G-Cloud

Hitachi Digital Services

Security Testing
and Engineering Services

Hitachi Digital Services vision and mission

Hitachi has been a trusted supplier to the UK government for over half a century in Transport, Energy, Technology and Research among the numerous sectors where we have consistently delivered social value and value for money.

Hitachi Digital Services offers a diverse array of innovative technology solutions tailored to meet the specific needs and desired outcomes of governmental agencies. Specialising in advanced IOT, ERP, Machine Learning, data analytics, and cloud services, we stand out for our unwavering commitment to security, reliability, and innovation. With a track record of delivering robust and scalable solutions, Hitachi empowers government entities to streamline operations, increase efficiency, enhance data security, and optimize performance, thereby enabling them to better serve the UK public. By leveraging state-of-the-art innovative technology and a deep understanding of governmental challenges, Hitachi emerges as the premier choice for governmental agencies seeking to bolster their digital foundation and achieve their mission-critical objectives. Our cross-sector view and technology expertise makes us ideally placed to advise government on data-driven, end-to-end digital transformations that delivers value for money.

Hitachi Digital Services G-Cloud offerings

Partnership Offerings	Consulting/ Advisory Cloud Services	HARC/ Cloud Services	Healthcare Services
AWS Cloud Maturity Assessment	Business Analysis & Product Management	Cloud Cost Management – Assessment (FinOps)	Digital Care & Operations (DCO)
Azure Cloud Maturity Assessment	Data Strategy	Cloud Migration/Modernisation Assessment Strategy (Planning & Journey)	Lifestyle Management
GCP Cloud Maturity Assessment	Digital Transformation Strategy & Roadmap	Cloud Maturity Assessment	Secure Data Environment
Databricks Enablement Services	Cloud Organization Strategy & Design	Cloud Migration and Modernisation	Digital Healthcare Advisory and Technology Services
Oracle ERP	Organization Change Management	Cloud Operate Services	Lightbeam Health by Hitachi DS
SAP Cloud Support	Innovation Incubation Accelerators	Cloud Services	Luminai by Hitachi DS
Pentaho	Managed Service – Advisory	Harc Operations	Ambience Healthcare by Hitachi DS
	Managed Service – Rail	Performance Testing and Engineering Services	
Sustainability Cloud Services	Cloud Managed Services	Quality Assurance and Engineering Services	**AI Cloud Offerings**
Application and Software (IT decarbonisation)	Oracle Cloud Support	Resilience and Chaos Testing and Engineering Services	AI Business Accelerator Incubate & Launch
Energy efficiency for buildings	Maturity Assessment	Security Testing and Engineering Services	AI Business Accelerator Innovate
ESG Supplier assessment and engagement	Observability Assessment	Security Services	AI Business Accelerator Optimise & Solidify
GHG Emissions Dashboard	Reliability & Resiliency Assessment	SWAT Services	AI Business Accelerator Foundation Platform
Energy Strategy	Security Posture Assessment	FinOps – Managed Cloud Cost Implementation	AI Business Accelerator Starter Platform
ESG Strategy	Advisory/Consulting – Service Management (Cloud Managed Service)	IOT – Internet of Things	GenAI Strategy Assessment
		Smart Spaces and Video Intelligence (SSVI)	

Context

Hitachi Digital Services' Cloud Engineering Solutions offers integrated Performance Testing and Engineering services, guiding organisations in continuous testing, engineering, and fine tuning within the Agile Definition of Done (DoD). From meticulous testing planning to seamless setup, execution, and tuning, we ensure a seamless quality & reliability to & in the cloud.

Our solutions encompass robust testing services to safeguard your business, security, infrastructure, data, and applications. Additionally, our commitment to ongoing quality, performance, and reliability support ensures cloud environment remains optimised, performant, reliable, and resilient, allowing you to focus on driving innovation and achieving your business objectives with confidence.

Challenge

Challenges of Performance Testing & Engineering in Cloud Migration and Modernisation:

1. **Dynamic Infrastructure:** Cloud environments are dynamic, with resources provisioned on-demand. This dynamic nature introduces challenges in accurately simulating production-like environments for performance testing, as the infrastructure may vary over time.

