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InContext

Overcoming Data Challenges for Innovation in Financial Services through 360-degree Business Solutions from InterSystems

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Introduction

Innovation starts with an idea and a vision. It takes root through people accepting the need for change, but it relies on the availability of good quality, accessible, and timely data to deliver both the insights that identify opportunities for innovation and the evidence that innovation is producing the desired improvements. Traditional financial services firms have often faced challenges when looking to innovate as legacy IT systems have been a barrier to their transformation. However, the growth of fintechs, empowered by the cloud and digital native technologies, and the encroachment into provision of financial services by major technology companies like Amazon, Google and Apple have challenged traditional banks and insurance companies to become more agile and customer focused.

We think this paper will be of interest and relevance to senior business leaders, CIOs and CDOs (Chief Data Officers) in both traditional financial services organisations and newer fintechs who are looking to understand how to overcome the challenges of providing timely, relevant, and high-quality data to drive innovation. In it we will look at the importance of data in helping traditional financial services companies to innovate and keep pace with changes in their industry. We will consider the challenges and barriers preventing them from using their data to greatest effect. In the context of those challenges and barriers, we will consider how InterSystems financial services solution suite, powered by InterSystems IRIS, address and solve the problems.

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The need for innovation in Financial Services

There is a dichotomy at the heart of the financial services market. As Chris Skinner, CEO of The Finanser said in a recent article, *"Technologists and technology-based organisations are expected to innovate and yet, for all the discussion of banks being technology companies with banking licences, they are not technologists or technology-based companies. They are regulated institutions that are, by nature, meant to be boring."* On the other hand, changes in technology, the rapid growth of the cloud, changes in younger people's attitudes to banking and, finally, regulatory authorities that have started to take a more positive approach towards new technology, are upending traditional business models and forcing a need to think and act innovatively.

If you look back to 2008, at the time of the financial crisis, the top ten banks are in Europe and the United States. Revolut does not exist, nor do Monzo, Starling, or any of the other challenger banks.

Now look. Today, six of the biggest banks are based in Asia and fintech startups have filled up the market, becoming real competitors to traditional banks. By using innovative technology and automation, fintechs are not only providing financial services to their customers, but also user-friendly interfaces and transparency. To keep up, traditional financial services organisations across all sectors of banking, capital markets, and insurance have no choice but to undergo a digital transformation and innovate.

A recent study conducted on behalf of InterSystems, indicated a clear understanding of the imperative for innovation amongst the 150 UK and Republic of Ireland financial services organisations and fintechs who responded. One of the clearest responses showed 73% of the executives questioned thought that innovation was vital to the survival of their business. A staggering 89% were very confident or confident that their organisation's data could be used to drive innovation initiatives. This feels a little counter-intuitive given the range of data challenges that were mentioned in relation to innovation initiatives. Maybe that reflects a view that suggests answers can be found to those challenges. Let's investigate further.

Data Driven Innovation

While recognising that successful innovation is as much about culture, people, and processes, this paper seeks to show how data is key in driving innovation. Demand for data-driven innovation in the financial services industry is growing rapidly, as data takes an increasingly pivotal role in business models and operations. As W.E. Deming said – *"In God we trust, all others must bring data."*

So, what are some of the areas of business in financial services where data can drive real innovation?

Digital Products and Services

Financial services companies can use the data they collect about customers to create new and innovative products and services to boost revenue streams. It can take many forms, such as using data for collaborating with non-bank institutions to develop a network of services. For example, a bank could partner with car manufacturers to enable customers to purchase a vehicle directly from the bank's website and agree on deals at the same time.

Increased Efficiency

Data gathering and optimisation can help financial services streamline and optimise their internal processes using artificial intelligence (AI) and machine learning (ML) to drive business process automation. As a result, financial services companies can cut operating costs and boost overall performance. They can also use their customers' data to reduce operational risks and cut business processing costs.

To gain real-time customer insight, banks can segment their customers using available data (e.g., customer

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profiling, analysing transaction patterns, past and immediate customer behaviour). By doing so, it's possible to predict the products or services that customers will most likely buy next (i.e., predictive analysis), thus allowing banks to determine the next-best offers and determine other possible actions.

Personalisation

Traditional banks and insurance companies have tended to push products through channels to get a greater share of wallet and cross sell, whereas newer, digital banks start with the customer journey and need, and then build the user experience to be part of a relationship interaction digitally rather than trying to actually sell them anything. So, for traditional organisations one of the most significant advantages of gathering and optimising customers' data is achieving data-led personalisation; or, put it another way, becoming customer-centric and having a single view of the customer. In this way, they can use the data they collect to tailor their products and services to the personal needs of a customer. This can involve bespoke pricing, matching life needs with services, insights to boost financial well-being, etc. As a result, this personalisation can increase customers' engagement and hence, the revenue.

