

# DATA MANAGEMENT IN FINANCIAL SERVICES: WHY ON-DEMAND ACCESS TO ACCURATE, LIVE DATA TOPS THE AGENDA



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**Financial services firms aim to gain a competitive edge, deliver more value to customers, reduce risk, and respond faster to the needs of the business. To meet these and other critical business goals, firms need a single view of accurate, consistent, live, and trusted data that they can access on demand as needed.**

However, most firms struggle to get this single view of their enterprise data. Meanwhile, their data continues to grow in both volume and complexity. Thus, integrating and leveraging data from internal and external data sources to power accurate business decisions remains a challenge.

Now, as firms demand more from the increasing levels of batch and real-time data they have available, neglecting or delaying these data management initiatives is no longer a viable option.

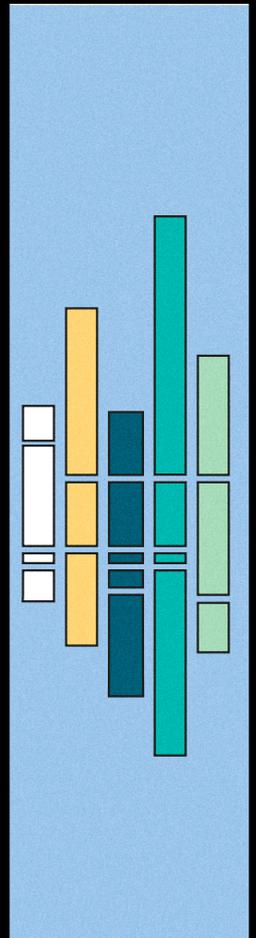
## A next generation approach

At InterSystems, we are helping leading financial services firms harness information from their legacy systems and their disconnected processes, applications, and data with approaches that address the limitations of previous efforts.

A modern approach to data management allows existing applications and data to remain in place, while empowering organizations to extract the needed information on-demand from these legacy systems, data lakes, and other sources quickly and flexibly to power accurate decisions and new initiatives without creating more data silos. With easier and faster access to accurate, live data from across the entire enterprise on demand and the ability to easily combine, visualize, explore, and analyze the data, businesses can better meet a wide range of critical enterprise-level, mission-critical initiatives.

Leveraging a smarter, more modern approach to data management, financial services firms are better positioning their businesses for success, driving competitive advantages, and optimizing customer experiences.

InterSystems provides innovative data solutions for organizations with critical information needs in the finance, healthcare, and logistics sectors, and powers mission critical applications running in production at most of the top global banks. Our cloud-first data platforms solve interoperability, speed, and scalability problems for organizations around the globe.



**CELENT**

# **FINANCIAL INSTITUTIONS GET SMART ABOUT DATA (FABRIC)**

Financial Institutions embrace Smart Data Fabric approaches to better leverage enterprise-wide data for advanced insight capabilities

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This Celent report was commissioned by InterSystems, at whose request Celent developed this research. The analysis, conclusions, and opinions are Celent's alone, and InterSystems had no editorial control over the report contents.

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# EXECUTIVE SUMMARY

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Line of business (LOB) and technology heads at wholesales financial institutions (FIs) come from different angles in wanting to realize business outcomes and gain competitive advantage, but data is a unifying thread. As FIs move from process- to platform-driven organizations, the business focus has shifted to customer experience. This shift requires mastering and leveraging data for insight at an enterprise level. Leading FIs are turning to Enterprise Data Fabrics, the latest evolution of data management approaches, for help.

While excitement over advanced analytics, data science, and artificial intelligence (AI) is palpable, easy access to data—where, when, and by whom it is needed—is a work in progress. A wide mix of data types and systems and a history of disjointed business expansion common to FIs means data remains siloed across numerous platforms, tuned for very different use cases.

Within capital markets and across banking for example, trends such as the move to cross-asset trading at both asset managers (buy side) and banks/brokers (sell side), requirements for 360-degree customer views, the continual regulatory onslaught, and a desire to simplify architecture mean it is time for a rethink in the approach to data management and analytics. A key question for today's FI is whether a trade-off in cost versus performance when architecting data infrastructures—which dictates different solutions by use case—still holds true.

In other words, is having different data management platforms or centralized data stores by use case cause still required? What if one data management platform could service enterprise data management and analytics needs, regardless of the end user? What innovation could be unleashed with freer access by business users to data and data tools? Celent research has found that leading capital markets' FIs are exploring Data Fabric approaches to answer these questions.

