50 Years of Growth, Innovation and Leadership

A Prescription for Growth: Financial Firms in the Digital Era

The What, Where, When, Why and How of Data Management

A Frost & Sullivan Executive Brief
Sponsored by IBM

FROST & SULLIVAN

INTRODUCTION

Over the past 10 years, few industries have faced as many challenges as financial services. Globalization, cybercrime, and political turmoil—such as the uncertainty surrounding the terms of the UK's negotiations for departure from the EU (Brexit)—add to the costs and risks. Competition has increased, as once-clear barriers have blurred between insurance companies, banks and brokerage firms, as well as local, regional, and international institutions. Smartphones, social media, and financial technology firms (fintechs) are changing the relationship between traditional financial firms and their customers. Adding to the complexity, a slew of regulations brings a steady stream of challenges, including the following:

- Data privacy regulations, such as the European Union (EU) **General Data Protection Regulation (GDPR)**, as well as **anti-money laundering (AML)** and **Know Your Customer (KYC)** regulations, require firms to change their data management processes.
- Insurance-focused regulations continue to expand regionally with, for example, a **Customer Best Interest** standard in New York State; and internationally, with the global **Insurance Capital Standard (ICS)**.
- In addition to the Basel rules, firms are preparing for changes associated with the 2022 implementation of **Fundamental Review of the Trading Book (FRTB)**; the adoption of the **alternate reference rates (ARR)**; and **Open Banking standards**.

Underlying these challenges and opportunities is data. Customer data. Account data. Transaction data. Market data. Data about the data—to support decisions and to show regulatory auditors how decisions were made.

Firms are looking for insights about their customers, operations, and marketplaces that will lead to improved efficiencies, profitability and customer experience across multiple channels. They are investing in cloud, mobile, and IoT platforms to help collect this data. However, the collected data doesn't just sit in storage; it is accessed by applications and users to run a range of business operations. The business workloads that access the data vary in function and value to the business. Some data-intensive workloads require "real time" performance (e.g., on-line transactions, chatbot-aided customer service); some call for broad access to data stores (such as KYC searches). Some ultimately support revenue growth or innovation; while others are designed to streamline processes and reduce costs. Increasingly, firms are using machine learning and artificial intelligence to analyze these massive datasets.

Underlying these challenges and opportunities is data. Customer data. Account data. Transaction data. Market data. Data about the data—to support decisions and to show regulatory auditors how decisions were made.

Most firms are challenged with their ability to organize and manage data: how to acquire, curate, store, manage and control access. To optimize the value of data assets, firms need to implement a comprehensive hybrid multi-cloud data management strategy, supported by a flexible, secure, hybrid and multi-cloud storage solution.

In this paper, we will review the questions IT leaders in financial services firms may have about data management, including:

- Why do I need to rethink my storage strategy?
- How does storage impact my company's ability to achieve business objectives?
- When is the right time to transform my storage?
- What should I look for in a storage solution provider?
- Where should I go for help?

WHAT FINANCIAL ORGANIZATIONS NEED TO SUCCEED IN THE DIGITAL ERA

Like organizations in every industry, financial institutions are redefining themselves to compete in the digital era. In a 2018 Frost & Sullivan survey, IT leaders in financial firms listed the following drivers to digital transformation:

- **Improve customer experience** (cited as very or extremely important by 88% of financial IT leaders)—Financial firms must continuously earn the business of customers, who are less brand-loyal than in the past and will quickly move to competitors if they are not delighted.
- **Maintain regulatory compliance** (cited by 84%)—Financial services firms are investing in technology to manage new and evolving regulations.
- **Support business agility and market responsiveness** (cited by 84%)—Competing with new and non-traditional entrants requires improved speed-to-market.
- **Optimize IT resources** (cited by 80%)—Narrowing margins require firms to be more thoughtful about their investments in technology and the people who manage it.
- **Leverage data assets**—Even more than other industries, financial firms look to **big data and advanced analytics—including artificial intelligence (AI)**—to achieve their business goals. Forty-one percent of financial IT leaders cite Big Data and Analytics among the top-three technologies that have the most impact on revenue growth (compared with 33% for other industries).

