



Trust. Value. Velocity

G-Cloud 15

Enterprise Modernisation using Microservices

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1. About Mastek

Mastek has been delivering Critical National Infrastructure programmes in the UK Public Sector for over a decade now. We are trusted with multiple contracts for the UK Government across Central Government, Health, Local Government, Policing, Public Protection and Defence. The majority of our national services are delivered in a context of high uncertainty and complexity while collaborating in multi-supplier environments.

While working for these large and complex public sector organisations, we have continuously refined our management, delivery and underlying processes to reflect key learnings from the sector:

Working through a complex stakeholder landscape: We understand the importance of establishing effective communication channels, building trust and fostering a collaborative working environment that empowers stakeholders to contribute meaningfully to the project's success. Our approach is based on a deep understanding of stakeholder needs and requirements. We leverage our experience and expertise to design governance structures that promote transparency and accountability and use data-driven reporting mechanisms to ensure stakeholders have real-time visibility into project status and progress. At the Home Office, GDS, Ministry of Defence and NHS, we have a proven track record of working seamlessly with large stakeholder groups, including civil servants.

Standards, compliances: We comply with >20 policies and standards, including Government Digital Standards and Government CDDO Service Toolkit covering service standards, service manuals, TCoP, API technical and data standards. Our stringent governance, methods, playbooks and processes (manual and automated) span across service delivery phases, ensuring continuous compliance.

Policy-driven: Policies and procedures largely drive Public Sector organisations. We need to be Agile and flexible to meet demands for policy/regulatory changes, geopolitical events and ministerial commitments.

Culture: We adhere to the Civil Service core values of integrity, honesty, objectivity and impartiality. Key behaviours we promote stem from a combination of Civil Service and Mastek values. These include being passionate, accountable, sustaining predictable and repeatable outcomes, not transferring risk, transparent, leading to enable, acting with transparency, practising a no-blame culture and being flexible.

Mastek's global presence



Australia

Austria

Bahrain

Belgium

Brunei

Canada

Denmark

Egypt

Estonia

Finland

France

Germany

Hungary

Iceland

India

Indonesia

Ireland

Italy

Japan

Jordan

Kenya

Kingdom of Saudi Arabia
(KSA)

Kuwait

Latvia

Luxembourg

Malaysia

Netherlands

New Zealand

Norway

Oman

Philippines

Poland

Romania

Singapore

Slovakia

Spain

Sri Lanka

Sweden

Switzerland

United Arab Emirates (UAE)

United Kingdom

USA

Did you know?

75%

Around three quarters of Local Authorities in the UK who run Oracle have worked with Mastek on their digital transformation journey.

300,000 Users

Supported managing up to 750,000 logins per month to MOD through Identity and Access Management

Crime reduction

We designed, built and manage the UK's Strategic National DNA Database that helps Forensics and Law Enforcement Authorities investigate and stop crime

90% faster

We enabled the National Health Service (NHS) to drive 90% faster response times with a billion pharmacy prescriptions a year.

Technical Service Desk

We provide level 2 and ITSM support for the One Login service at Government Digital Service

22k

Our systems enable 22,000 schools to function efficiently every day of the year.

Healthcare and manufacturing

We delivered Finance, HCM and Supply Chain transformations for clients across health and manufacturing globally powered by Oracle Cloud

Transformation of trade

Transforming UK's trade with the EU and rest of the World by supporting Customs Declarations Services and its trade users.

99.99% Availability

We support the Home Office Biometrics (HOB) Platform, Having migrated it to an AWS platform.

Our digital and cloud services portfolio

Powered by Glide 4.0 and value-based delivery

Industry-aligned approach with business outcomes

Digital engineering and experience	• Cloud engineering and migration • Legacy modernisation • Low code / no code App Dev • DevSecOps • Enterprise integration	• MACH • Digital commerce • UX and CX • Platform engineering • Gen AI software development.
Oracle Cloud and enterprise apps	• Oracle Cloud applications • Oracle consulting • Oracle Cloud infrastructure	• Value-based delivery • Glide 4.0.
Data, automation and AI	• Cloud data modernisation • Business Intelligence and Analytics	• Data management • Intelligent automation • Data Governance.
Salesforce	• Sales Cloud • Service Cloud • Marketing Cloud • Industry Cloud	• Experience Cloud • Mulesoft.
Innovation labs and platforms	• Enterprise workforce scheduler • Connected enterprise • icx-Pro – intelligent part assistant	• iLeaseFinPro.
Cloud enhancement managed services	• Oracle managed services • Digital managed services • Commerce managed services	• Salesforce managed services.