This research report aims to review Data Fabric approaches empowering FIs to achieve smarter data enablement, "information fluidity," and a simplified data architecture. This paper also discusses how leading Financial Institutions are positioning their business for success in utilizing high fidelity data and coherent collaboration across the enterprise by embracing "Smart" Data Fabric approaches.

# INTRODUCTION

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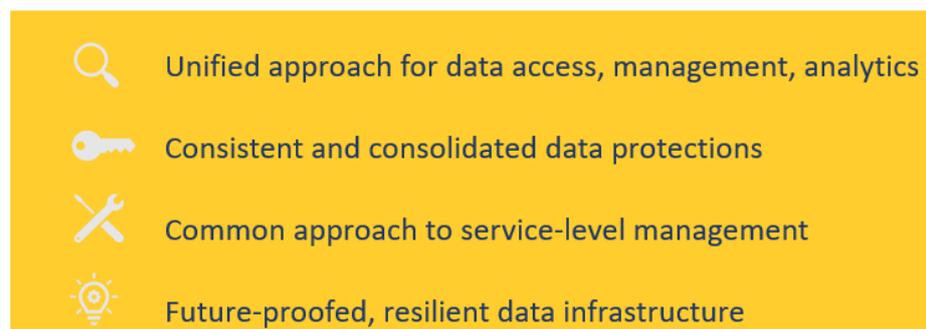
We know business decisions rely on insights that come from data, but FIs continue to struggle to make their data useful to the business. There is a frustration around obtaining data fast enough or in a useful format or in a way that is easy to interpret and share. The issue is not that the technologies for managing data are lacking. In fact, an abundance of data technologies used across financial institutions has resulted in overly complex data infrastructures that rely on a messy set of technologies for data framework, semantic layers, data pipeline, and data harmonization.

Whether in the line of business or technology divisions, the need for accurate and trusted data from different parts of the organization is a common requirement for delivering analytics uses cases spanning customer insight, pricing, liquidity, margining, risk, regulatory compliance, and more.

Meanwhile, as FIs look to move from business-level to enterprise-level digital transformation and focus on customer experience in a shift from a process-driven to platform-driven business, the need to weave data seamlessly from internal and external data sources has been identified as a key priority.

Celent research found that leading FIs—including Bank of America, Citi, Goldman Sachs, JPMorgan, and RBC—are embracing Data Fabrics in order to future-proof their data management infrastructures. The concept of a Data Fabric as an abstraction layer to virtually lay over and provide access to all data sources has existed previously, but the next-generation so-called Smart Data Fabric offers a number of features that aim to future-proof data infrastructure (see Figure 1) and provide a range of analytics capabilities directly within the fabric. A core difference between Data Fabrics and data warehouses or data lakes is that the former eliminates the need to move data. This sets the stage to enable insights on real time data as it flows through the fabric.

For FIs who have spent hundreds of millions on data warehouses or data lakes without achieving the desired results, or for those starting to move toward a data-driven model, Data Fabric approaches offer a way to leverage existing data investments to create a truly user-friendly, enterprise-ready, and adaptable solution.

**Figure 1: Next-Generation (Smart) Data Fabric Aims Include Futureproofing**

Source: Celent analysis

Data infrastructure challenges—and costs—are at the most extreme in the high-performance environment of the capital markets’ front offices, where rock-solid support for low latency, high throughput, and large-scale use cases form the table stakes of any trading solution—from simple price discovery to quantitative- and algorithmic-driven strategies for portfolio construction and risk. However, the need to fully access and leverage data across the full financial services value chains and across siloed business lines are fueling a rethinking of traditional assumptions.

Joint research by Oliver Wyman and Morgan Stanley has found that the direct and indirect benefits from having clean, consistent, and automated data management could be 2–4% of infrastructure and controls costs, excluding other benefits this would bring (e.g., lowered staffing and support costs from rationalizing underlying data structures). Leading banks have focused on creating authoritative data stores and instilling discipline and governance over data ownership and consumption to minimize manual processes and errors.



The benefits from having clean, consistent, and automated data management could be a 2-4% reduction of infrastructure and control costs.”

