

IBM Consulting



G-Cloud 15 IBM – Quality Engineering - AI Testing Services Service Definition Document

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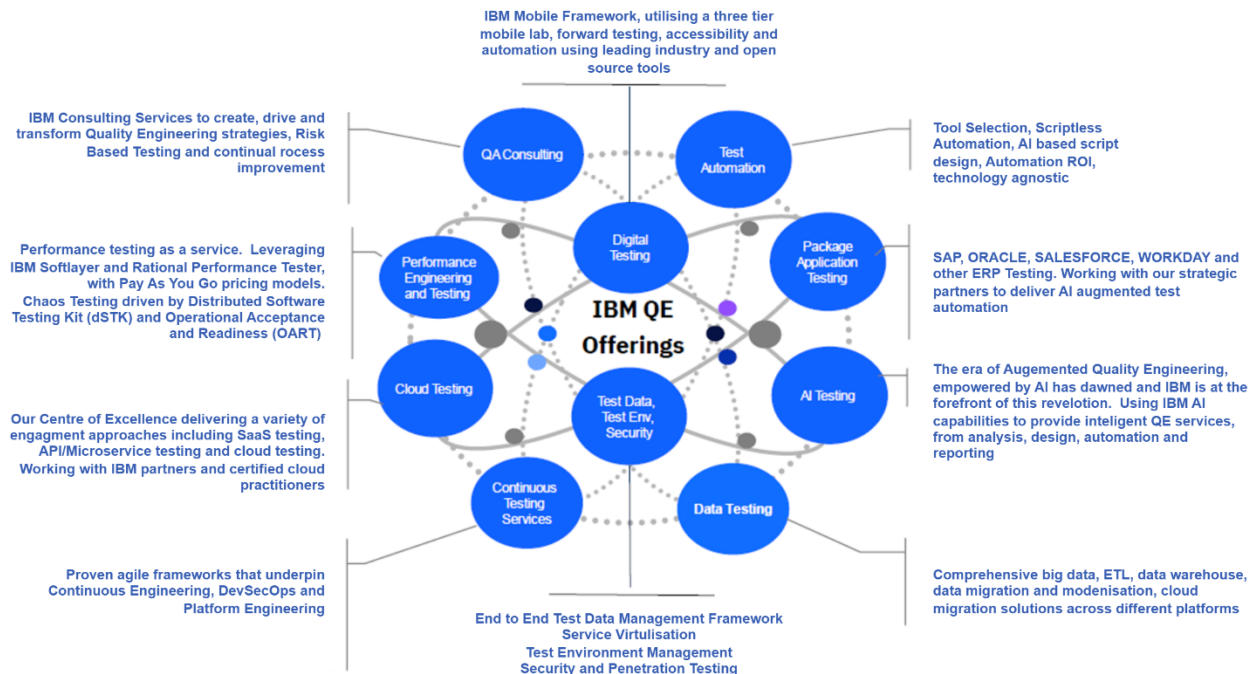
IBM - Quality Engineering - AI Testing Services

Our Offering Framework

The AI Testing service is part of the IBM QE (Quality Engineering) suite of offerings. IBM QE offerings cover the full breadth of testing needs. The purpose of these services is to help you deliver quality government services at scale and to get increasingly complicated applications to market faster, with fewer defects and at a lower cost.

We envision a future where 'Quality First' isn't just an aspiration, but the fundamental DNA of every process which we provide to our clients.

In 2016, IBM began incorporating AI into our standard Quality Engineering. As a result, AI is now an essential catalyst that



drives higher levels of optimisation, automation, and cognition across our Quality Engineering service engagements.

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Service Overview

Features

- Cost savings
- Scalability - easy scaling of resources up and down
- Faster time to market
- Improved collaboration and reduced cycle times
- Greater reliability
- Access to the latest technology
- Better test coverage
- Reduced CapEx
- Meeting regulatory and compliance requirements.

Benefits

- Quality driven earlier in the life cycle – through analysis of Epics, User Stories and improved In-Sprint testing
- Improved overall test coverage – through analysis of business combinations and generation of test cases to cover the combinations, driving quality, resulting in less maintenance effort in future releases
- Increased levels of automation at multiple steps of the IBM QE lifecycle
- Better quality delivery as a result of improved tooling selection and solution design (features and increments)
- Provide a foundation of quality that facilitates the successful completion of large programs
- Reduced total cost of ownership.

Key Differentiators

- Advanced Analytics: IBM's AI testing service provides advanced analytics and reporting capabilities
- Integration with DevOps Tools: IBM's AI testing service integrates with popular DevOps tools, such as Jenkins and Jira, improving collaboration
- Continuous Testing: IBM's AI testing service supports continuous testing
- Model-Based Testing: IBM's AI testing service uses model-based testing
- AI-Powered Test Optimisation: IBM's AI testing service uses AI-powered test optimisation.

