Optimised Digital Transformation for Data Services

Fujitsu Data Services for Financial Services

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1. Introduction

Technology is changing at an alarming rate and new digital enablers – such as Cloud Enabled Analytics, Open Data, Client APIs, Microservice Ecosystems, Virtual Assistants, etc. provide opportunities to create new business models and products. Born-in-the-cloud companies are disrupting the market and the established companies are struggling to adjust because their legacy systems are less flexible and much harder to adapt. Now business lines are developing their own new capabilities, increasing the pressure on the IT operation, while ever present budget constraints push the organisation to its limits. Meanwhile the hyper-connected world is exposing a new set of cybersecurity vulnerabilities, making data breaches and system outages a regular occurrence. Public trust in corporations is reducing[1], and in response regulatory powers are increasing[2]. Legacy platforms – historically low on the priority list – are no longer flexible and secure enough.

> Recent research on behalf of Fujitsu shows that 39% of the public trust organisations less than they did five years ago, whilst 73% of business leaders believe technology will be vital to their future success.

Through the transformation of Data Management Services, organisations can remedy the cyber vulnerabilities and constraints caused by the legacy database estates. Instead of being a constraint to progress digital transformation, data becomes an asset and enabler of change. The combination of automation and the migration strategies to new technology and cloud platforms provides a springboard to develop new capabilities. Cost savings achieved from standardising the database platforms and associated services enables increased investment in new initiatives. As data becomes more accessible the ability to effectively leverage it to measure business strategy, drive enabling change and gain competitive advantage becomes paramount.

To help companies address these challenges, Fujitsu have developed a complementary set of Data Services, (see Figure 1), covering Lifecycle Management Programme, Digital Transformation, Service Management and Automation. Through these services, we help organisations deliver the following outcomes:

1. **Reduce Risk:** Of cyber vulnerabilities and regulatory compliance risk by eliminating End of Service Life (EOSL) databases and platforms through upgrade or securely isolating the workload.
2. **Reduce Cost of Ownership (TCO):** By reduction of fixed license, support and platform cost through a usage-based model, as well as automation to optimise operational management and end-user experience.
3. **Improve User Experience (UX):** With Database Services through committed Service Levels, as well as self-service and automation, providing a relevant service to internal and external users.
4. **Accelerate the pace of change:** At which digital transformation can be executed to increase revenue and facilitate new business models. The enhanced and managed data services enable a data platform capable of delivering business insights and innovation. Business and applications services can be implemented faster and more effectively, and the transition to new (data) services is managed using proven methodologies.

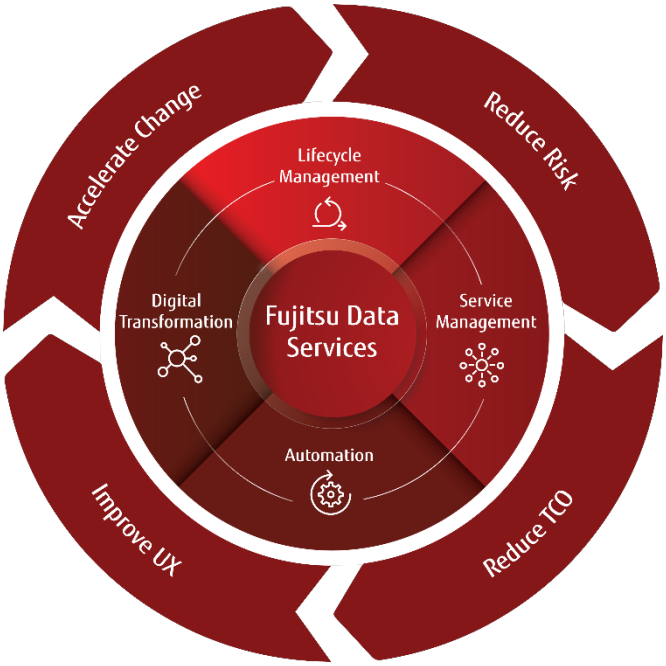


Figure 1: A complementary set of capabilities make up the Fujitsu Data Services

This paper outlines these capabilities and how they will deliver these outcomes.

[1] As found in the Fujitsu Global Survey 2019
[2] According to the Treasury Select Committee report "IT failures in the Financial Services Sector", published 28 October 2019

2. Lifecycle Management

To address EOSL database platforms Fujitsu has created an Adapative Transformation Factory. Using our understanding of the complexity of enterprise transformations, we have developed a methodology (Figure 2) that demonstrates the business value of upgrading, reduces the risk and simplifies the end to end process for business-critical environments.

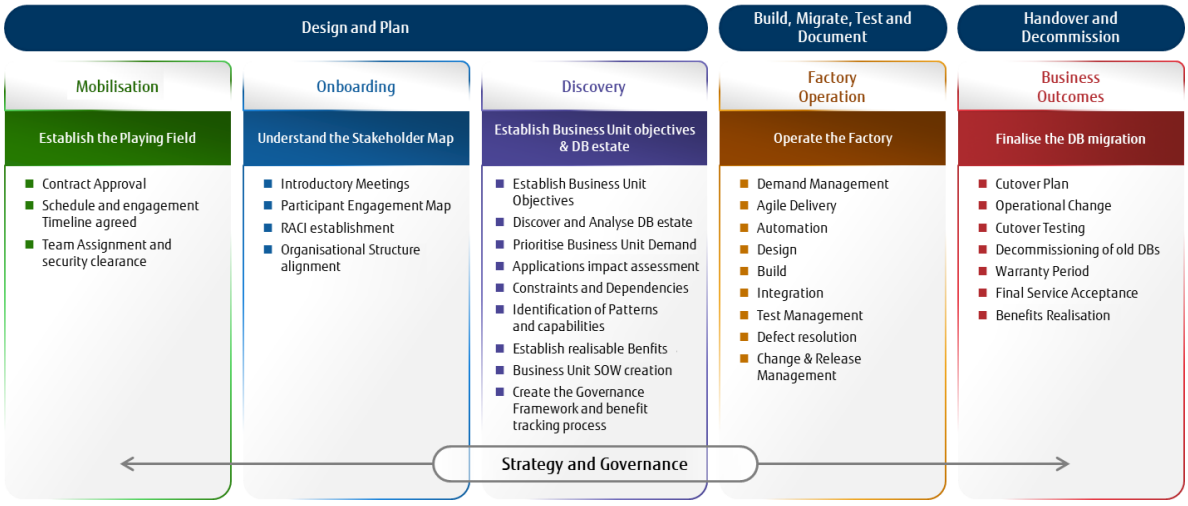


Figure 2: Our Database Transformation Factory Methodology is built around maximising business value

Combining business priorities, operational constraints, innovative commercial approaches and an enterprise scale agile working model, the Fujitsu Lifecycle Management Programme provides a structured, flexible and low-risk approach to remediating EOSL database platforms. Enabling the reduction of cybersecurity risks, reduction in costs, increased time to market and an overall simplification of the database estate.

