



Trust. Value. Velocity

G-Cloud 15

Data Testing Service



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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:

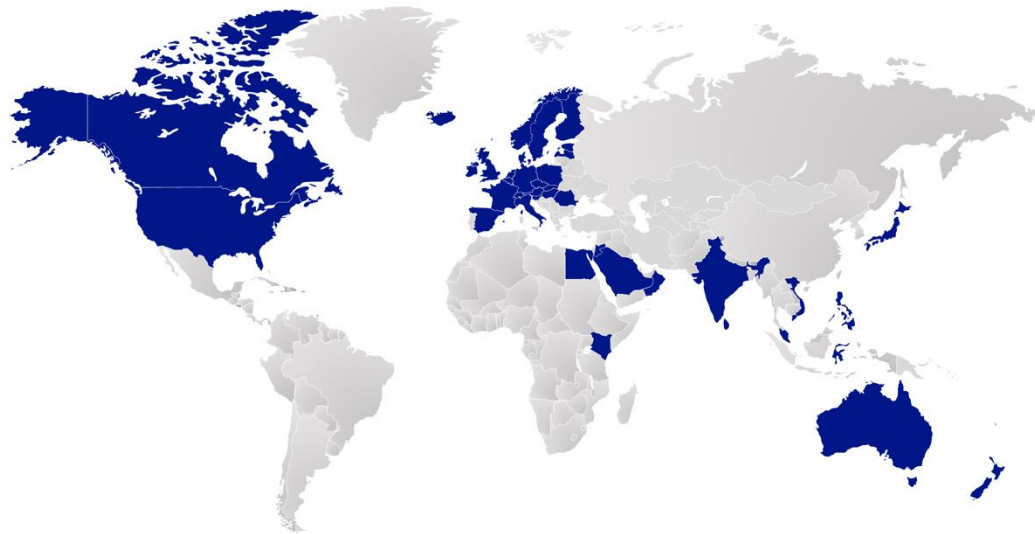
Working through a complex stakeholder landscape: We understand the importance of establishing effective communication channels, building trust and fostering a collaborative working environment that empowers stakeholders to contribute meaningfully to the project's success. Our approach is based on a deep 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

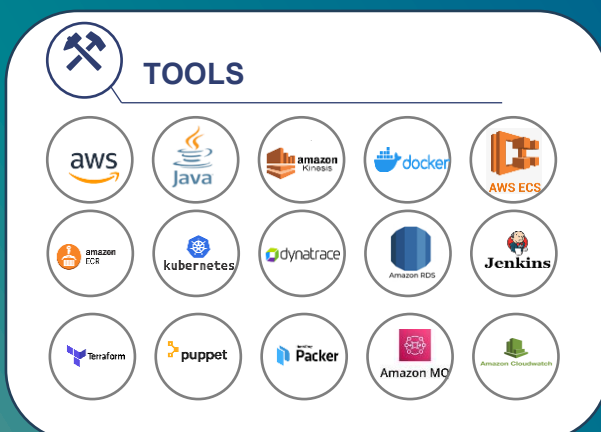
- Transition business-critical Platform services from incumbent supplier with minimal risk
- Migration from private cloud to AWS Cloud.

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:

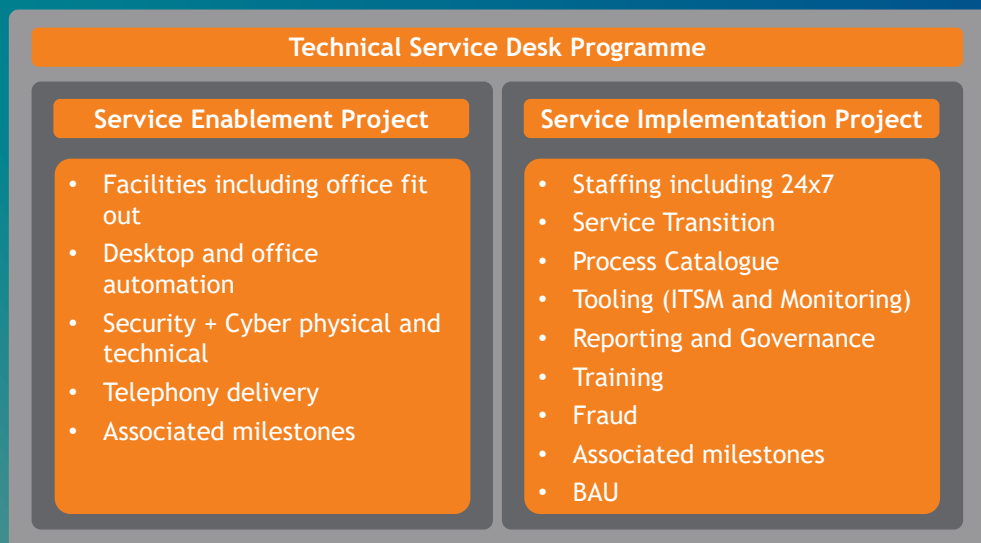
- Service Management Vice President
- Programme Director
- Chief Technology Officer
- Programme Management office lead.