Home Office Biometrics (HOB)

Public sector platform modelled 24x7 with 99.99% availability

Problem

- Transition business-critical Platform services from incumbent supplier with minimal risk
- Migration from private cloud to AWS Cloud.

Solution

- Migrated the infrastructure from private cloud to AWS
- Embedding Kubernetes Containerisation
- Introduced Docker and fully-baked AMIs
- Supporting the platform's self-service functionality using Jenkins Jobs
- Applying security updates to the OS base images through pipelines
- Instituting automated patching and testing for infrastructure images
- Support of configuration, test and releasable artefacts through the pipeline.

Outcome

- **Zero impact** on live service
- **80% automation** of SIT
- Environment Provision **2 days to 1 hour**
- **5x scalability** in handling student BRPs
- Cost saving the authority circa **£9.5m/year.**
- Won the '**Best Use of Cloud Services**' award
- **35%** Incident Volume Reduction.



Government Digital Service

Problem

GDS initiated the One Login programme to create a single front door for identity verification and authentication, which could be adopted and scaled across all government departments. This would improve the user experience by providing the public with a single identification and verification service for the government, reduce costs as each department no longer required its own identity service and reduce identity fraud and identity-enabled crime.

GDS released a tender in June 2023 to provide a Technical Service Desk (TSD) managed service for the One Login service. This service would provide a single point of contact for level 1 and 2 service support as part of the wider support ecosystem. It would be provided in the UK and replace the incumbent's scaled-down non-ITIL-aligned break-fix service.

Solution

In September 2023, Mastek were successfully awarded the TSD contract to deliver TSD on behalf of GDS. GDS had an extremely aggressive programme driven by the onboarding of HMRC as a user, which was a major milestone planned for February 2024, migrating new and existing HMRC users to the One Login platform. The TSD service was expected to go live in November 2023. This was an extremely complex programme which, within this timescale, would deliver:

- The contact centre provider for level 0 directly facing the public
- The TSD supplier in place directly facing all government departments
- The TSD supplier in place providing L1 and L2 engineering support and monitoring
- Continued delivery on the One Login backlog of features
- Continued migration of smaller government departments to the platform.
- Delivery of a new ITSM toolset to be configured for use by GDS and the One Login programme, integrating level 0 to level 3 support
- Working as one team, Mastek quickly integrated into the programme, appointing the leadership team early in the engagement. We collaborated with GDS from the outset, ensuring we tailored the service to their expectations rather than delivering what was written in the contract.

Our leadership team consisted of:

- Service Management Vice President
- Programme Director
- Chief Technology Officer
- Programme Management office lead.

Outcome

At its height, the programme team was circa 15 strong, covering programme/project delivery, PMO, architecture, fraud, security, support, omni-channel and quality assurance. The service team is currently in place providing circa 21 resources now covering end-to-end service management, service delivery and L1 and 2 engineering roles.

As the One Login migrations continue, Mastek is supporting Government departments onboarding to the platform as they transition into the new service and provide One Login a secure Technical Service Desk managed service with:

- Omni channel access for other government departments via telephony, email and web form
- Provision of L1 and L2 engineering support
- 24x7, 365 days a week cover
- 24x7x365 eyes on monitoring service
- Fraud detection and security, GDPR compliant
- End-to-end (L0-3) incident and problem management
- End-to-end 24x7 Major incident management (MIM)
- On-call/call-out engineering support, incident and MI management
- Adherence to stringent SLAs on incident response, call handling and fix times
- End-to-end monthly service reporting alongside TSD KPI and SLA reporting.
- A shift left culture and mindset, reducing the impact of service on product teams (L3)
- Support with service maturity in the programme, preparing GDS to run critical national infrastructure.



Internet-facing platform and applications for Army Digital Services

Developed mobile app and web app with 24*7 high availability

Problem

- New Defence Gateway Portal
- Combine all internet-facing applications into one
- Easy to use
- Enable easier access to the MySeries portfolio of products.

Solution

Designed and developed the following easy-use Progressive Web Apps:

- Defence Gateway Landing Page
- My Leave App
- My Expenses App
- My Health App
- My Details App
- My Appraisal App
- My Admin App
- COVID-19 Reporting Tool
- Commanders' COVID-19 Tool.

Outcome

- Delivered 20+ successful projects
- Deployment Automation
- £7.5m in savings annually
- Zero Downtime
- Environment creation in hours.