Real World Studies

- US Telco used AAT for API testing. One hundred fifty-five endpoints required 1.5 hours to create 3000 test cases. AAT reduced test creation time to 2.5 hours. IBM AI API Testing revealed 9 5xx errors and previously undetected null-point exceptions. Without IBM AI API Testing, testing would have taken 6 weeks (2 weeks of planning and 4 weeks of execution). IBM AI API Testing achieved an 85% reduction in planning and execution effort. Streamlined testing, critical error identification, and expedited timeline.

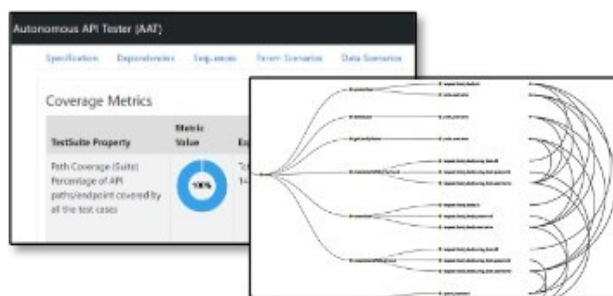
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Addressing Business Needs

Leveraging AI, we are revolutionising our offerings to deliver faster, more predictable, and results-focused solutions. This AI-driven approach provides our Quality Engineers with deep insight into daily, real-time outcomes, empowering our clients to make critical decisions with utmost confidence and precision. As a result, engaging IBM Quality Engineering with an enterprise can quickly and efficiently deliver high-quality products by leveraging unique optimisation, automation, and cognitive capabilities, while leveraging a client's existing knowledge base and reusable IBM industry assets.

Proof point: IBM is using AI for API testing

IBM AI API Testing, the Autonomous API Testing asset, is a cutting-edge solution provided as part of the IBM Quality Engineering (QE) Service. Powered by Generative AI, the API testing process is revolutionised, delivering comprehensive test automation and actionable insights. IBM AI API Testing uses generative GPT/Transformer models to demystify API specifications, clarify producer-consumer relationships, and generate tests and test dependencies from Swagger/OpenAPI specifications. The tool was built using advanced technology. AI models and Program Dependence Graph technology illustrate endpoints and their interdependencies graphically and generate the data needed to support them across control points.



IBM can help you address your requirements for testing essential government digital services with rigour and depth. The use of AI within Quality Engineering will resolve several critical issues:

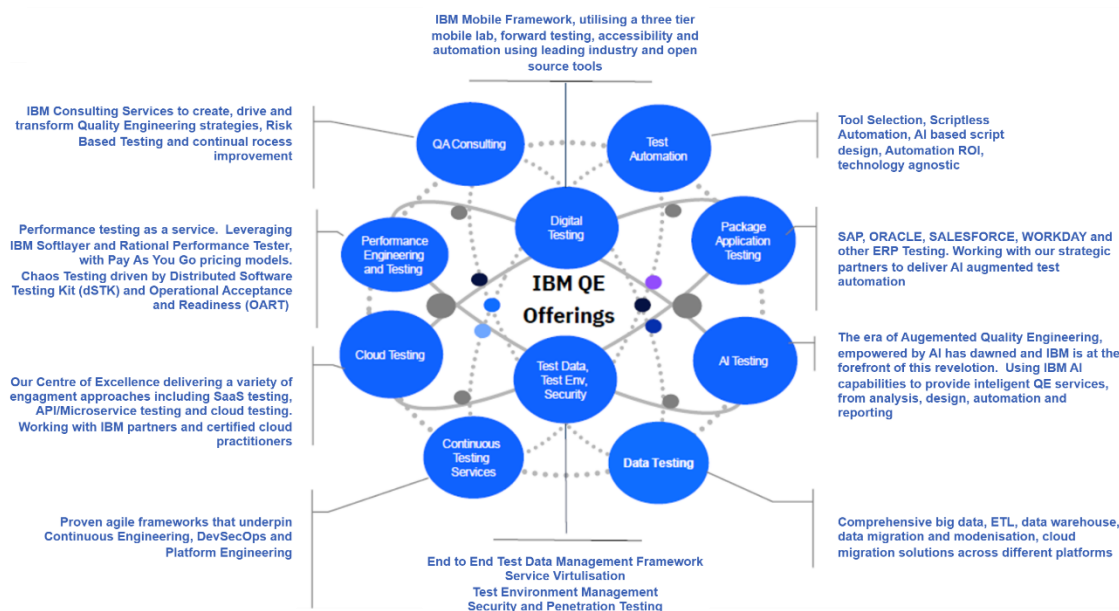
- Traditional manual testing processes are time-consuming and often lead to inefficiencies. AI significantly reduces time and enhances efficiency through automated testing processes and predictive analysis
- Insufficient automation capabilities limit the speed and coverage of testing. AI accelerates quality processes by automating test script creation and learning from past experiences
- A lack of skilled resources in AI and automation technologies inhibits innovation in testing. AI platforms offer intuitive interfaces, making quality processes accessible to all team members
- High costs associated with maintaining an in-house quality testing team. AI, by automating processes, eliminates the need for a costly, large testing team
- Inability to align testing processes with Agile/ DevOps workflows, resulting in slower delivery times. AI enables efficient alignment of testing with Agile/DevOps Continuous Integration/Deployment.