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.

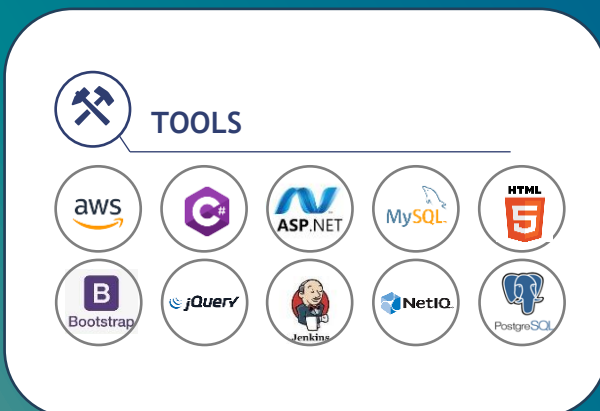
Solution

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

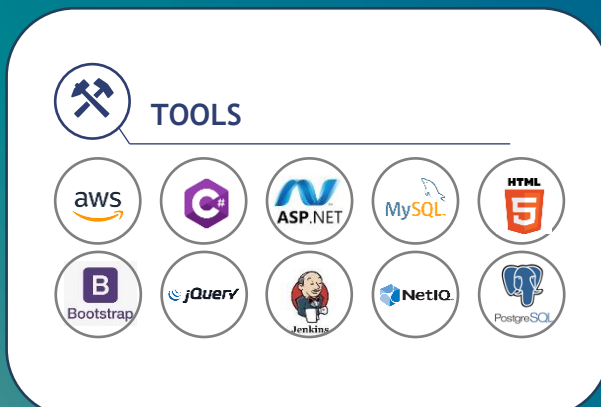
- Leveraging DevOps platform based on reusable GitHub, AWS and Azure DevOps Pipelines
- Introduce more flexible, scalable and reusable IaC capabilities
- Implement CI/CD pipelines.

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

Mastek has worked in Information Technology for over 41 years and has extensive experience in on-premise and cloud-based Data Migrations, BI and Data Warehouse implementations.

Our **Data Testing Services** are designed to deliver real customer benefits, helping projects develop a test strategy that best suits their business needs, along with the required Quality Assurance (QA) and applicable quality control measures.

The success of any Data Warehouse depends on its architecture, complexity, data model and the selection of ETL and BI tools. Although there is no standard tool or process for BI DW testing, the choice of tools depends on business needs, complexity and the type of data on which OLAP processing occurs.

With extensive experience in delivering Data Warehousing projects, Mastek provides end-to-end, integrated testing, along with recommendations on templates, tools, processes and analytical and testing techniques as applicable.

3. Masteks Service

Mastek's data testing strategy benefits from our experience delivering large-scale data migration and BI DW implementations (On-premise and cloud). Our overall data testing services provide a critical layer of quality assurance for your data-driven initiatives. We work closely with your team to understand your specific data migration or BIDW project goals and develop a customised testing strategy encompassing various data aspects.

This strategy ensures your data is:

- **Accurate:** We verify that data accurately reflects the source systems and aligns with defined business rules.
- **Complete:** We identify and address any missing or incomplete data elements that could impact downstream processes or reports.
- **Consistent:** We ensure data formatting, structure and values are consistent across the target system, promoting data integrity.
- **Usable:** We test data usability within the context of your BIDW environment, guaranteeing its suitability for analysis and reporting.

3.1 Data Migration Testing

Our data migration services ensure:

- **Pre-migration data assessment:** We analyse source data to identify potential quality issues, allowing for proactive remediation before migration begins.
- **Data extraction and transformation testing:** We meticulously test the accuracy and completeness of data extraction from source systems and their transformation to the target format, minimising errors during migration.
- **Data volume testing:** We ensure the target system can handle the volume of data being migrated, preventing bottlenecks or system failures during the process.
- **Post-migration data validation:** We comprehensively validate the migrated data in the target system, verifying its accuracy, completeness and consistency with the source data. This ensures a smooth transition and minimises disruption to downstream processes.

