



Trust. Value. Velocity

G-Cloud 15

**Microservices and Service Mesh
Architecture Adoption**



Contents

1.	About Mastek	3
2.	Summary	13
3.	Masteks Service.....	14
3.1	Assessment and Strategy	14
3.2	Architecture and Design	14
3.3	Implementation and Migration	14
3.4	Security, Compliance and Governance	14
3.5	Operations and Continuous Improvement	14
4.	Key Features.....	16
5.	Business Benefits	17
6.	Technologies, Languages, Methodologies and Vendor Support.....	18

Table of Figures

Figure 1: MicroServices and Service Mesh Architecture Adoption	13
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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 (both 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, being transparent, leading to enablement, 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

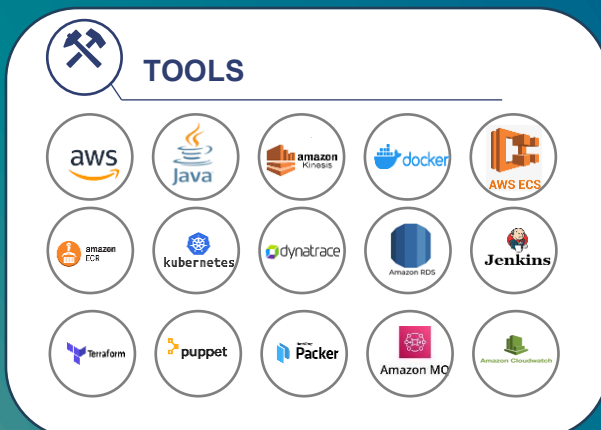
- Transition business-critical Platform services from incumbent supplier with minimal risk
- Migration from private cloud to AWS Cloud.

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.

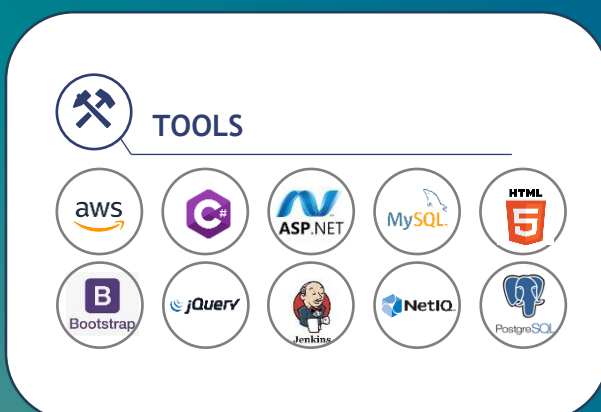
Solution

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

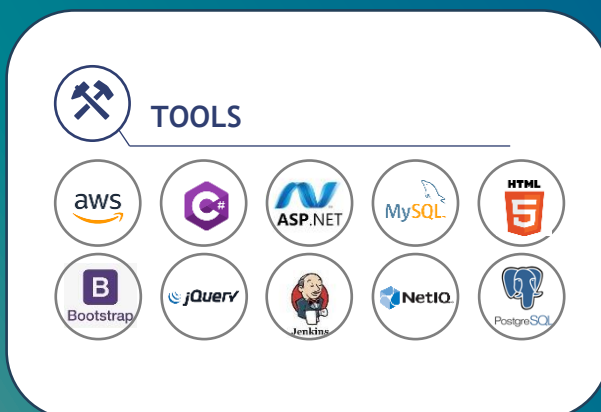
- Leveraging DevOps platform based on reusable GitHub, AWS and Azure DevOps Pipelines
- Introduce more flexible, scalable and reusable IaC capabilities
- Implement CI/CD pipelines.

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

Microservices and Service Mesh Architecture Adoption is Mastek's end-to-end modernisation service designed to help organisations transform legacy and monolithic applications into scalable, resilient and cloud-native digital platforms. The service enables a structured transition to a modular microservices architecture, supported by a secure and highly observable service mesh that standardises communication, governance and control across distributed systems.