—Oliver Wyman and Morgan Stanley Research

Celent has found that banks are progressing from databases to data warehouses to data lakes—the latter two being approaches that move data to a centralized store to create a single source of truth. However, data managers have come to realize that every data owner can have their own “truth”; the definition of a customer may vary whether you are speaking to the marketing or sales departments.

Adding to this hurdle is the fact that data can also be incomplete, incorrect, biased, or not readily discoverable/available. The data management platform must offer tools to manage this aspect as well.

A key driver for advanced data management is recent regulation such as the Fundamental Review of the Trading Book (FRTB), Markets in Financial Instruments Directive 2 (MiFID 2), and the Consolidated Audit Trail (CAT), which have introduced increasing challenges around the collection, quality, and linkage of market data and other information such as customer data.

FRTB, for example, introduced the concept of nonmodelable risk factors (NMRF) to address concerns where there is insufficient or inadequate quality data. In other words, FIs must show that the data going into models is real and derived from actual transactions. Data will also now be gathered at desk rather than entity level, resulting in a likely material increase in the amount of data subject to analysis, validation, and reporting operations. Poor data can lead to higher capital requirements and “could determine whether a desk survives or not,” according to one director of risk at a top-tier investment bank.



Poor data will lead to higher capital requirements, and ... could determine whether a desk survives or not.”

—Director of Risk, Top-Tier Investment Bank

Use cases around risk management are often cited when discussing the need for advanced data management approaches. According to a CTO for risk at a top-tier global investment bank, spending on risk model and model development can reach the hundreds of millions, with the number of models growing at double-digit rates. He explained that “data wrangling”—or activities that include data preparation, data handling, data lineage, and data quality—is extremely time-consuming but, if automated successfully, can lead to reductions of 50% or more in overall costs.

Reporting is another area where sell side firms are eager to consolidate on a standard data management infrastructure. This area will typically encompass many different use cases with varying levels of sophistication, data moving at different velocities and needed by numerous different applications (e.g., Excel through to NLP-based applications).

Meanwhile, data silos continue to proliferate as data sources and types relevant to drive business decisions and support customers grow. FIs generate or consume data from a wide range of sources, including machine logs, applications, social media, customer interactions, internally derived data, business systems, and external providers. This data is stored on premises at various geographies as well as in the cloud.

One thing is certain: if data insight is going to accelerate business innovation, both business and technology end users need easy and uniform access.

# DRIVERS FOR DATA FABRIC ADOPTION

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While the notion of a Fabric as a connector of computing resources can be traced back to early grid computing concepts in the 1990s and the term Data Fabric has been in use in capital markets since the 2000s, the current definition of Data Fabric has evolved. Early Data Fabric approaches in capital markets focused on low latency real time streaming market data consolidation and distribution for front office trading to address challenges around trading application integration, data distribution, speed, access, and capacity.

But today, as FIs transformation agendas move from business level to enterprise level in order to support platform-driven business models, the need for next-generation approaches to data management is coming to light. VC investors have taken note, with reports of increased activity in data management, particularly around data lineage and data governance.

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The increasing complexity of an organization’s data estates and the growing recognition of data as an asset, combined with increasing regulatory demands, is bringing data management into the limelight.”

—Jay Wilson, Albion VC, Tech Investment Arm, Albion Capital Group LLP

## Defining a Smart Data Fabric

The current definition of Data Fabric refers to the concept of a unified data environment that integrates data sources and data management processes while abstracting complexities associated with storage, movement of data, transformation, security, and data processing. The Data Fabric connects all data, including data stored in traditional data management architectures (e.g., databases, data warehouses, and data lakes), and it supports seamless access and ease of use by both end users and applications. A Smart Data Fabric takes this one step further by incorporating advanced analytics capabilities such as business intelligence, data exploration, machine learning (ML), and other capabilities directly within the Data Fabric itself.

A key distinction between Data Fabrics and traditional data management architectures is that while the Data Fabric offers centralized access and a single unified view of data across the organization, it does not require that data be copied and stored outside its original location.

A key distinction between Data Fabrics and traditional data management architectures is that while the Data Fabric offers centralized access and a single unified view of data across the organization, it does not require that data be copied and stored outside its original location. This is an important distinction as it means that a Data Fabric approach avoids the creation of new data silos—especially important as firms increasingly embrace cloud—and provides a bridging solution to extending the life of legacy systems holding business-critical data.