3.2 Data Warehouse and BI Testing

Mastek has extensive experience providing end-to-end system Integration testing for a BI DW implementation. As part of this service, we ensure that data from upstream and downstream sources is cohesively integrated. Complex integrations are verified for transformations, encryptions, decryptions, derivations, calculations, aggregations and summarisations.

BIDW system integration testing verifies and validates the following:

- System integration between ETL and BI.
- End-to-end data flows from source systems to reports
- Scenario-based testing with business-critical transformation rules.
- End-to-end system connectivity and data integrity
- Data recovery and restorability.

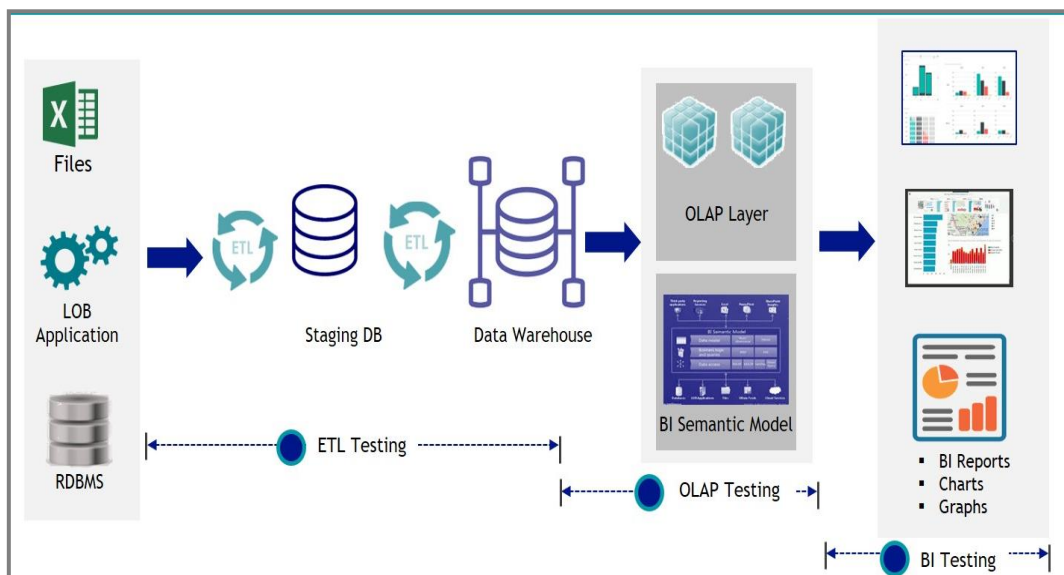


Figure 1: Data Warehouse and BI Testing

Data Warehouse implementation requires continuous upgrades of transactional data stores and periodic data loads; therefore, we recommend using a well-defined and baseline automated regression suite.

Automated Regression Suite verifies and validates the following:

- Critical functionality is intact and working as expected
- Major functionality is not broken due to the new changes.

Our Data Warehouse and BI test strategy follows a data-centric approach, considering all test types and phases that are critical for validating any BI DW implementation throughout its life cycle.