This offering spans **strategy, architecture, engineering and operations**, guiding clients from initial assessment and target-state design through implementation and production readiness. Mastek helps decompose monoliths into well-defined, domain-aligned services, establishes API-first and event-driven patterns and implements container orchestration platforms, such as Kubernetes, to support independent deployment and rapid release cycles.

The service mesh layer introduces **consistent traffic management, security and observability** without increasing application complexity. Through capabilities such as mutual TLS, policy-based access control, intelligent routing, retries, circuit breaking and rate limiting, organisations gain fine-grained control over service-to-service interactions. Built-in telemetry provides real-time insights into performance, reliability and dependencies, enabling faster incident resolution and improved operational confidence.

Mastek also supports **platform and operating model enablement, including DevSecOps integration, automated CI/CD pipelines, environment standardisation**, and SRE-aligned practices. Governance frameworks, architectural guardrails and reference patterns ensure scalability, regulatory compliance and cost efficiency across multi-cloud and hybrid environments.

By adopting microservices with a service mesh, organisations can **accelerate time-to-market, improve system resilience, enhance security posture and reduce operational risk**, while empowering product teams to innovate independently. The result is a future-ready application architecture that supports continuous evolution, business agility and sustainable digital growth.

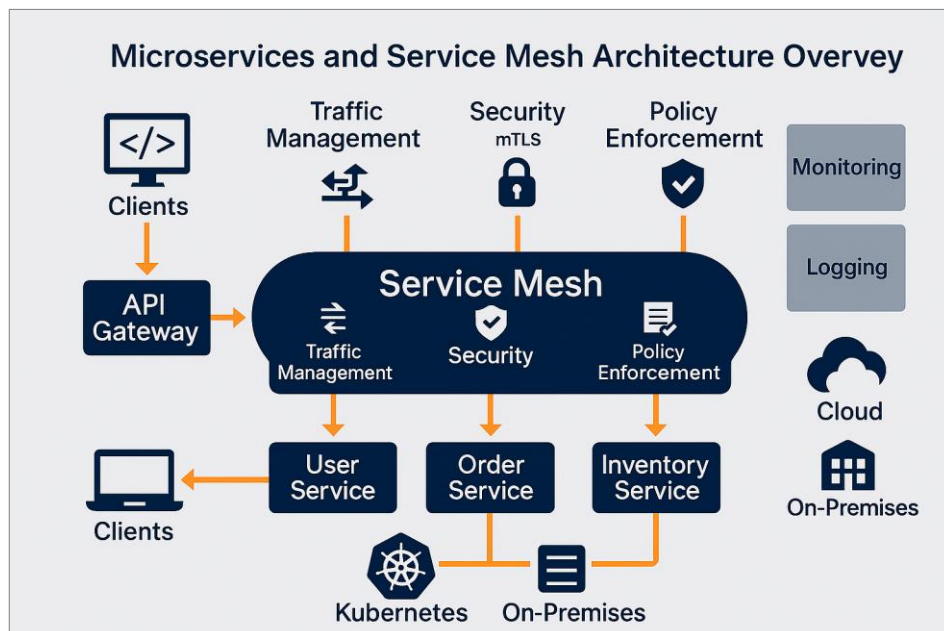


Figure 1: MicroServices and Service Mesh Architecture Adoption

3. Masteks Service

3.1 Assessment and Strategy

- **Current State Analysis:** Comprehensive review of existing application landscape, integration points, deployment pipelines and operational pain points.
- **Readiness Assessment:** Evaluate organisational, technical and process maturity for microservices adoption.
- **Target State Blueprint:** Define the future-state architecture, including domain-driven design, bounded contexts and service decomposition strategy.
- **Business Case and Roadmap:** Develop a phased migration plan, ROI analysis and risk mitigation strategies.

3.2 Architecture and Design

- **Microservices Reference Architecture:** Design modular, loosely coupled services with clear APIs, leveraging containerization (Docker, Kubernetes).
- **Service Mesh Topology:** Architect a service mesh layer (e.g., Istio, Linkerd, Consul) for traffic management, security and observability.
- **API Gateway and Edge Patterns:** Implement API gateways for ingress, authentication, rate limiting and protocol translation.
- **Resilience and Scalability Patterns:** Integrate circuit breakers, retries, bulkheads, autoscaling and distributed tracing.