2.1 Factory Model

We begin by establishing the measurable and strategic management of your database transformation need, facilitating workshops with your stakeholders from across the technical, application, business, security and governance domains, to establish the guardrails for the Factory, confirming the business demand and prioritise deliverables.

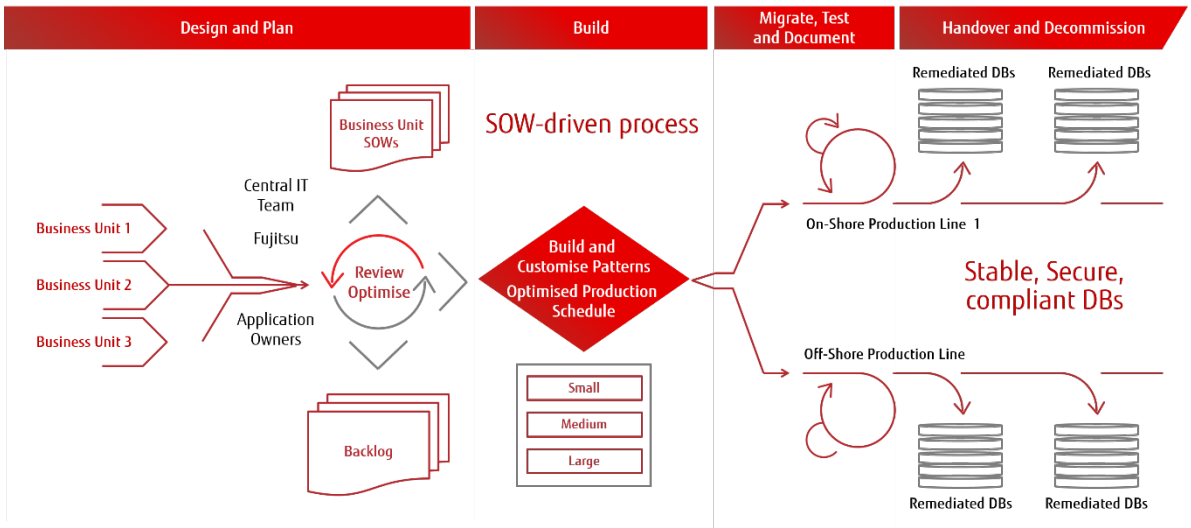


Figure 3: Accelerated Delivery of Database Upgrades

The backlog of Statements of Work (SOW) is agreed with the Business Units and captures the level of management, scope of additional services and pace of change needed per business. Discovery, automation tooling and organisation specific pattern creation optimises the delivery according to your unique needs. We dynamically scale our factory capacity and throughput according to your demand to meet your timeline objectives.

2.2 Digital Security

We ensure your organisations application and data security, regulatory compliance and data privacy are properly accounted for in the factory. These requirements, dependencies and constraints are also used in our demand prioritisation process at a level to your organisations risk appetite. You may have specific security concerns relating to the current environment and the risk exposure that end of life assets can bring, this along with understanding the classification of data and its sensitive, further bounded by internal control requirements and regulatory requirements can be used to determine the priority and demand for the factory. Maintaining digital security throughout the transformation is essential, and your organisation specific requirements will be incorporated into the existing security patterns used by the factory. Special attention is required for the databases that must be retained in order to mitigate the impact of any security breaches. EOSL databases are more vulnerable to cyber security breaches, as patching is limited. Isolating the infrastructure supporting these databases from the core business infrastructure can limit the blast radius of any incident.

Based on our assessment up to 20% of EOSL environments are in a purely sustaining state; this means that they will ultimately be decommissioned or potentially refactored. These "die on the vine" environments cause the biggest challenge to organisations trying to realise the benefits of a strategic transformation programme. Long lived EOSL environments generally appear on transformation plans as "marked for decom", in reality, there are always higher priorities which mean that planned decom dates are seldom achieved, and inevitably long-lived legacy environments persist far beyond their planned decommission dates.

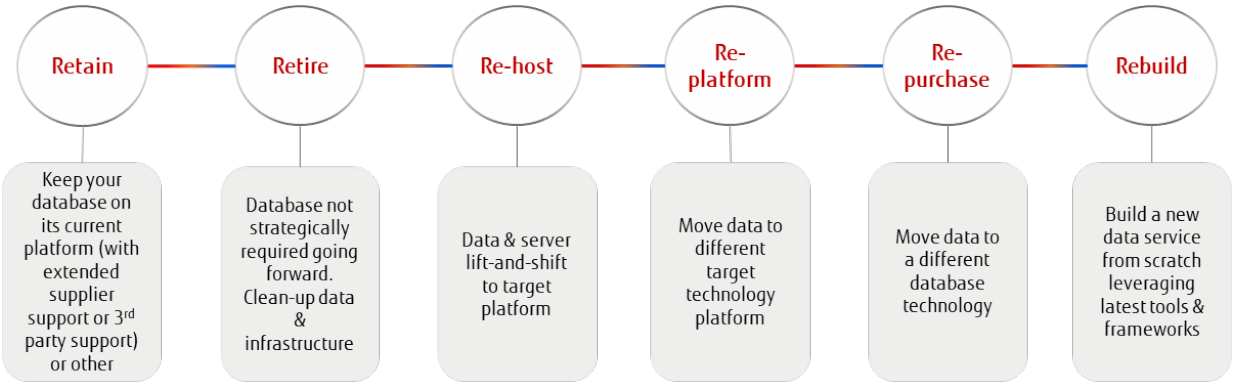


Figure 4: The 6R strategies for remediating legacy databases

It is critical to accept that long lived EOSL environments are an organisational reality, they will persist in the environment, and they are a fundamental part of the transformational challenge Ignoring them will stall or significantly delay the benefits that can be achieved through transformation.