While a traditional ETL (extract, transform, load) data management framework has a layered approach (data sources ingested by data processing and storage services, then loaded into a data access layer for visualization and analytics use), the Data Fabric has a unified data interface, providing access to the enterprise's full range of data.

However, Data Fabric is not generally available as an out-of-the-box product from either commercial vendors or via open source. Rather, it is a concept that encompasses an ecosystem of services and solutions. Key components of this ecosystem include modules and services for:

- Data handling (e.g., access, connectivity, pipeline, preparation, transformation).
- Discovery (e.g., catalogue, access and search, metadata).
- Lineage.
- Operations: Data Fabric deployment, management, performance, scale.
- Security.
- Governance.

Additional components that extend a Data Fabric into Smart Data Fabric include built-in capabilities for:

- Data exploration.
- Business intelligence, business rules.
- AI (e.g., ML, natural language processing).
- Reporting and visualization.
- Business user self-service.
- And other analytics capabilities.

## Why Smart Data Fabric?

FIs are overwhelmed with data in both the number of sources and the complexity in unifying them. They want great visibility into their complex and heterogeneous data landscape so that they can become more data-driven in their decision-making.

However, analytic challenges abound involving performance, scalability, and integration of new data types across the enterprise. In short, business users at FIs can struggle to extract value from data due to many obstacles (see Figure 2).

**Figure 2: Business Users at FIs Can Struggle to Extract Value from Data**

	Scattered data	Organization is data rich, but its data is messy and scattered.
	Ad hoc analytics	Analytics done in nonstandardized, inconsistent ways; solutions not scalable.
	Limited tools	FIs users lack tools to translate the findings into actionable insight.
	Silos continue to proliferate	As new data sources and use of cloud grows, there is need to change approach to avoid ever more silos.
	Skills shortage	Fis are competing with BigTech and more in attracting and retaining staff with hard core data science and analytics skill sets.

Source: Celent, Oliver Wyman analysis

One of the main differences between data warehouses/data lakes and Data Fabrics is that the former involves permanent data movement, while the latter allows data to remain at the source. Having to move data to a centralized store can result in a series of challenges, including latencies, dependencies across multiple data flows (leading to increased latency), resolution of middle-step failures involving entangled data flows, data duplication/inconsistencies, and delays in sharing new data sources due to the design of the ETL/ELT process.

**Figure 3: Drivers and Advantages of Data Fabric Approach**

Drivers	Advantages
Increasing variety of business data	Establish a unified environment to run queries and access data
Emerging needs for business agility and accessibility	Eliminate need to consolidate sources on isolated platforms
Need to leverage critical data in legacy systems without system replacement	Support flexible data pipelines spanning multiple databases and cloud data sources
Move from business-level to enterprise-level digital transformation	Access data elements true to their lineage and pulled directly from source
Demand for realtime streaming analytics	Lower costs and complexity of data integration
Increasing data volumes	Accelerate holistic view of data by accessing current/accurate data from across full ecosystem, including on-demand access by business users for ad hoc decision support

Source: Celent analysis

Issues around addressing data governance and data lineage, which are components of any Data Fabric solution, have risen in prominence across financial services. Simon Jeffrey, Group Data Director at Ecclesiastical Insurance Group, noted this is partly due to an increasing requirement by regulators for FIs to be able to demonstrate control of data and partly due to the “failure or poor returns of many data and analytics or digital programs over the past few years where effective data governance wasn’t in place, akin to building your house on the sand.” An increasing awareness of the need for a richer, more complete data management solution is also bolstering support for Data Fabric approaches.

“

[There has been] a failure or poor returns of many data and analytics or digital programs over the past few years where effective data governance wasn’t in place to build upon, akin to building your house on the sand.”

—Group Data Director, Insurance Group

# WHO IS USING DATA FABRICS?

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Celent spoke to a variety of technology and business executives at a variety of FIs including asset managers and banks/brokers and found that the range of awareness and adoption of Data Fabric approaches varies significantly. While some FIs are building out this approach (see Figure 4), executives at other FIs are just starting to explore or were new to Data Fabric approaches. Nearly all FIs Celent spoke with were actively reviewing their data management approaches.

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There is a need for proficiency in tools and an ability to look across large data sets and uncover value. That is a growing skill set in fixed income trading.”