2. **Scalability and Elasticity:** Cloud platforms offer scalability and elasticity, allowing resources to scale up or down based on demand. Testing the performance of applications under varying loads and scaling conditions requires specialised tools and expertise.

3. **Multiple Variability factors:** Cloud applications are subject to load, latency, failures/faults, data, network, cost, security, network, throttling & fluctuations, variabilities. Testing the impact of network conditions on application performance requires simulation of real-world network scenarios.

4. **Shared Resources:** Cloud environments often share resources among multiple tenants, leading to potential performance interference. Testing the performance of applications in shared environments requires isolating resources and mitigating interference from other workloads.

5. **Data Migration:** Migrating data to the cloud introduces challenges in ensuring data integrity, consistency, and accessibility. Performance testing of data migration processes is essential to identify bottlenecks and optimise data transfer speed and efficiency.

6. **Legacy Systems Integration:** Integrating legacy systems with cloud-native or modernised applications introduces complexities in performance testing. Ensuring seamless integration and interoperability between legacy and cloud-based components requires thorough testing and validation.

7. **Vendor Lock-in:** Cloud migration and modernisation may lead to vendor lock-in, limiting flexibility in choosing cloud providers or services. Performance testing should consider the implications of vendor lock-in and assess the portability of applications and data across different cloud environments.

8. **Security and Compliance:** Ensuring security and compliance in cloud environments is critical during migration and modernisation efforts. Performance testing should address security vulnerabilities, data privacy concerns, and regulatory compliance requirements to mitigate risks effectively.

9. **Cost Optimisation:** Cloud migration and modernisation can impact cost structures, with potential cost implications based on resource usage, performance characteristics, and service-level agreements. Performance testing should evaluate cost-performance trade-offs and optimise resource utilisation to minimise costs while maximising performance.

10. **Skill and Knowledge Gaps:** Cloud migration and modernisation require specialised skills and knowledge in cloud technologies, performance testing tools, and best practices. Organisations may face challenges in acquiring and retaining skilled personnel to effectively perform performance testing in cloud environments.

11. **Non-functional Requirements (NFR) Gaps:** From experience, we have observed gaps in NFRs a general challenge. Traditionally importance given to functional requirements and not having detailed NFRs causes migration delays or after migration degradations. Understanding the variabilities and having detailed NFRs is very important.

12. **Variability in Cloud Data Lifecycle Management:** Cloud environments exhibit variability in data lifecycle management, including data storage, retrieval, replication, and deletion processes. This variability introduces challenges in managing test data effectively, as data may be transient, distributed across multiple locations, or subject to different retention policies.

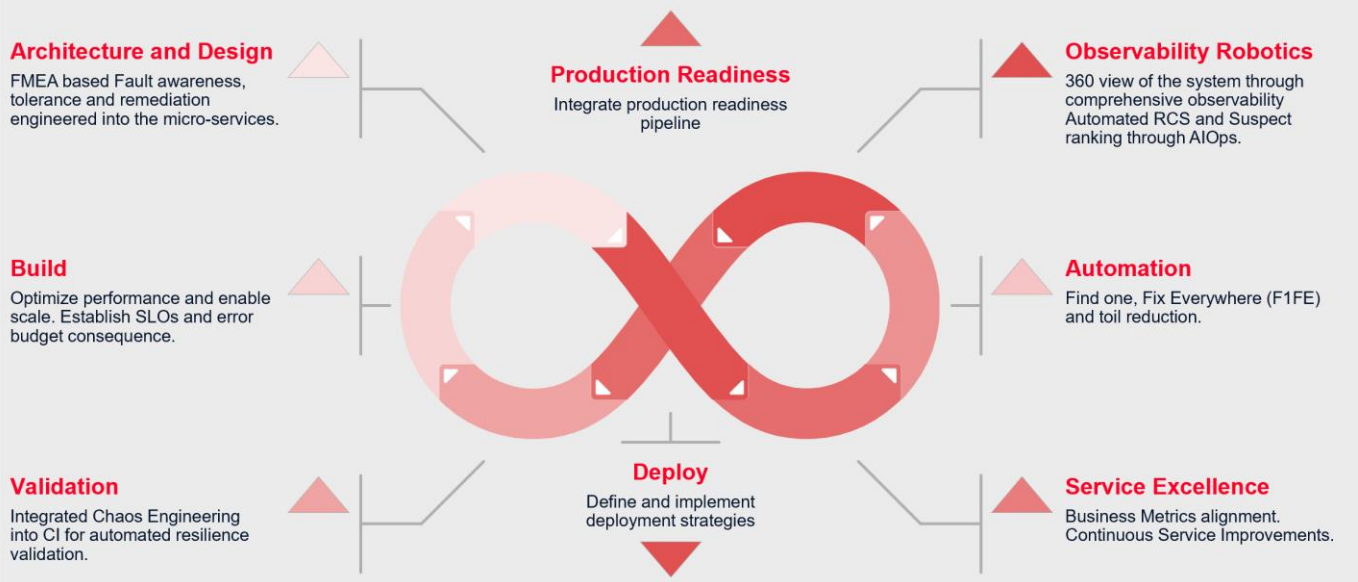
Addressing these challenges requires a comprehensive approach to performance testing and engineering, encompassing thorough planning, expertise in cloud technologies, advanced testing tools, and collaboration across teams involved in cloud migration and modernisation initiatives.