Increased Revenue

Financial services can view their customers' behavioural trends, market trends and internal process efficiency by collecting and analysing real-time data, this is particularly true for capital markets. For that reason, banks can get a competitive advantage because they can recognise and anticipate new business ventures as well as retain and acquire new customers.

Financial institutions can also maximise their revenue by identifying their clients' willingness to pay using sophisticated and AI-driven data analysis. This can considerably enhance the accuracy of pricing models and reduce the need for *"best guesses"* when pricing a new product or service.

Prediction

Financial services can make more informed decisions in the future by collecting and optimising data from multiple sources. For example, some significant strides were made using AI to forecast more sophisticated financial crimes. This data-led prediction can help financial institutions detect fraud, expand credit decisions, improve collection strategies, forecast liquidity needs, mitigate risks, and decrease costs.

Financial institutions can also make use of AI to maximise sales by improving their cross-selling efficiencies. By building predictive models on existing customer behaviour data, companies can devise more relevant cross-selling offers for every customer.

Improved Risk Management

Financial services can reduce compliance risks by ensuring trusted data, essentially required for regulators. These regulators can create and evaluate risk profiles to improve fraud detection and credit management. Also, by following a robust data-driven approach, financial services can get valuable insights from it via high-performance analytics. Such insights can help the financial industry understand customers better, quicken decision-making processes and enhance business processes.

Data is continuously transforming the current landscape of many industries, including the financial sector. Many banks and financial institutions have started utilising data analytics to get a competitive edge. At present, data analysis brings new opportunities for banks' development. Financial institutions that use this technology can better understand markets, their customers, partners and regulators, and make better decisions. Consequently, as sources and types of data have proliferated, the ability to interpret data and convert it into usable, relevant information has become a key differentiator for financial services organisations.

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The Data Challenge

As business leaders begin to understand the value of the data they hold and look to their organisations to deliver data-driven improvements, they eventually face an unfortunate reality: their enterprise data environments are outmatched by the demands being placed on them. There's growing volumes of different kinds of data, stored in too many different places, to support a meaningful data transformation. It is also likely that organisations don't actually know where it all is. It takes specialised skills to discover, access and extract data from an environment like this – and even then, can you trust it?

For mature financial institutions, as opposed to fintechs, the access and extraction challenges are caused by siloed data in a range of legacy technologies with different standards. Regarding trust, financial institutions are gifted with an enormous volume of data from a broad range of sources, but are bedevilled by a lack of confidence in its quality. The reasons for this include, incomplete or inconsistent data, duplicate records, missing values, data decay (data getting out of date), and ambiguous data.

Ensuring the quality of your data is a manually intensive and time-consuming task. Once the data has been cleaned it has traditionally been extracted and loaded before being structured into suitable formats for data warehouses. These generally have proved too complex and lack the flexibility needed to get actionable, near real-time insights, that are so critical in many financial services applications. Data lakes have improved the situation by enabling the storage of unstructured data which only has to be formatted as and when required. This makes it more suitable for predictive analytics, machine learning and data visualisation.

However, data management technologies are changing at pace to support the growing data volumes. Depending on the industry and use-case, data structures may be highly complex, with deep hierarchies of classification, or enormous in scale. As well as traditional requirements for analysing business performance by bringing together corporate transactional and master data, financial institutions now look outside the corporate firewall for some key data. Data held by government agencies, 3rd party industry sources, data from e-commerce, social media, and physical sensors such as vehicle telematics in insurance may all be increasingly important. This data may be extremely large in size, and may be less well-structured than the data in corporate systems. As well as financial data there may be a need to deal with images, video, sensor feeds, website traffic, and more, as well as time-series data and other complex data structures. For large financial organisations the amount of data to be dealt with is now measured in petabytes rather than terabytes, and this represents a significant challenge to traditional database and data management platform vendors. The scaling up has led to columnar databases, true multi-parallel processing, cloud-native databases, in-database analytic functions, entirely new file storage systems, and database optimisers that can split queries across numerous applications.

In order to deal with this added volume and complexity, we are seeing two new developments. Firstly, there are new data management platforms that incorporate a multi-model database that stores data in multi-dimensional arrays. These platforms should be able to scale simply and cost-effectively, while maintaining performance and consistency across a range of different use cases such as ingesting and analysing streaming data in real time and analysing historic data running at scale, at the same time. They should also make it easy for business users to design relevant dashboards and provide interfaces for popular 3rd party analysis tools such as Tableau, for example.

The second, very new, development is an architectural approach that speeds and simplifies access to data assets

across the entire business. This is a data fabric. It starts with the assumption that data proliferation and decentralisation will continue, so traditional methods of managing data through centrally managed repositories could become obsolete. Instead, a data fabric accesses, transforms, and harmonises data from multiple sources, on demand, to make it usable and actionable for a wide variety of business applications.