We address this challenge by reducing the business exposure and risk associated with such environments. This provides an additional layer of security, segmentation and isolation to ensure that "die on the vine" environments are safely maintained within an optimised footprint that does not stall transformation activity, and which represents the least cost to the business and provides the highest level of security and assurance possible.

2.3 EOSL Remediation Benefits

Our Refresh Programme provides a structured and flexible approach to address the cyber vulnerabilities posed by the technical debt that has been built up in EOSL databases, and the associated regulatory compliance issues. The result is a simplified, ever-green data services estate that is more cost-effective to procure, support and manage, and enables acceleration of the digital transformation agenda. The outcomes are listed in Table 1 below.

Outcomes	Benefits
Business driven engagement model	Reduce the risk and complexity of enterprise-scale transformation Address cyber security as an intrinsic part of the transformation Business-aligned commercial structure Scalable, global delivery capability
Removal of technical debt in EOSL databases	Reduction in cyber vulnerabilities and regulatory compliance risk
Removal of extended or 3rd party support arrangements	Reduced support cost
Standardised database platforms with enhanced automation	Reduced operational cost
Maintaining long lived End of service Life environments	Consolidate, optimise and protect long lived EOSL environments Provide isolation and segmentation that significantly reduces the business and security risk associated with long lived EOSL environments Enterprise-grade security and isolation technology that can be widely adopted to address long lived EOSL environments

Table 1: Outcomes and Benefits delivered by the Database Transformation Factory

3. Enabling Digital Transformation

Born in the cloud neobanks are disrupting the market because they provide customer-centric services, leveraging the full power of public cloud capabilities. They have the ability to start small and scale in response to demand, rapidly developing new features in response to changing market trends. Traditional banks face the choice of adopting different strategies to maximise the benefits that public cloud can offer, balancing the intrinsic power of their existing operations with the agility and innovation of cloud services.

Pivoting the organisation to cloud can be an organisational challenge, as it requires different skills and resources. With increasing pressures on operating budgets, the existing team is often too overstretched delivering the ongoing services. They lack the time and knowledge to effectively design and implement new services, impacting on the pace and success with which digital transformation can be implemented. We can help you by leveraging our experience of implementing digital transformation in financial service companies, combining business and technical knowledge to advise and support your teams. In addition, we have a scale and resources to accelerate the transformation.

Our consultants are supporting a US-based customer to disrupt the market through digital transformation. We work closely with stakeholders to define the strategic objectives and roadmap. We are now managing a multi-year programme, and multiple partners to modernise or retire 2,400 enterprise application systems and consolidate data centre and hybrid cloud deployment. Based on our recommendations the customer has been able to take out $125M from an $800M IT investment portfolio.

With a long history of providing services and platforms, we support many of our customers with the journey from legacy platforms to a hybrid and multi-cloud estate. We can help you:

- Define a strategy and architecture for accessing and managing data in the cloud, and accelerating innovation and growth in the market
- Optimise cloud economics through the use of cloud native and open source data services
- Migration and masking of non-production databases to leverage the consumption-based infrastructure and increase time to market of new features
- Improve data insights from effective data management

Here we discuss some specific examples how we can help our finance customers accelerate their journey to the cloud.

3.1 Optimised Delivery via our Adapative Transformation Office

Our Adapative Transformation Office capability manages the lifecycle of the Database Transformation Factory. Its purpose is to proactively and effectively manage our relationship with your organisation and its needs, to ensure our deliveries align with your agreed strategic goals. We invest real effort to properly understand your organisation and its needs, prioritising our work to meet your objectives in a measurable manner that focuses on delivering quantifiable business benefits – all within the framework of digital security.

Figure 5: Our Digital Transformation Office collaborates closely with customers to enable the strategic business outcomes

- **Relationship Refinement** establishes and comprehends your organisation, meeting with your stakeholders and consumers to build the relationships we need to effectively manage our engagement with your organisation.
- **Journey Discovery** runs targeted workshops with you to understand your system landscape, strategic change needs, security, privacy, and the dependencies the Factory will need to operate under.

- **Journey Definition** details and agrees the capabilities and patterns the Factory will provide and realisable benefits that need to be delivered
- **Journey Prioritisation** provides a clear view to your stakeholders of the various consumer demands and their benefit to your organisation to agree the resulting prioritised demand backlog and create the needed SOWs for the factory.
- **Digital Security** ur team will work with your security, privacy and business representatives to capture the security, privacy and regulatory requirements needed for the Factory deliverables, and to define the operational security controls that you will need the Factory to enforce.

3.2 Migration of non-production databases to Public Cloud

Many global financial service institutions are leveraging the consumption-based cloud platforms to support the fast-changing development and test environments. As illustrated in Figure 6, we are helping financial customers securely provision data, on-demand, into cloud-hosted databases using tools such as Delphix. Through a combination of automation, virtualisation and data masking, the entirety of the non-production environments becomes consumption based, accessed through self-service and securely masked to comply with data protection regulations. This enables the refactoring of applications and the underlying data into cloud-native solutions.