Delivered a platform for the Department for Health and Social Care

Delivered capability supporting 200k+ tests in a day,
traced millions of COVID-19 infections

Problem

- Leveraging DevOps platform based on reusable GitHub, AWS and Azure DevOps Pipelines
- Introduce more flexible, scalable and reusable IaC capabilities
- Implement CI/CD pipelines.

Solution

- Uplifted from Cloud Formation into Terraform (IaC)
- Pre-built the AMIs using Packer, with automated security checks
- Immutable infrastructure, thus eliminating the risks of partial upgrades and patches
- Continual Cost Optimisation processes and other service functions, such as Change and Risk management
- Migrated into an organisation-wide collaboration toolset. This included Jira, Confluence, Trello, Miro, Teams, SharePoint, O365, Slack, etc.

Outcome

- 75% reduction in lead time due to pre-built AMIs
- Zero Downtime Deployments
- Delivered a Platform - Secured, multi-tenanted hosted on Azure and AWS in 5 weeks
- Cost reduction achieved through close monitoring of resource utilisation.



Mastek and Technology in the Public Sector

Technical Capabilities	Relevant Technology Capability	Mastek Scale
Software Development Continuous Integration, Platform - Other Products, Cloud Collaboration Tools		Software Engineering 2354 FTE
QA and Test: API, Automated Functional and Compatibility, Accessibility & Performance		QA and Testing 774 FTE
Cloud Platforms Amazon Web Services AWS Microsoft Azure		Cloud Platforms 1046 FTE
Data BI/MI Components, Integration		BI and Visualisation 725 FTE
User-Centered Design		UCD 25 FTE
Office Automation Tools		Collaboration 4565 FTE

2. Summary

Increasing organisational agility and reducing time to market are key considerations in any successful business strategy.

No matter where an organisation is on the path to **Enterprise Modernisation**, Mastek can offer expertise in Microservices adoption, Agile, DevSecOps and Cloud.

3. Masteks Service

We help organisations modernise their applications using Microservice-based architecture for scalability, maintainability and quick releases. At Mastek, we see Microservices as an innovative approach to revitalising business processes.

By creating Microservices for our clients, Mastek enables enterprises to rapidly transform their legacy applications. Once transformed, the flexibility, resiliency and scalability of these applications increase. Most transformed applications are natively Cloud-ready because Microservices typically take a 12-factor architecture and development approach. If deployed with a necessary individual deployment pipeline into containers like Docker, these applications are highly portable.

The modernisation goals are:

- Organisational alignment - Align business and IT stakeholders around common goals and objectives, emphasising the value proposition of microservices in driving digital transformation and business agility.
- Establishing well-defined, platform-independent interfaces based on the bounded contexts of the underlying domain.
- Improving the application - in particular, reducing the number of entry points and preventing access to the internals, moving non-customer functionality into separate components and eliminating redundant and obsolete parts of the application.
- Incremental approach to modernise the application with no business disruption.
- Pilot projects - Develop a proof-of-concept (POC) or prototype to confirm architectural decisions, prove feasibility and gather stakeholder feedback.

Our approach to enterprise modernisation with Microservices is incremental and iterative delivery, as opposed to releasing a completed product all at once. Mastek has a Centre of Excellence for Microservices, Containerisation and PaaS (Platform as a Service). Mastek's DevSecOps approach defines the lifecycle as a continuous communication and feedback process between customers, business, development and operations.

The following illustrates our approach to Microservices adoption:

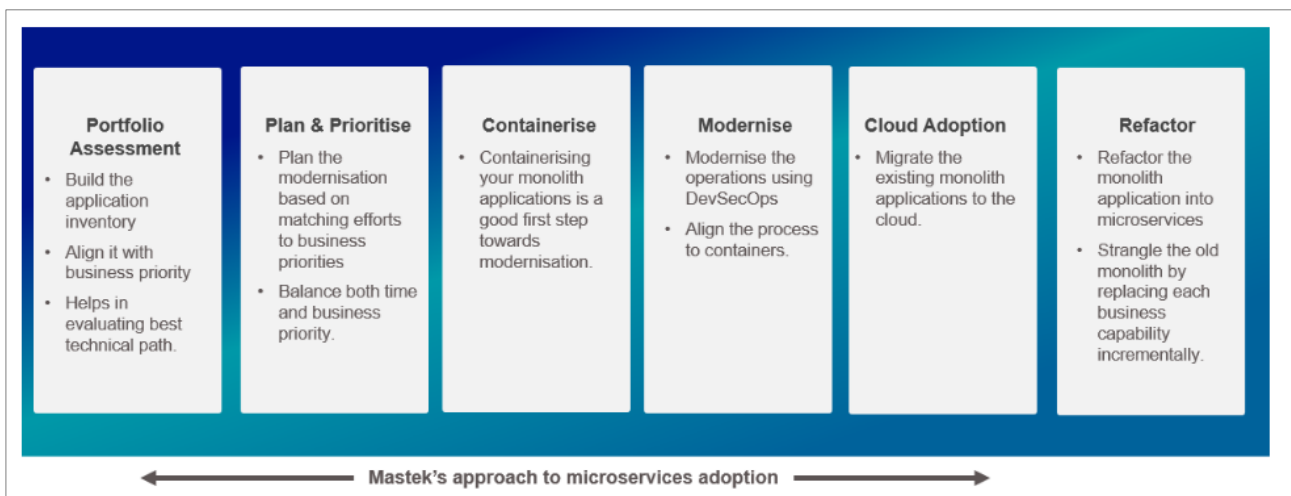


Figure 1: Our Approach to Microservices Adoption

4. Key Features

- Accurate Discovery and portfolio assessment of enterprise systems.
- Business requirements mining with deep understanding and focus on ensuring the business context throughout the service design and delivery.
- Incremental approach to modernisation with no business disruption.
- Modularity - Microservices architecture decomposes monolithic applications into smaller, independently deployable services, each focusing on a specific business capability or domain.
- Natural language interfaces - Generative AI-powered natural language interfaces can enhance developer interactions with microservices architecture, allowing users to query or interact with services using conversational commands or queries. AI-driven chatbots or virtual assistants can assist developers in tasks such as service Discovery, API documentation, troubleshooting and deployment, thereby improving productivity and user experience.
- Developed on Open Source with no technology or vendor lock-in.
- Microservice adoption framework for smooth transformation.
- Extensible framework to build custom microservices-based business services.
- API-centric microservice Discovery.
- Detail strategy and road map building to improve portfolio.
- Expertise in building scalable and resilient microservices with Cloud Native Applications.
- Performance engineering.
- Hybrid cloud architecture to migrate legacy applications to the cloud.
- Re-hosting services - Servers, containers and serverless platforms hosting.
- Integrates security into DevSecOps to reduce security risks.
- Consulting service for operational governance for microservices.
- Experience with multiple cloud technologies.

5. Business Benefits

- Solution developed using a modern Agile software development methodology.
- Reduce risk through proven and repeatable methodology.
- Ensure Enterprise scale and quality.
- High-quality, high-velocity transformation.
- Unique partnerships with key stakeholders: Microsoft and AWS.
- Automation and Continuous Delivery using auto service Discovery and monitoring.
- Microservice Re-usable assets and artefacts for a faster learning curve.
- By leveraging Generative AI (Artificial Intelligence) in conjunction with microservices architecture, organisations can unlock new opportunities for automation, optimisation and innovation, accelerating their journey towards enterprise modernisation and digital transformation.
- Advantage of our experience in Cloud native applications.
- Define the governance structure needed to deliver transformational outcomes.
- Upskill and knowledge transfer of digital skills to support modernisation.
- Removes the long-term commitment to one technology stack.
- Allows the business functions to scale with the organisation.
- More manageable application portfolios.
- New, cost-efficient ways to host applications and adapt platforms.
- Stronger resilience and higher availability ensure a good customer experience.

6. Technologies, Languages and Vendor Support

Technologies

- **Docker** is an open-source platform that automates application deployment, scaling and management. It uses containerisation to package an application with all its dependencies into a standardised unit for software development.
- **Kubernetes** is an open-source system for automating the deployment, scaling and management of containerised applications. It groups containers that make up an application into logical units for easy management and Discovery.

Languages

- **Java**: is still a popular choice for building microservices due to its robust libraries and frameworks, such as Spring Boot and Jakarta EE.
- **JavaScript/Node.js**: JavaScript, particularly with Node.js, is often used for microservices due to its event-driven, non-blocking I/O model, perfect for data-intensive real-time applications.
- **Python** is another popular choice due to its readability, ease of learning and powerful frameworks like Django and Flask.
- **Go** is a statically typed, compiled language known for its simplicity, efficiency and reliability. It is often used in distributed networks.

Vendor Support

- Vendors, latest toolset, best practices and standards supported.

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