3.3 Implementation and Migration

- **Service Decomposition:** Refactor monoliths into independently deployable microservices, ensuring data consistency and transactional integrity.
- **CI/CD Enablement:** Establish automated pipelines for build, test, deploy and rollback, with policy-as-code and security scanning.
- **Service Mesh Deployment:** Roll out service mesh components, configure mutual TLS, traffic splitting and policy enforcement.
- **Observability and Monitoring:** Deploy distributed tracing, metrics and logging for end-to-end visibility and proactive incident response.

3.4 Security, Compliance and Governance

- **Zero Trust Security:** Enforce mutual TLS, identity-based access and least-privilege policies at the mesh layer.
- **Compliance Automation:** Integrate audit trails, policy validation and evidence packs for regulatory requirements (GDPR, ISO, NCSC).
- **Governance Framework:** Define service contracts, versioning and lifecycle management with automated quality gates.

3.5 Operations and Continuous Improvement

- **Run-Operations:** 24x7 monitoring, SRE practices, error budgets and incident response.
- **Continuous Optimisation:** Regular architecture reviews, performance tuning and cost optimisation.

- **Enablement and Training:** Workshops, playbooks and coaching for engineering and operations teams.

4. Key Features

- **Modular Microservices Architecture:** Loosely coupled, independently deployable services for agility and scalability.
- **Service Mesh Integration:** Centralised control of service-to-service communication, security and observability.
- **API Gateway and Edge Security:** Unified ingress, authentication and traffic management.
- **Automated CI/CD Pipelines:** Rapid, reliable and secure delivery of microservices.
- **Resilience Engineering:** Built-in patterns for fault tolerance, retries and graceful degradation.
- **Zero Trust Security:** Mutual TLS, identity-based access and policy enforcement at every hop.
- **Comprehensive Observability:** Distributed tracing, metrics and logs for real-time insights.
- **Compliance and Governance Automation:** Policy-as-code, audit trails and evidence packs.
- **Scalable Operations:** SRE practices, error budgets and proactive incident management.
- **Continuous Improvement:** Ongoing optimisation, training and best practice adoption.

5. Business Benefits

- **Accelerated Innovation:** Faster time-to-market for new features and services.
- **Operational Agility:** Rapid scaling and adaptation to changing business needs.
- **Enhanced Security and Compliance:** Granular controls and automated evidence for audits.
- **Reduced Risk:** Fault isolation and resilience minimise the impact of failures.
- **Cost Optimisation:** **Efficient resource utilisation** and reduced technical debt.
- **Improved Developer Productivity:** Clear service boundaries and automation reduce friction.
- **Future-Proof Architecture:** Ready for cloud-native, multi-cloud and hybrid deployments.
- **Transparent Operations:** Real-time visibility and actionable insights for stakeholders.
- **Stakeholder Alignment:** Business and IT collaboration through clear service contracts.
- **Sustainable Growth:** Scalable foundation for ongoing digital transformation.

6. Technologies, Languages, Methodologies and Vendor Support

#	Technologies	Languages	Methodologies	Vendor Support
1	Kubernetes, Docker, Helm	Go, Python, Java, .NET	Agile, DevSecOps, SRE	CNCF, Microsoft, AWS, Google
2	Istio, Linkerd, Consul	YAML, Bash, JavaScript	Microservices, Policy-as-Code	Istio, HashiCorp, Buoyant
3	API Gateway (Kong, Apigee, AWS API Gateway)	Node.js, Java, Python	API-First, CI/CD	Kong, Google, AWS
4	Prometheus, Grafana, Jaeger, Open Telemetry	PromQL, SQL	Observability, Monitoring	Grafana Labs, CNCF
5	GitHub Actions, Azure DevOps, Jenkins	YAML, Groovy	Automation, Continuous Delivery	Microsoft, GitHub, Jenkins
6	OPA, Kyverno, Vault, Key Management	Rego, HCL	Policy-as-Code, Zero Trust	Open Policy Agent, HashiCorp

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