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Service Definition

IBM's AI testing services provide a comprehensive, integrated approach to testing AI-infused applications and AI-augmented tools, helping businesses ensure the quality, performance, and security of their cloud applications.

- **Advanced Analytics:** IBM's AI testing service provides advanced analytics and reporting capabilities, enabling teams to gain insights into their testing processes and identify areas for improvement
- **Integration with DevOps Tools:** IBM's AI testing service integrates with popular DevOps tools, such as Jenkins and Jira, allowing teams to streamline their testing processes and improve collaboration. **Continuous Testing:** IBM's AI testing service supports continuous testing, enabling teams to test early and often in the development lifecycle and catch defects sooner
- **IBM Watson® Test Data Manager.** Help organisations create, manage, and use synthetic test data to validate AI systems and applications.



The diagram above details all the IBM QE offerings.

- **Model-Based Testing:** IBM's AI testing service uses model-based testing, which allows teams to generate test cases automatically based on system models, reducing the time and effort required for manual testing
- **Risk-Based Testing:** IBM's AI testing service uses risk-based testing, which prioritises testing efforts based on the risk associated with different parts of the system, ensuring that critical areas are tested thoroughly



- **AI-Powered Test Optimisation:** IBM's AI testing service uses AI-powered test optimisation, which analyses test results and identifies opportunities to optimise test cases, reducing the number of tests required and improving testing efficiency
- **Security Testing:** IBM's AI testing service includes security testing capabilities, enabling teams to identify and address vulnerabilities in their systems
- **Scalability:** IBM's AI testing service is designed to scale, enabling teams to test large and complex systems with ease
- **Expertise and Support:** IBM's AI testing service is backed by IBM's expertise and support, ensuring that teams have access to the resources they need to succeed.

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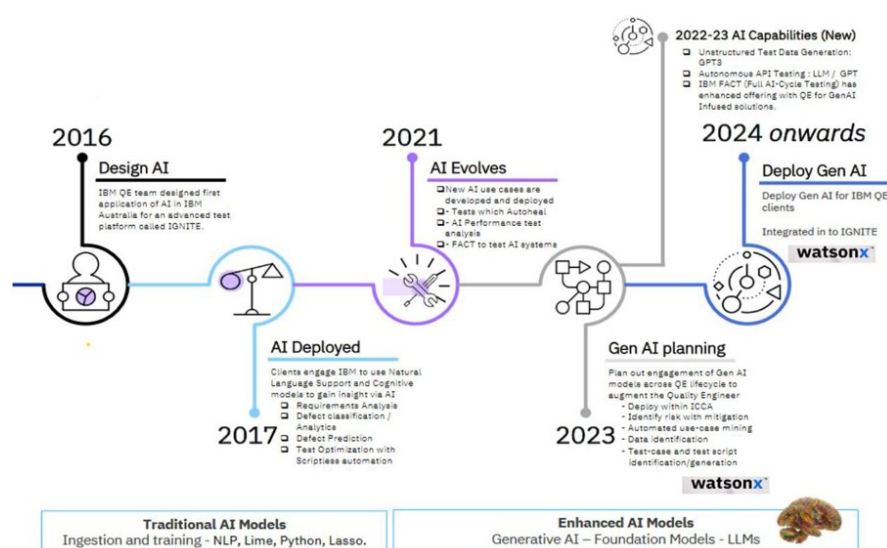
AI-enhanced QE Roadmap

As we embark on our journey into the future, we present our comprehensive roadmap. This strategic guide illustrates our commitment to continuously innovate and enhance our services by integrating advanced AI technology. We aim to deliver superior-quality solutions, optimised efficiency, and faster results for our clients.

Which AI-related use cases has IBM integrated into its current and future technology?