Data fabrics are designed to integrate with existing architectures while being nimble enough to connect new data sources as they emerge. Coupled with a strong data management platform as described above, data fabrics open up the potential of self-service analytics, empowering everyone to use data with AI-powered predictions, what-if scenario planning, guided model building, insights, and other data science techniques. We would concur with the Gartner statement that the *"data fabric promises to elevate data management out of its bucket of disconnected tools and siloed datasets to an unprecedented level of integration, interoperability, and innovative business applications."*

In summary, innovation in financial services organisations is seen as being critical for them to keep pace, and get ahead of technology, regulatory and societal shifts that threaten to up end existing business models. Being able to take advantage of the wealth of data they hold is a key factor in ensuring the success of innovation initiatives. While the data challenges we have identified in this paper could hamper the success of innovation initiatives, we believe that the development of new multi-functional data management platforms and the use of data fabrics will enable financial services organisations to maximise the value of their data to deliver innovative new services and streamline operations.

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Solution: InterSystems Financial Services Solution Suite

What is it?

The solutions, Business 360, Customer 360, InterSystems TotalView™ for Asset Management, and Cloud Fintech Gateway have been designed to enable business leaders and their teams to take full advantage of a 360-degree view of enterprise and customer data. They utilise what InterSystems calls, a smart data fabric that takes the data fabric approach one step further by embedding a wide range of analytics capabilities, including data exploration, business intelligence, natural language processing, and machine learning directly within the fabric, making it faster and easier for organisations to gain new insights and power intelligent predictive and prescriptive services and applications. This is described by InterSystems as the 'last mile' of analytics, and positioned as an essential capability for generating real value from analytics technology. We are inclined to agree.

The underpinning capabilities for all of the solutions are founded on InterSystems IRIS Data Platform – introduced in 2018 as a single, unified platform that is the evolution of the company's Caché database, Ensemble interoperability platform, and its various data analytics offerings. InterSystems IRIS is available for on-premises, cloud-based, and hybrid deployments, with Kubernetes support included.

The major elements of InterSystems IRIS include a horizontally and vertically scalable, multi-model, transactional-analytic database with full ACID compliance and immediate consistency; scalable and distributed application server(s); a Visual Studio Code-based development environment supporting several languages; a business process layer equipped with a rules engine, workflow and process orchestration; specific capabilities to support self-service-enabled analytics on structured or unstructured data; integration with streaming environments such as Apache Kafka; and on-demand access to data across multiple data sources via a data fabric architecture.

How does it work?

InterSystems IRIS stores data in multi-dimensional arrays. It supports relational, object (with full persistence, polymorphism, inheritance, and so forth, and with no requirement for object-relational mappings), document, and multi-dimensional models, and you can implement any number of these within the same environment, with full interoperability across these projections, and without any duplication of data. Note that you can read an array either vertically or horizontally, which means that you only need to store data once to support both transactions and analytics. This is a major differentiator for InterSystems.
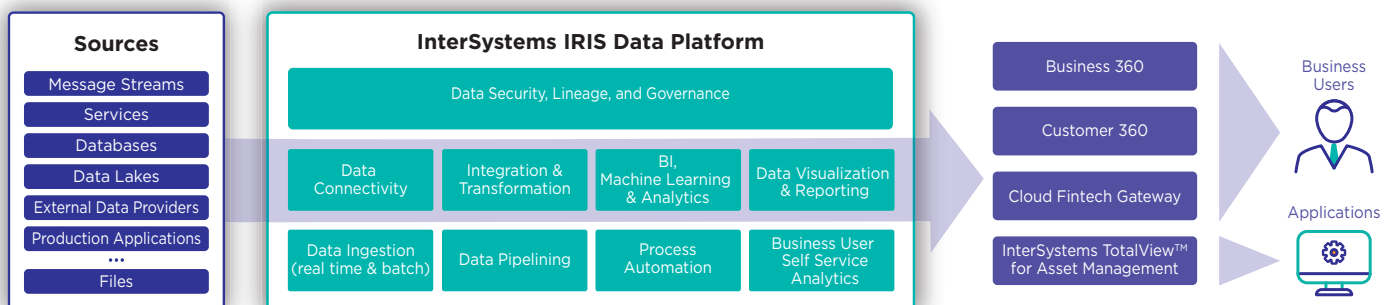
Overview of InterSystems IRIS and the FS solutions

InterSystems IRIS scales to accommodate large workloads and data sets on commodity hardware, with both database and application servers scaling out horizontally. Application code is decoupled from the persistence of data, which allows application servers to scale horizontally, independently of the number of shard servers, and to distribute workloads automatically, thereby supporting both performance and consistency. The environment is configured so that nodes are designated as query, transactional or hybrid servers, in order to cater for different workload resource requirements. Data ingestion can be parallelised directly to each shard server, providing high-performance ingestion for streaming data, and analytic queries can be pushed down to partitioned or sharded data tables, further increasing performance and resource efficiency. The software can also make direct use of graphics processors for pipelining and so forth.