Despite the plethora of new technologies and tools designed to accelerate digital transformation, achieving their goals remains challenging. In some cases (for example, security, compliance, and

customer demands), the nature of the challenges evolves faster than the technologies designed to alleviate them. In other cases, resource- and budget-constrained organizations find that technology is changing faster than their ability to absorb it.

IT leaders in financial services firms say their top challenges include:

- **Concerns about security and unauthorized data access** (cited as very or extremely important by 65% of financial IT decision-makers). Security threats—from breaches, to data hijacking schemes—continue to escalate, as bad actors become more sophisticated and creative. In addition to operational disruption and mitigation costs, a security incident creates reputational risk as well: no financial services organization can afford to find itself in the headlines (or in front of a congressional committee) because of a data breach. To earn the trust of customers, and to satisfy regulators, financial firms need to ensure that data is both secure and available, protected not only from breach but from loss and corruption. That requires encrypting all data, both at rest (in storage) and in transit (over the internet).
- **Inability to meet compliance requirements** (cited by 62%). Old, manual processes cannot keep pace with regulatory changes. To control compliance costs, financial firms are implementing data management solutions that incorporate automation and artificial intelligence tools.
- **Poor or inconsistent application performance** (cited by 48%). Customers and employees have no patience with sluggish transactions or long lead times for decisions; and critical analytics-based applications may grind to a halt if data is not quickly and easily accessible. To speed data processing, financial firms must implement data hygiene processes that ensure data is curated, prepared, and ingested into the data pool in a way that optimizes throughput and processing time.
- **Managing data growth** (cited by 46%). Facing more data, of more types, with more uses and varying requirements, many firms are barely keeping up with the data onslaught. A comprehensive data management strategy is required to ensure that data sets are accessible, secure, and available to users and applications, as needed.

For the most successful financial firms, digital transformation represents not simply a way to keep pace, but to outshine competitors. These financial firms leverage their valuable data assets—via artificial intelligence and advanced analytics—to drive revenue, operate efficiently, and delight customers.

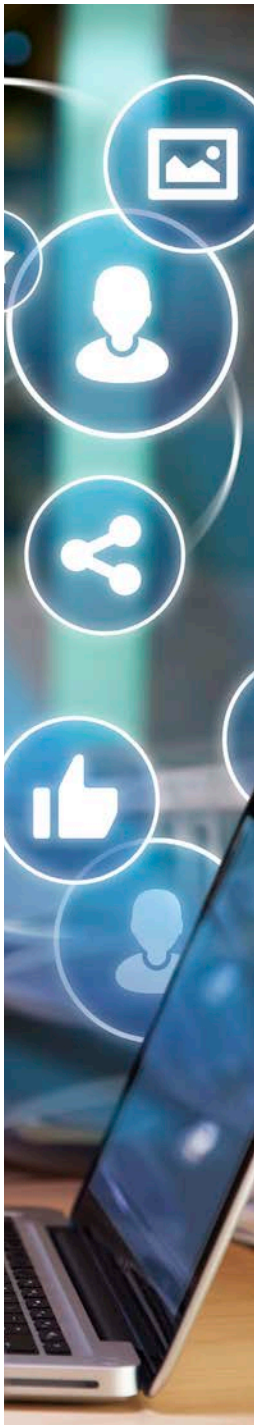
HOW FINANCIAL SERVICES FIRMS USE DATA IN THE DIGITAL ERA: FOUR SAMPLE USE CASES

Financial firms have always collected and stored data. But the need to effectively manage data has become increasingly urgent as they strive to compete in the digital era.

But just as each data set is different, so is the way it can be leveraged. The following use cases illustrate a variety of data-intensive workloads. Each is essential for the organization's operations, but each faces different requirements.

Customer Transactions

REDEFINED FOR DIGITAL INTERFACES AND STRINGENT REGULATIONS



Banks, brokerage firms, and insurers interface with their consumer and business customers via a range of channels, including mobile, internet, ATM, as well as live interactions in the local branch office.