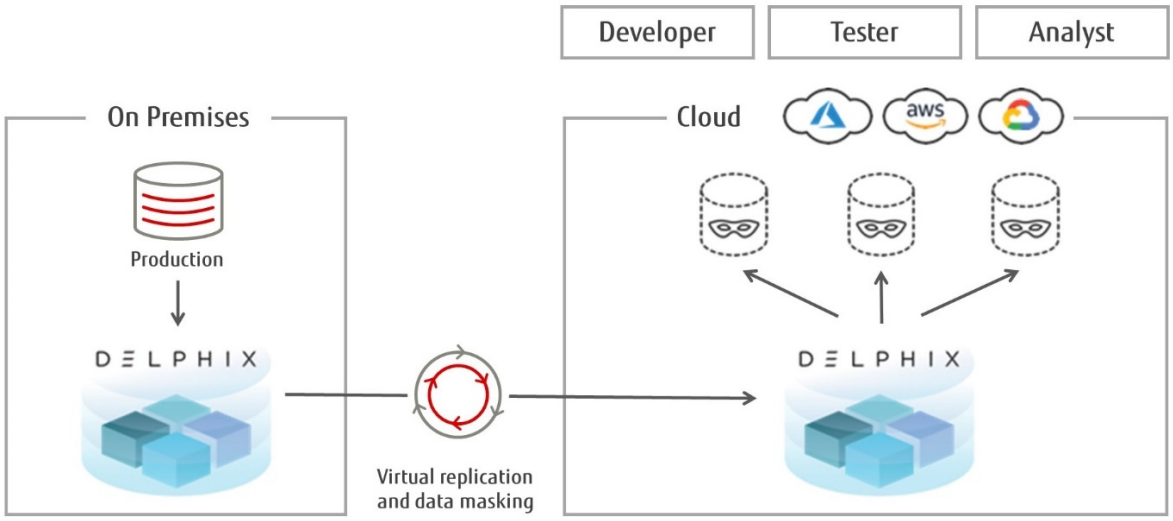


Figure 6: Delivering data securely and on demand into any cloud environment to support shortened development lifecycles

3.3 Migration to Postgres

With a range of Open Source and cloud data services now available, supported by scalable and increasingly powerful infrastructure, global companies are reviewing their data service platforms. As illustrated in some of our case studies in Section 7, we have helped a number of customers transform from legacy database platforms, to open source PostgreSQL on cloud infrastructure.

For a global investment bank, we migrated their Oracle estate to cloud-hosted FUJITSU Enterprise Postgres, saving the customer $10M AUD in legacy license costs for production, expediting their new Risk Management

We have over 20 years' experience in working with Open Source Technologies including PostgreSQL. Fujitsu has an enterprise distribution of PostgreSQL called Fujitsu Enterprise Postgres (FEP). FEP presents a lower cost of ownership, open standards, multiple support options, plus 100% compatibility with PostgreSQL. It leverages the strength and reliability of PostgreSQL with enhanced features such as one-click backup and recovery, redundancy, secure data encryption and advanced compression. FEP has additional capability for extra security (enabling true DevSecOps) and enhanced performance with VCI. We have used FEP as part of a number of large scale digital transformations, and have incorporated the best practice and lessons learnt into our solution, service and methodologies. These are the reasons why a number of government and enterprise customers have chosen FEP as a viable alternative to proprietary databases such as Oracle, SQL Server and Sybase.

3.4 Cloud Transformation Benefits

The overall benefits are outlined in Table 2 below.

Outcomes	Benefits
Value-driven transformation strategy	Manage stakeholder expectations Transformation roadmap based on incremental business value Governance and assurance incorporated from the outset
Virtualised data provisioning to public cloud	Reduction in storage cost through on-demand virtualised data Reduction in platform license cost through increased utilisation of database instances Increased cost transparency through consumption-based infrastructure and platform Increased uptake of public cloud services Accelerate regression testing for data migration
Self-service provisioning of data into non-production databases	Reduction in test cycle times Increased speed to market of new features Increased developer productivity Increased application quality through availability of high-quality production-like data Reduction in operational management
Integrated data masking	Compliance with data protection regulations Reduced software development cost through increased utilisation of off-shore development teams
Supported, enterprise-scale open source database	Reduced license cost Flexibility to support scalable, secure applications in modern, dynamic environments such as private, public and hybrid cloud Supports a multi-cloud strategy required by regulators Enterprise-grade scalability, availability and security

Table 2: Benefits of Enterprise Digital Transformation Services

4. Automation

Fujitsu's database platform automation capability is a critical component in our wider Data Services offering. We've abstracted our deep domain expertise across multiple database technologies – Oracle, SQL Server, PostgreSQL, Delphix, and others – and combined it with open-source automation and declarative development methodologies from the cloud-native world.

The result is a set of standardised, API-driven database platform automations that cover the entire support lifecycle, from infrastructure build, through database creation, configuration and planned maintenance, to end-of-life and eventual decommissioning. We present the reliable, tested and standardised automations via a user-friendly browser-based interface and as REST API endpoints. This removes the dependency on scarce, expensive and highly-trained technical resources to manage the database lifecycle; – developers, testers and application owners can all have self-service access to their own database configurations. Our approach helps you avoid one-off point-solutions and database configuration drift, your key users select from a pre-configured service catalogue designed to satisfy your critical non-functional requirements around availability, performance and recoverability. This applies – whether you need a business-critical 24/7 customer-facing application, or a one-time dev database that's created for a single regression test and decommissioned immediately afterwards.

> We're helping a European investment bank implement Open Source database lifecycle automation using Ansible. This will save the bank £2M annually in vendor specific license fees, as well as providing a unified automation framework across different database technologies.

All of our database automation end-points are secured, with access control that can be integrated with your existing enterprise security framework. All API calls are logged and audited, and resource consumption on the entire managed database platform is monitored against quotas that you control and allocate centrally. We integrate with your existing credential management systems to keep privileged admin accounts fully protected – our automation layer allows you to restrict privileged access to only those instances where it is truly needed.

4.1 Standardised API-driven database lifecycle

The use of database automation API end points removes the need for administrators to log in directly at the command line to access databases and their underlying hosts. This ad-hoc command-line access can be difficult to audit, monitor and control, and is therefore a significant potential security vulnerability. It also opens up the possibility of costly human error.

Our thoroughly-tested API-driven lifecycle automations can be tailored to your mandated security, compliance and audit rules and consistently applied for all privileged database access. There is no longer a need to grant direct access to high-privilege accounts for routine administration activity, consistency is assured and the chance of misclicks or user error eliminated.