Analytics capabilities provided by InterSystems IRIS include a new IntegratedML feature that allows you to create and use predictive models using automated SQL functions; support for PMML (Predictive Modelling Mark-up Language) and a server side Python runtime engine that allows native execution of predictive models; and a connector for leveraging Apache Spark-based machine learning and predictive models within the InterSystems IRIS environment (with parallel operations and high-speed connections from each of the shard servers into a Spark cluster). *'Adaptive Analytics'* is another new feature that allows you to expose analytic data only once, in such a way that it can serve multiple use cases simultaneously. This is accomplished using a *'virtual cube'* data model, an alternative to the OLAP cube, that can be assembled using a drag and drop interface and deployed to various business intelligence and visualisation tools, such as Tableau, Power BI, and Qlik (supported via an ODBC interface).

On that note, to facilitate the embedding of real-time business intelligence into operational applications, InterSystems IRIS includes a designer for creating dashboards; an analysis component, that can be employed by business users to explore and display relevant data; and an architect component, used to define your data model. For unstructured data, InterSystems IRIS includes natural language capabilities, and it supports Apache UIMA (Unified Information Management Architecture).

InterSystems IRIS provides several language options for development purposes. Apps that run on the platform directly can leverage SQL, Python, or ObjectScript (an in-house programming language) while external applications can also use Java, .Net or Node.js. Access to Python is a recent development and is a significant step forward in terms of access to trained developers (Python is more commonly used than ObjectScript) and programming libraries, without needing to sacrifice the performance, security, scalability and other benefits of an embedded approach. Notably, Python can run in the kernel directly on the data, and is considered a *'full peer'* to ObjectScript, meaning that the two can essentially be treated as interchangeable and cross-compatible within InterSystems IRIS.

Why should you care?

Hybrid real-time use cases are common in financial services (for instance, fraud detection). With a dedicated Financial Services Solution Suite, InterSystems IRIS caters to these environments. We consider InterSystems IRIS to be highly performant and scalable. It is, for instance, quite capable of processing transactions, indexing incoming data, and performing analytics on both real-time data and non-real-time data (that is, historical data and reference data) at scale and in real-time.

The platform also takes pains to make sure its analytics are not just highly effective in theory, but easy to build, access and use in practice. You can see this in practice with the specifically focused Business 360, Customer 360, InterSystems TotalView for Asset Management, and Cloud Fintech Gateway use cases.

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The Bottom Line

Recent developments to InterSystems IRIS, the development of a smart data fabric and introduction of InterSystems Financial Services Solution Suite make for a compelling hybrid transactional/analytic offering for all financial institutions.

The Bottom Line

About the author

PAUL BEVAN
Navigator, Research Director:
IT Infrastructure

Paul has had a 40-year career in industry that started in logistics with a variety of operational management roles. For the last 33 years he has worked in the IT industry, mostly in sales and marketing, covering everything from mainframes to personal computers, development tools to specific industry applications, IT services and outsourcing. In the last few years he has been a keen commentator and analyst of the data centre and cloud world. Until recently he was also a non-executive director in an NHS Clinical Commissioning Group.

Paul has a deep knowledge and understanding about the IT services market and is particularly interested in the impact of Cloud, Software Defined infrastructure, OpenStack, the Open Compute Project and new data centre models on both business users and IT vendors. His mix of business and IT experience, allied to a passionate belief in customer focus and "grown-up" marketing, has given him a particular capability in understanding and articulating the business benefits of technology. This enables him to advise businesses on the impact and benefits of particular technologies and services, and to help IT vendors position and promote their offerings more effectively.

Bloor overview

Technology is enabling rapid business evolution. The opportunities are immense but if you do not adapt then you will not survive. So in the age of Mutable business Evolution is Essential to your success.

We'll show you the future and help you deliver it.

Bloor brings fresh technological thinking to help you navigate complex business situations, converting challenges into new opportunities for real growth, profitability and impact.

We provide actionable strategic insight through our innovative independent technology research, advisory and consulting services. We assist companies throughout their transformation journeys to stay relevant, bringing fresh thinking to complex business situations and turning challenges into new opportunities for real growth and profitability.

For over 25 years, Bloor has assisted companies to intelligently evolve: by embracing technology to adjust their strategies and achieve the best possible outcomes. At Bloor, we will help you challenge assumptions to consistently improve and succeed.

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