IBM is continuing to evolve and mature several AI use cases to augment Quality Engineering outcomes:

- **Reduced business Risk:** AI can ensure higher quality by reviewing and correcting design and specifications, and by anticipating required risk mitigation actions for a program
- **Intelligent Automation:** AI can automate repetitive, manual tasks, freeing up Quality Engineers to focus on higher-value activities. It can also handle complex tasks with higher accuracy and efficiency
- **Test Case Optimisation:** AI can analyse vast quantities of test data and identify patterns, allowing for more effective prioritisation and optimisation of test cases
- **Defect Prediction and Analysis:** Using Machine Learning algorithms, AI can predict potential defects based on historical data, allowing teams to address issues before they occur proactively
- **Enhanced Decision Making:** By providing real-time insights and analytics, AI empowers Quality Engineering teams to make faster, more informed decisions
- **Accelerated Learning and Improvement:** Machine learning enables AI systems to learn from past data and experiences, continually improving the quality of processes over time
- **Seamless Integration with DevOps:** AI can help to align Quality Engineering activities with Agile/DevOps workflows, fostering more efficient and effective collaboration between development, operations and quality teams.



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IBM Approach

The most critical systems that support government organisations demand quality outcomes. To achieve this, we take an asset-driven approach to delivery and bring extensive expertise in Quality and Testing methods.

We categorise our approach into six areas, each of which has a set of specific activities:

Governance • Environmental governance • Data governance • Quality governance • Control functions	Team • Team sizing and structure • Quality standards • Tooling and automation • Metrics
Stakeholders • Strategy & Digital Testing • Product ownership • Communications approach • Stakeholder engagement	Process Integration • Demand • Branching and merging • Testing approach • Path to live
Inception • Onboarding • Coaching • Training • Location management	Ways of Working • Methods • Empowering Team • Transparency • Continuous Improvement



**We have a
“Test Less, Test Right”
mantra and we believe
in accelerating testing
using AI to improve root
cause identification
and achieve faster
resolutions.**

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About IBM

Supporting Government

The problems we solve for clients are complex and cannot be satisfied with technology alone. They require a partner who can also offer deep industry expertise and a trusted relationship.

IBM combines the portfolio, people and sense of purpose necessary to meet today's enterprise demands. Every day, we support and manage complex delivery for government clients, with the impact of delivery reaching far beyond citizens and national services.

We bring industry experience, insight, and technology capability to deliver and operate secure, scalable, optimised, and available services for government.

We support you by bringing:

- **Industry expertise** – Professionals who understand and are passionate about delivering quality public services and can bring industry insights and apply innovation to your business processes
- **Trust and security capabilities** – Protecting valuable data and insights and deploying innovations responsibly
- **Innovative technology** – Expertise in areas such as AI, blockchain, 5G, Automation, IoT, cybersecurity and quantum, delivered in a Hybrid Cloud environment
- **Experienced Services Professionals** to support strategy, innovation and deliver transformation and change to processes, applications and cloud infrastructure
- **Global alliances** – valuable partnerships with the world's leading vendors.

We help government organisations in the UK and worldwide deliver and transform essential public services – our teams are passionate and proud about helping you to make a real difference to people's lives.

Government Services Supported by IBM



Defence and Intelligence



Public Safety and Policing



Healthcare



Life Sciences



Tax and Revenue Management



National Infrastructure



Social Care



Education



Works and Pensions

This is IBM in the UK

We have worked together with organisations in the UK for over 100 years, with a rich history of joint innovation and achievements, built on trusted relationships.



Cloud

Together, IBM and Red Hat are working to deliver the world's only **next-generation hybrid multicloud platform**



Economy

IBM has been **integral to the UK economy for >100 years**, and is one of its largest tech employers



R&D

In the UK alone, IBM **invests £170 million in R&D** each year



Quantum

IBM Q, the world's most advanced quantum computing initiative for commercial use, is being used by CERN



Environment

IBM's **focus on sustainability** began in 1971 with our first environmental policy



Artificial Intelligence

IBM develops **watsonx based generative AI solution** for the Austrian federal armed forces to **provide fact-based evaluation and classification** for the ability to remain capable of acting in the light of risk scenarios.



Changing the world

IBM was awarded **World Changing Company of the Year 2019** by Fast Company



Royal recognition

29 UK IBMers received **honours from the Queen** for contributions to tech and society



Diversity

IBM won the **Global Diversity Award 2019** and the ENEI's **Gold Standard**



Graduates

IBM is committed to developing future talent – we are **Target Jobs' Graduate Employer of the Year 2019**



Volunteering

IBM dedicates **>20,000 volunteering hours every year** for a better society



Tech talent

IBM runs P-TECH schools in 18 countries, helping **>100,000 students build skills for careers of the future**



Inventors

IBM UK is home to many Master Inventors, with **>250 patents filed last year alone**