Data requirements: An omnichannel strategy presents significant accessibility, integrity, security, and compliance requirements for managing customer account data. Customer account information must be accessible and available to all channels, devices, and geographies. It must be consistent, with minimal lag time to record transactions, and replicated to maintain data integrity. Most importantly, account data must be secure and compliant—which requires encryption for data in storage and during transactions. These urgent and disparate needs for just one data set (customer account data) can create challenges. For example:

- **Due-diligence can slow customer-facing processes:** Customers want fast loan decisions, on-demand account openings, and fast access to deposits. But required processes for verifying customer identity may call for searches through disparate public and private data sets. By pooling diverse data, and tagging data and metadata, financial firms can speed searches and yield more accurate results.
- **Personally identifiable information must be carefully handled:** Financial firms collect years of private data for their customers, including driver's license and tax returns, which may not have a clear bearing on the transaction at hand. But regulations such as GDPR, which are designed to give individuals control over how personally identifiable data is used, may limit how the organization stores and uses the collected data. Data must be identified and tagged as "personally identifiable," and then securely managed and stored, for fast access at a later date.
- **Mobile transactions and public cloud add complexity:** Mobile and public cloud applications introduce a new security challenge, as the firm loses direct control over sensitive data that has been downloaded onto a mobile device or put onto the cloud. Financial firms must ensure that all data is encrypted at the source, as well as in-transit; and/or prevent data from being stored on the device; and wipe the device clean when it is no longer in use.

Complex Back-Office Systems

LEVERAGE DATA TO DERIVE INSIGHT AND INTRODUCE EFFICIENCY

To run their operations, most financial firms use a combination of traditional and new (cloud-native) solutions—with data stores often tied to a particular workload. Unfortunately, this challenges the firm's ability to access and use the data efficiently, and to provide a seamless customer experience. Cloud-native or hybrid cloud-based applications must be integrated with existing back-office systems including ERP and CRM systems. Collected data will need to be pooled and prepped on a continuous basis. Through the adoption of technologies such as Docker, Kubernetes, and RESTful APIs, clients can enjoy ease of integration and data-sharing, as well as greater efficiency. The emergence of IoT devices such as Kerv rings for payment, and drones for surveillance, adds further integration and data management complexities, as well as drives the adoption of edge computing.

For due diligence, many organizations still strongly rely on manual processes. However, processes that rely on human judgment may result in inconsistent treatment of different populations. In recent years, financial firms have come under greater scrutiny by regulators, thanks to laws such as KYC, AML, and similar regulations. Firms are increasingly turning to AI and machine learning to aid in their analysis; e.g., identifying fraud patterns and minimizing false positives. To do so, firms need to conduct supervised, accelerated deep learning with access to large sets of customer data.

Data requirements: Financial firms must ensure access to a broad variety of data to support their back-office systems. Data that is collected from multiple public and private sources will require curation and pooling for analysis, before storing the data (or meta-data) for compliance audits. Each data source may be subject to varying handling requirements and retention timeframes (e.g., personally identifiable data must be tagged and handled differently under GDPR). As such, the organization may be required to ensure continual data integrity and availability, without relying on backup solutions that may offer inadequate Recovery Time or Recovery Point Objectives.

Actuarial, Risk and Liquidity Analytics

ACHIEVING PROFITABILITY WITHOUT SACRIFICING COMPLIANCE OR SOLVENCY

In the highly competitive insurance and capital markets, organizations are leveraging advanced analytics and artificial intelligence to improve their bottom line. This requires access to a variety of data assets, both on-premises and in the cloud. It also means complying with increased regulatory scrutiny due to more stringent solvency requirements enacted after the crisis of 2008 to 2009.

Data Requirements: More stringent rules governing risk and liquidity add complexity for firms of all types. The Basel rules and the proposed International Capital Standard (ICS) will require firms to implement new risk models, use more data, and conduct more detailed analysis frequently. The shift from IBOR to ARR adds greater complexity to risk modeling.