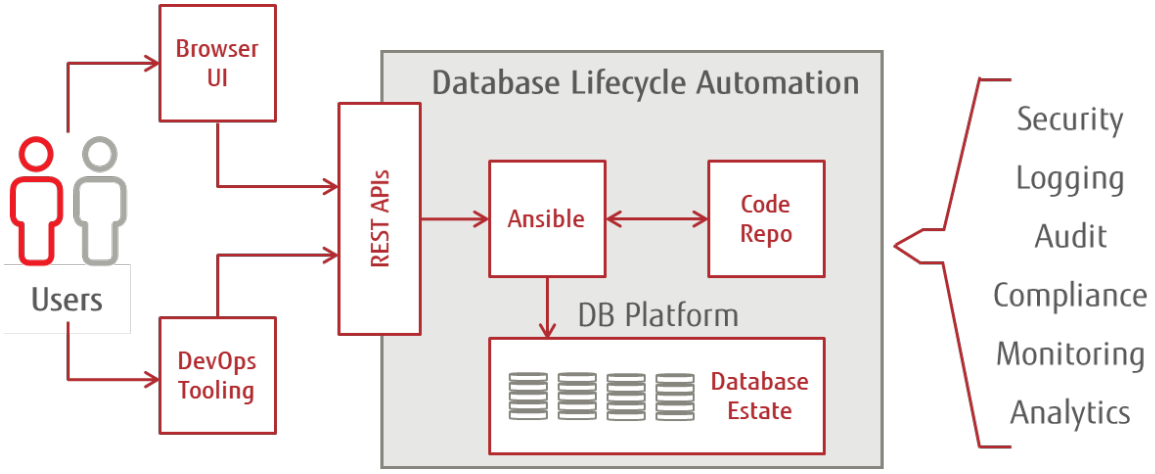


Figure 7: Our database platform automations are accessed only via secure, standards-based REST APIs

Our standardised API specs remove the need for your database administrators to learn technology-specific toolsets, and when integrated as part of a DevOps toolchain they can significantly reduce test cycles from weeks to hours. This improves the time-to-market for new features, reduces the cost of change and, when offered as a self-service capability to the application owner and developers, can increase productivity and satisfaction levels. These techniques are also key to enabling the move to cloud platforms.

Similarly, we use the same lifecycle automation for the upgrade, migration and transformation of databases, as part of our own database transformation factory.

4.2 Using Ansible for database platform automation

Fujitsu has standardised around the use of Ansible for orchestration tooling, based on our long-term experience of cloud-native development from within our Application and Multi-Cloud Services (AMCS) team. There are several advantages:

- Ansible has become the leading open-source orchestration technology
- There's an extensive knowledge base of pre-built Ansible modules and roles – both those that are built into the standard product distribution, and those in the community-maintained Ansible Galaxy
- Simple syntax and pre-built components mean that the barrier to entry for new Ansible deployments is low – new users and new implementations become fully productive very quickly indeed

We've built the critical database lifecycle management features in Ansible already, and our hands-on experience shows that it's easy to extend those capabilities to pick up new use cases, or specific integrations.

```
- name: Installing db and checking status
  hosts: "{{ hostgroup }}"
  vars:
    hostgroup: "{{ tower_inventory_name }}"
  vars_files:
    - "{{ playbook_dir }}/group_vars/{{ hostgroup }}/passwords/db_passwords.yml"
    - "{{ playbook_dir }}/group_vars/{{ hostgroup }}/deploy_db.yml"
    - "{{ playbook_dir }}/group_vars/{{ hostgroup }}/databases.yml"
    - "{{ playbook_dir }}/group_vars/{{ hostgroup }}/db_health_checks.yml"
  become: true
  tasks:
    - name: Installing the database with automated failure health checking and remediation
      block:
        - name: CX-ORACLE | Installing cx_Oracle from local files using pip if unavailable on target
          include_role:
            name: cxoracle

        - name: Gold Image Deploy | Laying down the GOLD image.
          include_role:
            name: gold-image-deploy
          vars:
            oracle_user: oracle

        - name: Manage DB | Creating the Databases
          include_role:
            name: oradb-manage-db
```

Figure 8: Code snippet from a Fujitsu-developed Ansible playbook that automates database admin

Where we need to use a vendor-specific tool to manage detailed database configurations, – whether that be an Oracle database, SQL Server, PostgreSQL or any other – if it doesn't already have an Ansible-friendly presentation that's readily available, we code a minimal wrapper around the vendor's tool so that it can easily be invoked and parameterised as a task in an Ansible playbook. The result is a library of re-usable components that further speeds our delivery.

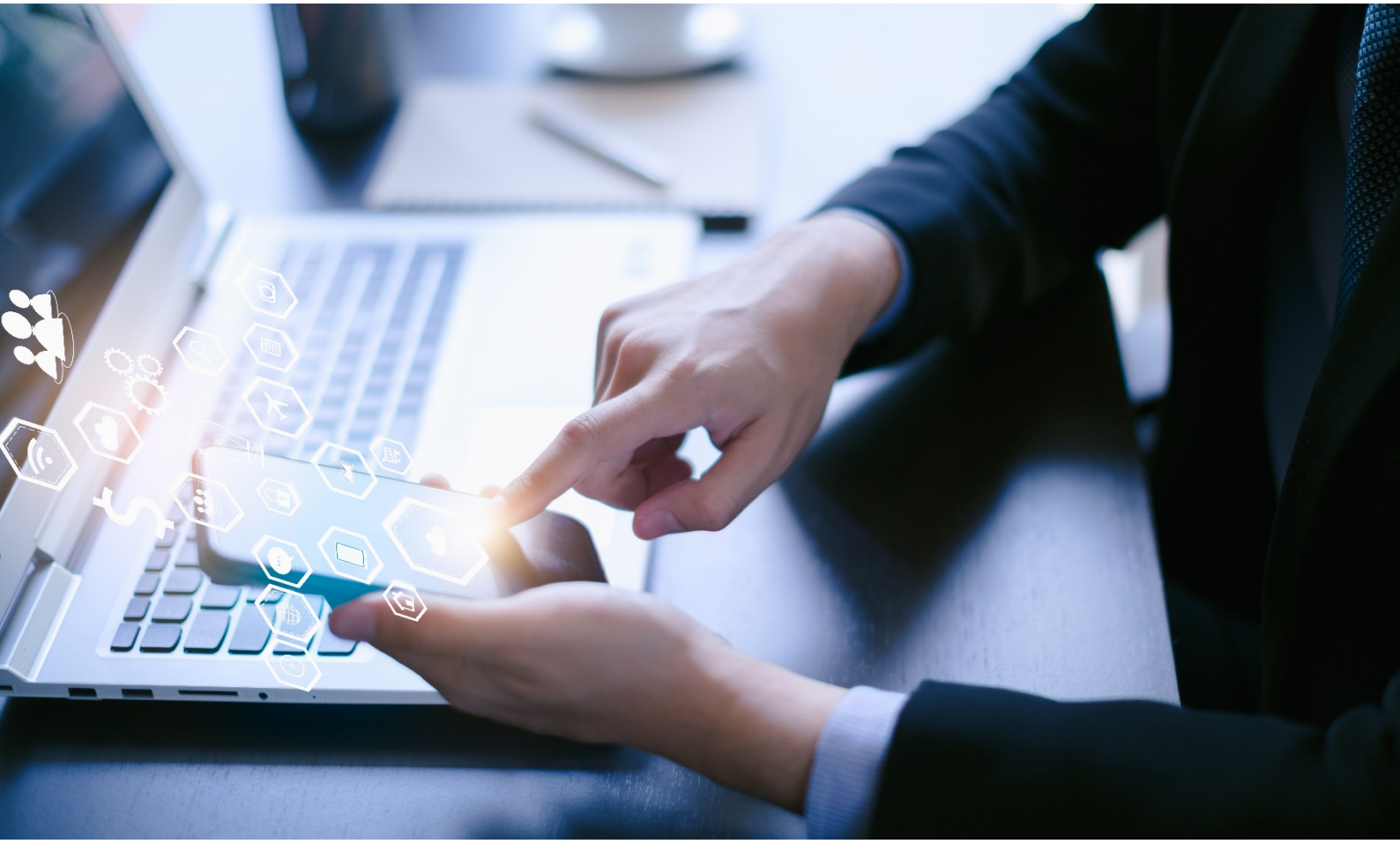
By using our automation platform, you free your staff from having to deep-dive into vendor-specific syntax before they can automate common administration tasks.