Our solutions encompass robust testing services to safeguard your business, security, infrastructure, data, and applications.

Solution

Ensuring a comprehensive grasp of a Buyer's requirements is crucial for delivering successful services. At Hitachi Digital Services, we pride ourselves on offering end-to-end Cloud services covering all categories outlined in Framework Schedule 1 Specification. Our aim is to facilitate seamless cloud migration, modernisation, and management, meeting Buyer's needs effectively.

Hitachi Digital Services introduces the Hitachi Application Reliability Center (HARC), comprehensive services to plan, design, build, run, and operate workloads across private, public, hybrid, and multi-cloud environments. HARC is the confluence of finest engineering talent, best in class tools and frameworks and a purpose-built modern facility that delivers the most advanced cloud workload management function yet. Our primary objective is to deliver value to the business leveraging digital cloud engineering functions.

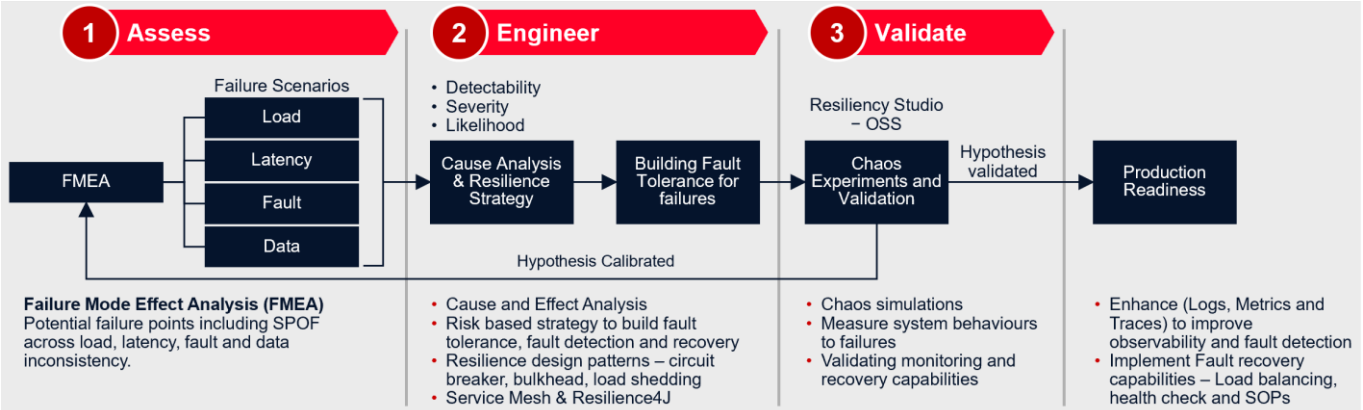


Comprehensive performance testing and engineering services encompass a systematic and thorough approach to evaluate, validate, and optimise the performance, scalability, reliability, and resilience of software systems across various dimensions. These services ensure that applications, data, infrastructure, and security aspects are rigorously tested to meet business requirements and user expectations. Below is a detailed definition of such services:

1. **Performance Testing Scope:** The service encompasses a wide range of performance testing activities, including load testing, stress testing, endurance testing, scalability testing, and spike testing. Each type of test focuses on different aspects of performance under varying conditions, ensuring that the system can handle expected workloads and scale effectively.
2. **Engineering for Scalability and Resilience:** Performance engineering principles are applied throughout the software development lifecycle to design and build systems that are inherently scalable, resilient, and responsive. This involves architecture reviews, capacity planning, bottleneck identification, and optimisation techniques to enhance system performance.
3. **Integration with CI/CD Pipelines:** Performance testing is seamlessly integrated into Continuous Integration and Continuous Delivery (CI/CD) pipelines, enabling automated testing as part of the development and deployment process. This ensures that performance considerations are addressed early and consistently throughout the software lifecycle.
4. **Validation of Key Performance Indicators (KPIs):** Service includes defining and validating key performance indicators (KPIs) such as response time, throughput, latency, resource utilisation, and error rates. These KPIs serve as benchmarks to measure system performance and identify areas for improvement.

5. **Comprehensive Test Scenarios:** A wide range of test scenarios are developed and executed to simulate real-world usage patterns and scenarios. This includes testing under normal, peak, and stress conditions, as well as scenarios involving data-intensive operations, concurrent users, and network variability.
6. **Chaos Engineering and Fault Injection Testing:** The service incorporates chaos engineering principles to proactively identify and address system weaknesses and failure modes. Fault injection techniques are used to simulate and validate the system's behaviour under adverse conditions, such as network failures, hardware faults, and software errors.
7. **Security and Compliance Testing:** Performance testing is conducted in conjunction with security and compliance testing to ensure that performance optimisations do not compromise system security or regulatory compliance. This includes testing for vulnerabilities, data privacy concerns, and adherence to industry standards and regulations.
8. **Reporting and Analysis:** Comprehensive reports are generated to summarise test results, performance metrics, and recommendations for optimisation. Performance data is analysed to identify performance bottlenecks, scalability limits, and areas for improvement, enabling informed decision-making and continuous refinement of the system.
9. **Continuous Monitoring and Optimisation:** Performance monitoring tools and techniques are employed to continuously monitor system performance in production environments. This enables proactive identification of performance issues, capacity planning, and ongoing optimisation efforts to maintain optimal system performance over time.
10. **Collaborative Approach:** Performance testing and engineering are conducted collaboratively with cross-functional teams, including developers, testers, architects, operations engineers, and business stakeholders. This ensures alignment with business objectives, timely feedback, and collective ownership of performance goals.
11. **Test Data Management:** Managing test data with volume and accuracy, especially in the context of cloud variability and data lifecycle challenges, requires a nuanced approach. Understanding the dynamic nature of cloud environments and the complexities of data lifecycle management is crucial. Organisations should employ strategies such as data profiling, synthetic data generation, and data sub-setting to generate representative datasets while addressing scalability and variability. Automation tools can streamline data provisioning processes, ensuring efficiency and accuracy. Additionally, implementing data masking, anonymisation, and encryption techniques can safeguard data privacy and security throughout its lifecycle in the cloud. Continuous monitoring and governance mechanisms are essential to maintain data integrity and compliance, mitigating risks associated with cloud migration and modernisation efforts.

In summary, comprehensive performance testing and engineering services provide a structured and proactive approach to ensure the performance, scalability, reliability, and resilience of software systems, thereby enhancing user experience, mitigating risks, and maximising business value.