Analytics-intensive workloads such as Monte Carlo simulations for financial risk and actuarial analysis—traditionally run on on-premises high performance grids—are being migrated to a hybrid cloud environment. Such an environment delivers low-latency, secure network connections (since large data transfers can be impacted by network latency); a data-aware computing environment tuned for analytics workloads; and parallel file storage systems that support scale out analysis. The storage and compute infrastructure supporting such workloads must be flexible to accommodate constant changes like spikes in demand and data aging. A mixture of economical tape, distributed parallel file/object storage, flash-based and in-memory storage can help firms meet speed and cost efficiency requirements.

Targeted Marketing and Customer Support

INCREASE CUSTOMER VALUE AND SATISFACTION

Faced with thin margins, increased competition, and fickle customers, firms must work harder to retain and upsell customers. Yet, with fewer live interactions, firms have less opportunity to review accounts or upsell products. As such, more firms are leveraging predictive analytics to understand the potential long-term value of each customer, and investing in targeted marketing and support activities designed to enhance the customer experience and increase revenue.

Data requirements: A positive customer experience requires a single view of the customer, accessible to all firm employees, and comprising current and historical data. To this pool of data, firms can apply predictive analytics to create customized promotions or product offers. The extensive dataset likely includes data with different requirements: for example, historical data may be stored in a low-cost active archive that can tolerate delay; but current customer transactions would be stored in a primary database that enables immediate access to customer support personnel—or, increasingly, AI-based chatbots. When all customer data—past and present—is pooled, the resulting large data set can support machine learning functionality for training chatbots, as well as a distributed parallel file/object storage environment.

HOW STORAGE IMPACTS FINANCIAL FIRMS' ABILITY TO LEVERAGE DATA

As financial services organizations create, acquire, and use more data—whether driven by needs for innovation, efficiency, or compliance—the way they store the data becomes more important. Traditionally, firms have maintained multiple application-specific databases in the on-premises data center. But traditional approaches to data storage can impact, or even conflict with, the organization's ability to achieve business goals. For this reason, forward-looking IT leaders have made their storage strategy an urgent priority within the digital transformation initiative.

Consider the following examples of business-critical use of data, and how the wrong storage solution can impede the firm's ability to leverage it:

- Retail customers increasingly rely on mobile and non-cash transactions. This requires **customer data to be available 24x7** (no downtime, even for scheduled maintenance) **and secured across multiple channels**.
- To compete with fintech firms for the mobile customer, traditional firms need to deliver fast service, speedy decisions, and rapid payouts. But profitability (as well as regulatory requirements) demands a reasoned analysis of each unique request or transaction to arrive at the right decision. By implementing advanced analytics tools—such as AI and machine learning—with near-real-time access to massive sets of valuable historical data, the firm can leverage its data assets to simplify and speed up account openings, claims processing, and customer support. IoT devices like drones, sensors and smart rings provide site- or event-specific data to speed transactions. This requires **a storage solution that can pool multiple data sources (on-premises and cloud), and multiple data types (structured and unstructured) for both "real time" and batch analysis**.
- In capital markets, trading decisions are often based on "past performance." By applying predictive analytics to new, non-traditional market data sources, e.g. alternative data may yield better results, and/or more innovative new products. This requires **storage that can support structured, unstructured, and semi-structured content, on-premises or in the cloud**; and that can easily integrate with a wide range of batch and real time analytics.
- Sophisticated AI and analytics tools can improve firms' risk profiles, and increase revenue. Historical data required to "train" the model may be archived on cost effective tape. Financial firms need a data management and storage solution that enables **cost-effective, intelligent and accessible "active archive" storage** to automatically manage aging and non-primary data.
- Under GDPR, personally identifiable information is now "owned" by the customer, which means the financial firm is accountable for locating, tagging, storing, and managing it appropriately. This requires data management and a **storage solution that can easily support search and tagging of data**, across large data sets.

- Cyber-resiliency will be required as cybercrimes continue to grow. The adoption of the NIST Cybersecurity Framework continues to grow as firms focus on data protection, recovery and network resiliency. Firms that fail to put in preventative measures face loss of customers, in addition to punitive damages.

To handle all the contingencies required by disparate data types and needs, firms require a **flexible, hybrid, multi-cloud storage solution**—one that allows them to derive maximum value from each data set while providing security, economics, openness, and performance as demanded in the digital age.