4.3 Benefits of Automation

Additional benefits are listed in Table 4.

Outcomes	Benefits
Automated database lifecycle	Remove dependency on proprietary tooling (e.g. OEM, HP CSA) and hence reduce vendor lock-in Consistent standards-based deployment, compliance and security model Reduced operating costs Cheaper and more readily available resources Fully extensible to include all database technologies – Oracle, PostgreSQL, SQL Server, Delphix etc.
Standards-based REST API access	Regulatory compliance is built directly into the API definition No need to grant direct access to privileged accounts Increased security Consistent outcomes with reduced human error
Self-service, browser-based user interface	Free your application owners and development teams to manage their own dev/test database requirements Easy and direct access for each application team Visibility and control of resource usage per application

Table 3: Benefits of Automation of Data Services



Effective Service Management

Operating an estate of database platforms provides many challenges to businesses today. With the pace of change increasing and an ever present focus on cost and efficiency, businesses are looking to focus on what really matters to them while assured that the technology on which it depends is available, performant and secure. Managing the technology, which underpins an application, is essential but not core to the business focus.

Maintaining a team of skilled and talented professionals to manage the technology on which business critical applications depend is costly. As competitive advantage drives initiatives towards cloud-based services, individual business units may progress at different rates and with different clouds suiting their applications best. In its wake there is often an ageing estate of database technology still to manage, as illustrated in Figure 9. These multi-hosted databases all need to be maintained and kept available. Data needs securing against the latest security vulnerabilities and controls are required to be in place to ensure industry compliance and corporate policy.

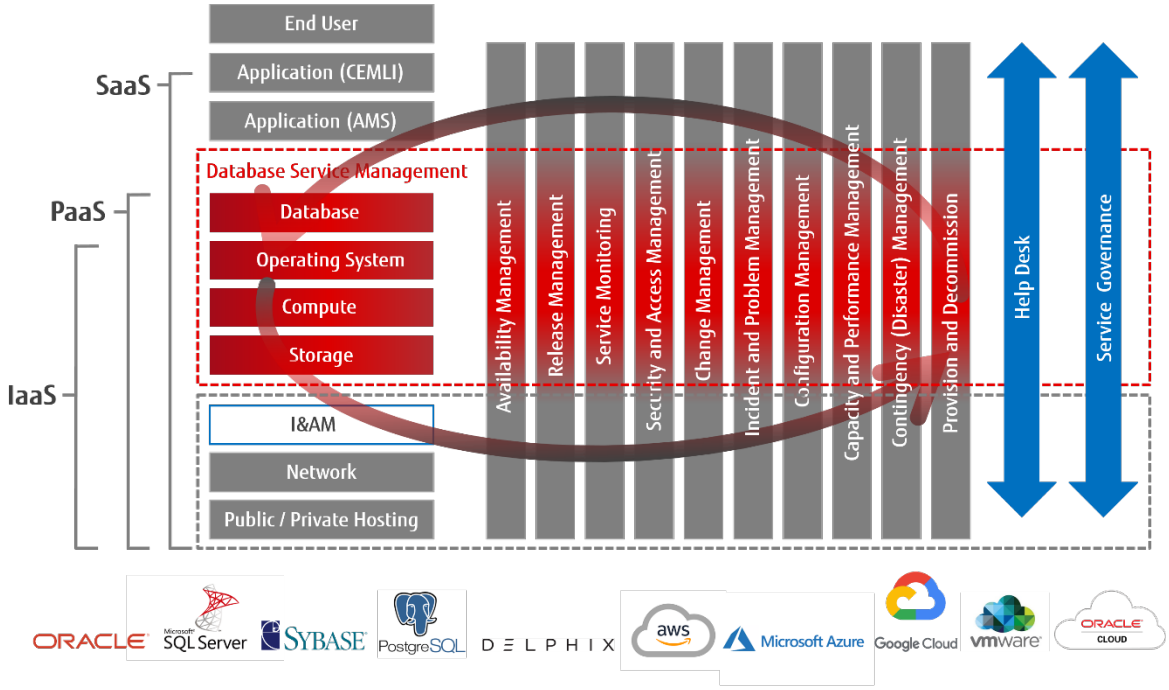


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Figure 9: Operating an estate of wide-ranging infrastructure and database platforms to provide consistent and compliant data services requires a complex suite of skilled resources

We can alleviate the pressure across all business units to focus where they need to, by providing ongoing management of databases, and the underlying infrastructure, critical to the business. Leveraging Fujitsu's global investment in certified and skilled engineers and class leading multi-cloud service delivery management, we can deliver cost effective management of your databases, at scale, where you need it and while delivering the outcomes needed to meet your business demands.

