-boarded the required Research Team members in time for the project commencing at the Data Labs design phase.
- The Design Lab outputs will inform a low level detailed estimate for Professional Services to refine the above estimate as needed
- Based on the current estimate AWS professional Services will invest up to \$115000, as detailed in the Letter of Support. At the time of reviewing the Design Lab output and submitting the SOW it may be apparent that the Data Lab Build can progress farther ahead with tasks and less Professional Services resource/time would be required overall, hence the cost and investment would lower accordingly.
- AWS Professional Services will apply a 5% expenses fee for any expenses incurred. If the project is delivered 100% offsite (remotely) then no expenses will be incurred.
- The AWS Professional Services investment is based on the current £/\$ exchange rate at time of writing. This value will fluctuate and accordingly so will the maximum investment amount.

**AWS Professional Services Resource Estimate:**

The following estimate is representative of the AWS Professional Services effort in delivery of the MAESTRO preliminary architecture and programme, enabling the MAESTRO outcomes, listed by AWS project delivery roles and workstreams. Full Time Equivalent days represent an 8 hour day with a time & materials billing based on actual hours worked, billed monthly.

**Engagement Manager** will orchestrate delivery with the AWS Technical Consultant team, beginning engagement at the end of the Data Labs Design phase to ensure optimal transition to Build phase for Professional Services team and handover

**Customer Delivery Architect (CDA)** will coordinate AWS Professional Services Technical Consultants and Advisory for the MAESTRO project delivery, beginning engagement at end of the Data Labs Design phase to ensure optimal transition to Professional Services Technical Consultant team and handover. The CDA work with the Data Labs Resident Advisory consultant to ensure smooth transition to Professional Services following Data Labs Build phase

Role / Workstream		FTE Days	Day Rate £	Total £
Customer Delivery Architect	L6	29	£2,040	£59,160
Engagement Manager	L6	20	£2,040	£40,800
Landing zone	L4	10	£1,152	£11,520
Security	L6	20	£2,040	£40,800
Data pipeline / Data engineering	L6	10	£2,040	£20,400
	L5	30	£1,592	£47,760
TRE environments for data science experimentation	L6	10	£2,040	£20,400
	L5	35	£1,592	£55,720
MLOps / DevOps	L6	10	£2,040	£20,400
	L5	30	£1,592	£47,760
Network connectivity between Customer and AWS	L5	10	£1,592	£15,920
<b>Total Days</b>		<b>214</b>		<b>£380,640</b>
Expenses @5%				£19,032
<b>Total</b>				<b>£399,672</b>