—Global Head of Fixed Income Trading, Global Asset Manager

The buy side is also joining the data party and paying keen attention to the subject of data management. A majority of attendees at a Celent-hosted buy-side-only breakout session at Celent’s Innovation & Insight event in March 2021 voted “data skills” as the top priority in hiring for the front office—more important than specific product skills, multiasset knowledge, or relationship skills. Celent sees data analytics use cases for the buy side clustered around three areas: client analytics, operations, and portfolio management.

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**Figure 4: Leading Financial Institutions are Looking to Data Fabric Approaches**


BoA's Data Fabric efforts fall under its Global Banking Data division, which is responsible for digital transformation and building a data-driven organization, and supports bank's wholesale credit, sales and profitability, and treasury solutions.



Citi provides a Data Fabric as a temporal store for all trade data, reference data, and market data. The technology is used by global Equity Risk software teams to deliver solutions to business problems, for example, as a foundation to Derived Market Data System as well as supporting front office quants, finance, and multiple technology teams across the organization.



Goldman Sachs's Data Intelligence is a new function within Engineering Product team, which manages the implementation of the Data Strategy with various businesses and is responsible for promoting the Data Fabric and driving adoption of the underlying tools. The team builds relationships with Business Functions.

J.P.Morgan

JPM is building a data discovery, metadata management, and cloud-based solution that involves partnering across all Lines of Business (LoB) and Chief Technology Office (CTO). The Data Fabric strategy and offering execution/adoption falls to the Enterprise Metadata Management and Data Governance team, part of the Enterprise Data Technology team.



RBC's Data Fabric Platform takes a metadata-driven approach to deliver capabilities for Big Data, compute, federated queries, caching, encryption, data movement, data lineage tracking, and visualization.

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Sources: Celent analysis, corporate information

# PATH FORWARD

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Data has moved from being a by-product of the business process to the core of every business, wholesale financial services included. As such, Celent expects investment on advanced data management approaches such as Smart Data Fabrics to increase. It may be a case of spending to save, as our research shows that meaningful cost reductions can be achieved once unified and seamless data management and access is achieved. However, maintaining or gaining a competitive advantage presents stronger drivers for adoption.

This new approach does not mean yet another consignment to the “legacy technology” of previous data management approaches. A Data Fabric approach to data management can leverage existing data stores, including traditional database, data warehouses, and newer data lakes, regardless of location (on premises or in the cloud), while adding new functionality and levels of flexibility. This means existing investments can be leveraged and business-critical, but legacy infrastructure can be decommissioned over time if desired.

The ability to support different data paradigms from real time data delivery (e.g., real time market data delivery) to batch processing (e.g., reporting) to stream processing (e.g., fraud detection, risk checks) within the same data management infrastructure will also be welcome, as this supports unified and simplified access to data for insight across the enterprise—by users in both business and technology divisions.

Celent believes it will be the business necessities and benefits that will propel the adoption of Smart Data Fabrics for both buy and sell side FIs, as regulatory imperatives require support for advanced data quality, data lineage, and semantics capabilities; as clients demand ever more personalized and tailored services; and as business users demand more direct and simplified ways to derive insight from the firm’s data assets.

# LEVERAGING CELENT'S EXPERTISE

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If you found this report valuable, you might consider engaging with Celent for custom analysis and research. Our collective experience and the knowledge we gained while working on this report can help you streamline the creation, refinement, or execution of your strategies.

## Support for Financial Institutions

Typical projects we support include:

**Vendor short listing and selection.** We perform discovery specific to you and your business to better understand your unique needs. We then create and administer a custom RFI to selected vendors to assist you in making rapid and accurate vendor choices.

**Business practice evaluations.** We spend time evaluating your business processes and requirements. Based on our knowledge of the market, we identify potential process or technology constraints and provide clear insights that will help you implement industry best practices.

**IT and business strategy creation.** We collect perspectives from your executive team, your frontline business and IT staff, and your customers. We then analyze your current position, institutional capabilities, and technology against your goals. If necessary, we help you reformulate your technology and business plans to address short-term and long-term needs.

## Support for Vendors

We provide services that help you refine your product and service offerings. Examples include:

**Product and service strategy evaluation.** We help you assess your market position in terms of functionality, technology, and services. Our strategy workshops will help you target the right customers and map your offerings to their needs.

**Market messaging and collateral review.** Based on our extensive experience with your potential clients, we assess your marketing and sales materials—including your website and any collateral.

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