Key Features:

- Scalable, Service Level driven and outcome based database management (Oracle, SQL Server, PostgreSQL, Sybase, etc.), delivering predictability and reliability through Fujitsu standards and expertise to allow you to focus on your business.
- Consistent delivery utilising industry best practices with customer security at the heart of what we do.
- Named service delivery manager for incident escalation, service and account reviews.
- 2nd Level support desk to manage ticket receipt and response, assign Fujitsu resolver groups, manage incidents.
- 24/7 remote proactive database instance monitoring and backups.

- Certified database engineers:
  - Problem resolution and Root Cause Analysis (RCA)
  - Proactive and preventative maintenance
  - Database tuning and performance recommendations
  - Capacity Management
  - Backups
- Disaster Recovery assistance and testing
  - Manage and maintain DR plans for databases as part of overall business continuity
  - Participation in periodic DR testing as required

5.1 Benefits of Effective Managed Service

Overall, the Database Managed Service will provide an optimised service at agreed terms, which can simplify the operation of the estate, allowing your teams to focus on your business. Further benefits are outlined in **Table 5** below.

Outcomes	Benefits
Standard SLAs	Consistent service quality management across database and infrastructure platforms Consistent SLA achievement and better customer experience Governance transparency Minimise operating cost
Managed Service Partner	Skilled resources on demand Optimised service workflows and processes Single user interface for all service requests globally Consolidation and optimisation of technologies, tools and processes
Outcomes-based commercials	Discounts on licenses and support Consumption-based cost profile One vendor delivery team to interface with you on global performance management

Table 4: Benefits of a Database Service Management Solution

6. Customer Stories

Global Investment Bank: Reduce time to market to achieve business growth	
Customer Challenge	In order for the customer to be able to respond to the rapid technology changes in the global financial market, they were looking for a partner to guide them on the journey. They wanted to improve delivery quality, reduce cost as well as improve service innovation through automated processes using AI / ML, insight through Data, Multi-Cloud portability for Application and Data services using DevSecOps and use of emerging technologies. Global and national regulatory changes required the customer to adopt a data strategy that transcends current siloed approach. Rapidly changing regulated market changes - deployment of new Risk Management software proprietary database was cost prohibitive, open source was a choice, but the customer needed assurance with secure fast and warranted software.
Our Solution	Results Chain™ to provide visualisation of the alternatives, value-based comparisons, and decision tree support. A target architecture leveraging multi-cloud, open source and COTS solutions. Toolsets to enable automation of the migrations to accelerate.
Outcomes	Data Migration from legacy to Open Source based technologies such as Fujitsu Enterprise Postgres and TimeScale. $10M AUD savings in legacy license costs for production and were able to expedite new Risk Management platform. Using APIs to deliver innovative new offerings to customers via the cloud such as Open Banking, Artificial Intelligence, Big Data, Blockchain and Internet of Things. Managing their ecosystem of platforms, applications and data to ensure compliance with the latest financial services sector relevant regulations and requirements. Combination of on, near and offshore resources to match the customers operational model and bring experts to the customer.

A financial service regulator: **Mission-critical Oracle Exadata upgrade**	
Customer Challenge	A regulator for 58,000 Financial Services firms with a number of their critical business services underpinned by the Exadata platform. Stringent performance, availability and security controls were implemented. The platform included a number of operating systems and support from an array of third parties. At the end of 2017 the Exadata platform, operating systems, RDBMS and applications were approaching end-of-life. This situation posed an unpalatable risk profile to the regulator. Fujitsu was engaged to transition from the legacy platform to a new highly scalable platform providing Data as a Service. In line with government directives, the client was looking for a cloud roadmap, with a secure cloud solution.
Our Solution	In close partnership with Oracle, we delivered the first Oracle Exadata cloud@customer solution in Europe. In order to achieve fixed timescales driven by the end of support dates, we implemented an agile, rolling migration plan, orchestrating on- and near-shore resources to achieve optimal value.
Outcomes	Successfully completed migration of mission-critical business services to the private cloud infrastructure to time and budget, resolving the customers risk position. 25% estimated savings on the operating cost. The new ExaCC service is fully managed and supported and provides increased levels of performance, availability and security, on a consumption-based charging and license model. Tailored services to suit the needs of the client – e.g. incident resolution SLAs, 24/7 monitoring, capacity reporting, patching aligned to its patch policy, etc.

A global retail bank: Enabling Cloud Transformation of Core Legacy Systems	
Customer Challenge	In order to accelerate their journey to the cloud this customer was looking for a technology-agnostic system integrator partner to guide them on the migration journey. The primary focus was on their large database on-premises estate which is utilising aging and costly infrastructure and unsustainable amounts of storage. As a financial organisation, concerns about data security in the cloud and system access from their global development teams outside of the EU is preventing them from realising the benefits of cloud.
Our Solution	In close partnership with AWS and Delphix we designed and implemented a Proof of Concept to technically prove the migration of Oracle database from customer on-premises infrastructure to the cloud to meet their extensive security and operational requirements. The solution included database virtualisation to address storage needs and data masking aligned to detailed customer security specifications.
Outcomes	■ Successfully completed virtualisation, masking and migration of customer Oracle databases to AWS utilising Delphix technology, meeting all customer security specifications. ■ Customer integrated migration model and processes were created working in close collaboration with the customer. ■ Enabled the customer to establish and certify a proven migration pattern for use by business application owners across their organisation.