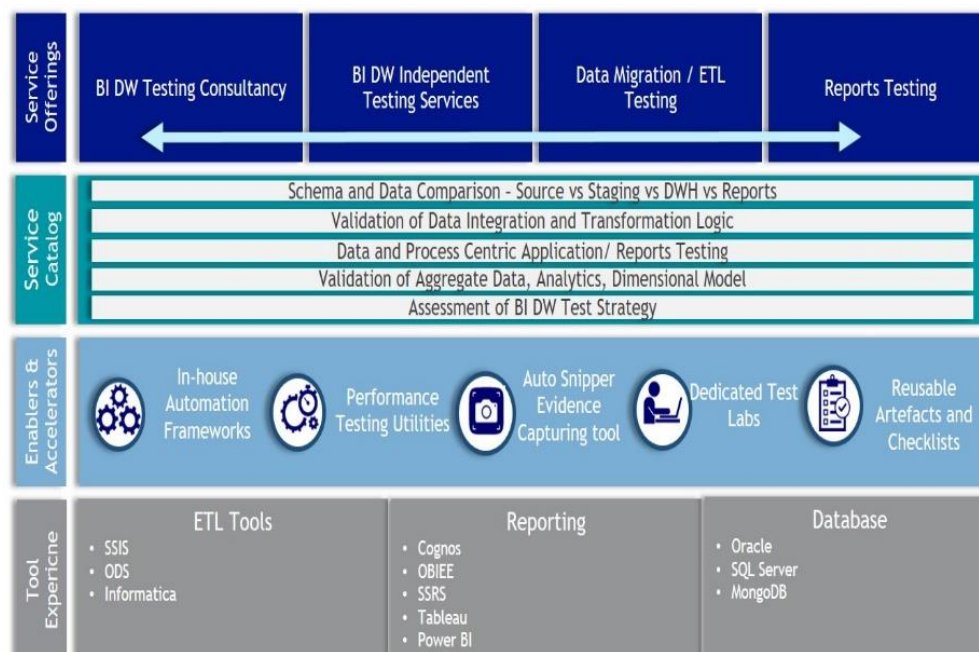


Figure 2: Our Data Warehouse and BI Test Strategy follows a Data-Centric Approach

Mastek provides services at multiple levels:

- Extraction, Transformation and Loading (ETL) testing.
- Online Analytical Processing (OLAP) testing.
- Business Intelligence (BI) testing.

3.3 ETL Testing

ETL includes extracting data from multiple heterogeneous sources, applying business logic and loading it into Data Marts/Data Warehouses. A well-planned, well-defined and effective testing strategy can guarantee a much smoother conversion to production.

ETL testing verifies and validates the following:

- Data Quality - Accuracy, Validity, Completeness.
- Identifying duplicates and missing data.
- Identifying missing constraints.
- Scalability and Performance of Data.
- Transformations, loading and truncation of data.
- Error handling, exclusions.

3.4 OLAP Testing

OLAP performs multidimensional business data analysis and provides complex calculations, trend analysis and sophisticated data modelling capability. It enables users to easily and selectively extract and view data from various viewpoints. OLAP Testing verifies and validates the following:

- Accuracy of measures, dimensions and facts.
- Accuracy of dimensional hierarchies.
- Derivations, aggregations.

3.5 BI Testing

BI includes analysing and visualising data and guiding in making enterprise-level decisions. BI testing involves verifying reports, dashboards and scorecards based on various OLAP operations in data warehouses.

BI testing verifies and validates the following:

- Report accessibility.
- Data mining and verification.
- Data model validation.
- Data reconciliation.
- Archival and purge strategy.
- Bi-reporting verification and analysis.

4. Key Features

To deliver on our commitment to comprehensive data testing, we utilise a robust suite of features designed to address the unique challenges of data-driven projects. These features encompass various stages of the data lifecycle, ensuring a thorough evaluation of your data quality throughout the process:

- Strong pool of certified resources with significant domain expertise and technical knowledge in BI-DW.
- Extensive experience in testing large and complex data migration and BI-DW implementations.
- Cost-effective and flexible testing solution for BI-DW.
- Test data management features, including data masking and data generation.
- Comprehensive test management, including test strategy, test planning and defect management with efficient reporting processes.
- Support from a dedicated assurance and testing service line on various quality control measures for required quality assurance.
- Extensive expertise in handling databases, high-volume transaction systems, data mart maintenance and business intelligence reports.
- Data profiling capabilities assuring data reliability.
- Automation expertise to reduce test effort and time.

5. Business Benefits

By implementing our comprehensive data testing solutions, you unlock many benefits that enhance the success of your Data Migrations and BIDW projects. These benefits span from risk mitigation and improved data quality to increased project efficiency and return on investment.

Let's explore the tangible advantages you gain by partnering with us:

- Accurate analytical and operational reports from well-tested, reliable data.
- Improved adoption of bi-reports in the organisation.
- Test effort reduction in regression and continuous data validation.
- Improved insight into quality, therefore reduced time to market.
- Reduction in the cost of poor quality.
- Avoid repeated manual testing by implementing test automation.
- Data profiling capabilities assuring data reliability.
- Improved quality due to thorough validation of data in the data warehouse.
- Increased end-user confidence resulting from increased confidence in integrated business data.

6. Technologies and Tools

- QuerySurge automated ETL testing tool.
- Microsoft SSIS.
- Oracle Data Integrator (ODI) and Warehouse Builder (OWB).
- Oracle GoldenGate for fast real-time transformations.
- Talend.
- IBM DataStage.
- Informatica Power Centre.
- Attunity data replicator.
- Denodo data virtualisation.
- JBoss data virtualisation.
- Cisco Composite.
- SOA data services using JBoss, Oracle, Microsoft, IBM ESB and Java.

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