Key features

1. **Comprehensive Testing Coverage:** HARC services understanding the Buyer's requirements, covers various aspects such as load testing, reliability, resiliency, chaos, edge-cases, security, cost impact, stress testing, scalability testing, endurance testing, and spike testing to ensure the application's robustness under different conditions, variabilities, and workloads.
2. **Realistic On-demand Test Environments:** The service provides realistic test environments that closely resemble production settings to accurately simulate usage and patterns, including multiple variability conditions, and configurations. Test automation ensures automated environment provisioning and decommissioning part of the automation with predicted cost forecasting & budgeting.
3. **Scalability Testing:** Testing the application's ability to scale up or down to handle varying loads and user concurrency levels is crucial for ensuring optimal performance under peak demand scenarios. This will also provide full visibility of cost variances during these conditions and appropriate alerting, forecasting & budgets to be devised.
4. **Observability:** Observability serves as a cornerstone principle within the HARC framework, providing organisations with comprehensive visibility and reporting capabilities. By enabling 360degree visibility, HARC empowers organisations to measure business and IT KPIs/SLOs. This holistic approach ensures that all aspects of the cloud environment are continuously monitored and optimised to enhance overall business and end-user experience.
5. **Performance Tuning and Optimisation:** Identifying and resolving performance bottlenecks through code optimisation, database tuning, caching strategies, and infrastructure optimisation techniques to improve application performance.
6. **Security Testing:** Performance testing services should include security testing to assess the application's resilience against security threats such as DDoS attacks, SQL injection, cross-site scripting (XSS), and other vulnerabilities.
7. **Cloud Variabilities:** Testing the application's performance in cloud environments, including public, private, or hybrid clouds, considering factors such as network latency, data storage, and scalability of cloud resources. Cloud possesses multiple variabilities to traditional performance testing, which is well understood by HARC engineers providing appropriate service.
8. **Mobile Performance Testing:** Evaluating the performance of mobile applications across different devices, platforms, and network conditions to ensure a consistent and responsive user experience.
9. **Continuous Integration and Delivery (CI/CD) Integration:** Integrating performance testing into CI/CD pipelines to automate testing processes and enable early detection and resolution of performance issues throughout the software development lifecycle.
10. **Reporting and Analysis:** Comprehensive reporting and analysis of test results, including performance metrics, trends, and actionable insights, to facilitate informed decision-making and continuous improvement of application performance.
11. **Collaboration and Communication:** Effective collaboration between development, testing, and operations teams, along with clear communication of test results, findings, and recommendations, to ensure alignment and accountability in addressing performance issues.
12. **Compliance and Regulatory Requirements:** Ensuring that performance testing services comply with industry standards, regulations, and best practices related to performance, security, and data privacy to mitigate risks and maintain trust with stakeholders.
13. **Cost Impact evaluation:** Recognising the significance of FinOps, cost visibility, cost optimisation, showback & chargeback, and fostering cost-conscious engineering teams in cloud environments, we have integrated these principles into the HARC framework as part of testing services.

Benefits

- Cost Optimised − 35% reduction through modern engineering principles.
- Reliable − 60% reduced risk
- Always-On − 15% operations efficiency with improved reliability.
- Integrated and seamless

95%

Reduction in Manual Coding Efforts

Automate code life cycle and improve cloud efficiencies with Hitachi Cloud Accelerator Platform.

85%

Increase in Engineering Team productivity

Accelerate your journey to cloud with best-practice processes and blueprints-based automation resulting in 7 months of saved time for cloud migration.

114%

Modernization Project ROI

Maximize value of cloud by rehosting and optimizing enterprise applications without rewriting.

100%

Consistent Deployments

Automate infrastructure creation and deployment with proven, efficient and on-time delivery.

Case Study

Large US Material Testing Legal Service Provider

Comprehensive performance and stability assessment enterprise application to resolve stability and performance issues that impacted productivity and experience of end users of the application.

60% Improvement of availability	**20** Application issues identified and resolved	**40%** Increase in performance
Database index optimization	Design change to improve **Database performance**	**Addressed tech debt** related to app libraries

What is done?

Application profiling	Detailed DB analysis	Performance reports and alerting analysis
Performance monitoring	Infrastructure analysis	Developer feedback
Load and volumetrics	Operations and communication frameworks	Performance monitoring tool gap analysis

Qualifications

ISO 9001
ISO 27001
Cyber Essentials Certified
DSPT Certified
AWS Premier Tier Services
AWS Managed Service Provider
AWS Public Sector Partner
AWS Solution Provider Program
AWS − APN Immersion Days
Select Databricks Partner
Microsoft Solutions Partner: Infrastructure
Microsoft Solutions Partner: Data and AI
Microsoft Solutions Partner: Digital & App Innovation
AWS Oracle Competency Partner
Google Cloud Premier Partner
AWS Premier Consulting Partner
Oracle Global Cloud Premier Elite Partner
IoT approved Oracle Partner