A leading automotive company: Disrupting the market through innovation	
Customer Challenge	The client demanded a digitally disruptive response to rapidly changing automotive industry trends. They required a partner to disrupt and lead the mobility services market through improved speed to market and a redirection of efficiency gains towards autonomous vehicles and future innovative software.
Our Solution	Fujitsu guided the customer through the modernisation of 2,400 enterprise application systems, data centre consolidation and hybrid cloud deployment. Based on our understanding of the true value of Digital Transformation, we delivered end-to-end services for transforming and optimising the applications business processes and services landscape.
Outcomes	Recommended consolidating the order to delivery portfolio from 89 applications to 10; reducing the operations budget by $32 million. Sliced $125 million from an $800 million non-prod IT investment portfolio. Tripled the percentage of cloud hosted and cloud-native applications. Currently delivering, at scale, application migrations that allow for the close of existing data centres, stand up of new capacity, reduction of technical debt.

A large mobile telecoms company: Future-ready e-Commerce services using cloud and Open Source	
Customer Challenge	This customer has a huge volume of customers who interact with and transact through online e-commerce and registration service, involving millions of daily transactions. It was imperative that this crucial customer service was available and scalable in order to maintain a world-class customer experience. In 2018, the customer came to Fujitsu to work in partnership to find the best solution to this challenge. The ultimate goal of this project was to deliver a Cloud solution to deliver availability and scalability in order to maintain a world-class customer experience whilst also being compliant within the regulated telecoms industry imperatives. Fujitsu provided a full suite of cloud-related services to this customer – Amazon Web Services, Data Centre Hosting, Remote Infrastructure Management up to Application Development and Test, underpinned by operational services. The ongoing Fujitsu Service Management includes Incident Management, Problem & Change Management, Service Delivery Management and Capacity Management with a 24x7 capability designed to meet the mobile company's always on, online business.
Our Solution	The chosen solution was to leverage the highly scalable and available AWS cloud service with a multi-availability zone architecture, alongside the Fujitsu AWS Managed Service in order to provide the requisite level of availability and scalability while delivering the mandated governance and compliance. The Oracle databases were replatformed into this AWS foundational environment onto RDS PostgreSQL, and in addition the Oracle WebLogic application was replatformed to take advantage of JBoss WildFly. The platform services several million discrete mobile end-customers and processes millions of transactions every day.
Outcomes	We successfully transitioned the solution with minimal operational impact to the users. As a result of this solution, the customer has an architecture across the hybrid of public cloud and dedicated hosting environments which is stable and has enough capacity to meet the business demand. The scaling solution enables them to be confident the stability of the solution which is a critical part of their customer data system. A modern DevOps and monitoring solution provide enhanced availability and compliance, as well as time-to-market. The reduced database footprint makes efficient use of the cloud infrastructure. Continuous compliance was enabled with auto-remediation using CloudTrail, AWS Config, CloudWatch, Inspector and Lambda functions delivering Accelerated Compliance Remediation and Accelerated Audit Reporting.

A leading energy company: Business-critical complex SQL Server upgrade	
Customer Challenge	The customer had SharePoint services used by call centre staff to book calls and schedule engineer visits. As part of a strategic SharePoint migration project, the underlying SQL Server estate had to be upgraded from 2008R2 to SQL2012. Interruption of the service had to be minimised, any overrun would have severely impacted their business, reputation and financial. We migrated Physical SQL clusters to Virtual SQL clusters in each data centre.
Our Solution	We worked closely with teams from different geographical locations and time zones to develop a consolidated migration plan. The migration process was automated as far as possible to accelerate the migration.
Outcomes	The migration project was completed successfully, with minimal impact to the service. The final synchronisation was successfully completed in a single weekend. The success of the programme was ensured through our management approach to establish integrated teams, enabling close collaboration of the client's staff, Fujitsu staff and third-party vendor staff.

Consolidated Managed SAP and Sybase Service: Service Optimisation in Finland	
Customer Challenge	Provide application and database support (MDM, HANA, S/4 HANA, SAP Sybase) for multiple customers with different industry verticals, using common off-shore support team. The service carried high system monitoring costs and included excess cost for less utilised modules. Lack of Flex frame skill set and knowledge for migration and support activities. System support required for extended service window.
Our Solution	An off-shore team was stood up to support multiple customers, pooling experts for less utilised models. Consolidated training programme to build knowledge on new technologies.
Outcomes	Cost reduction of 75% across the less utilised modules by involving flexible resources. System Monitoring cost reduced by 20% by optimising the monitoring process. Further cost reduction for MM, ABAP & FICO Module through adopting ticket-based model. Modernised customer services to make systems more stable, robust and agile by leveraging latest technology.

7. Conclusion

The Banking and Insurance sector has always been a data business as customers and the transactions they make generate huge volumes of information. It's a rich source of insights, ideas, and knowledge on what's happening not just in real time, but what the future might hold. Banks and Insurers have always thrived on data – in fact, they pioneered most collection and analytical methods.

We can help you leverage data to improve the customer experience at every touchpoint so that you can get ahead of disruption and build on your brand legacy. We have supported many customers on the journey to leverage existing technology and delivering on the promise of new technology.

We welcome a conversation to understand your specific challenges and look at how you can successfully transform your data services.

Please contact: Askfujitsu@uk.fujitsu.com, **+44 (0) 123 579 7711**, www.uk.fujitsu.com/financialservices

8. About Fujitsu

As a global IT company, Fujitsu has been working with Financial Services organisations for over fifty years. We provide many critical systems for Financial Services and Insurance providers as well as in tax, law enforcement, manufacturing, retail and utilities. From protecting against cyber-attacks, to detecting fraud and error and enabling the processing of mortgage payments to using AI to come up with the best debt management plan for an individual. Fujitsu understands the implications of the challenges facing our customers and also that IT needs are changing too. Underlying all of this as a consistent theme to accelerate digital innovation and transformation. Organisations need to find the right balance between adopting and exploiting emerging digital solutions, while also modernising the established systems that they rely on today and building trust.

Fujitsu's vision is to help create a society where people are empowered by technology – to innovate, lead enriched lives, and create new business and social value. It is our job to help make this happen and that's why with our expertise as a safe pair of hands, we want to enable financial services organisations to embrace digital opportunities. We want you to be confident that transformation will continue to securely deliver the essential services society relies on and, most importantly, to use digital to make a difference to people's lives.

If you'd like to talk to us about how to successfully transform your data services, please contact: Askfujitsu@uk.fujitsu.com, **+44 (0) 123 579 7711**, www.uk.fujitsu.com/financialservices

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