HYBRID, MULTI-CLOUD STORAGE: FLEXIBLE, BUT NOT ONE-SIZE-FITS-ALL

As noted, financial services firms are collecting and analyzing more data of different types. In addition to structured databases, they are managing unstructured and semi-structured data as well. For example, auto insurers may append photos, weather data, and police reports to customer claim information; and financial firms seeking to improve the customer experience may apply sentiment analysis tools to interactions across channels (including text, email, and phone calls).

Managing such diverse data can be challenging. Depending on the context, different datasets carry different data-handling requirements (for example, related to encryption, immutability, authorized access, usage, and retention time), which may vary by jurisdiction. In addition, different applications accessing a single dataset may also carry different requirements based on the application's function (for example, related to transaction processing speed, availability and uptime, backup and recovery RTO/RPO, or costs).

To efficiently and consistently manage their growing data stores, financial services firms can't rely on a single storage solution for all their needs. Nor can they continue to accumulate point-solutions for each use case—that solution is too limiting and labor-intensive for today's data-intensive businesses. The answer is a flexible data management approach that leverages multiple storage formats, media, and environments, with the ability to integrate and manage across data stores.

The right hybrid, multi-cloud storage solution will allow the organization to:

- Modernize on-premises storage with efficient software-defined, intelligent storage options, optimized for specific workload needs (e.g., high-performance, fast throughput, high capacity).
- Leverage cloud storage—public and private—for scalable, cost-effective solutions, and easy migration of data stores across environments.
- Support a mix of storage formats (object, file, and block).
- Integrate and migrate data stores, to support users and applications.
- Implement AI functionality, such as machine learning tools that can be "trained" to provide faster, more accurate decisions as more data is collected.

WHAT TO LOOK FOR IN A HYBRID, MULTI-CLOUD STORAGE SOLUTION

As they consider the storage foundation needed to support a comprehensive data management strategy, IT leaders should look for a flexible, compliant, and secure solution that can meet current and future needs. The right solution will not require a "rip and replace" decision, but will allow the financial institution to invest in a platform that will grow with them. Look for a provider that offers:

- A range of hardware, software, and services, to support a variety of storage needs, both on-premises and in the cloud, with easy migration as needs change. The solution should offer:
  - Cost-effective multi- and single-tenant cloud options.
  - On-premises systems in a range of sizes/capacity, priced to support needs.
- A sophisticated, software-defined storage platform that simplifies management across premises and cloud.
- Encryption integrated into the solution, to support security, compliance, and privacy needs.
- Support for cost-effective data durability and availability across regions or environments, without unnecessary replication.
- Support for multiple Application Programming Interfaces (APIs) and next-generation open technologies for analytics and deep learning, such as TensorFlow, CAFFE, and Spark.
- A long history of market leadership in storage, databases, security, and analytics/AI.
- Expertise in the financial services industry, with the right products and technical staff who understand the unique needs of financial services.
- Professional and managed services, as needed, to assist with planning, designing, implementing, and managing the storage solution.

GETTING STARTED: A CHECKLIST FOR FINANCIAL IT LEADERS

Implementing an effective data management strategy will not happen overnight—but starting on the journey can yield benefits in the short and long term. Here are some steps you can start taking today:

Start with a defined project and clear objectives: A "fast-win" that delivers tangible results within a reasonable timeframe will earn support (and budget) for the greater initiative from the C-suite and critical stakeholders. To select a project, consider your company's top business priorities—for example, to improve the customer experience, do you need a single customer view across channels? To enhance marketing efforts, can you use AI tools to predict the most profitable customers over their lifetime?

Bring the right team together: Many organizations are creating a "chief data officer" position to lead the data management strategy and implementation. Support the leader with a team that includes expertise in functions such as IT infrastructure and cloud, storage and AI, development and operations, compliance and risk analysis, as well as critical line-of-business stakeholders.

Pool your data: Siloed databases that are exposed to specific applications are placing an unnecessary burden on your productivity. To unlock the value of your data—including archived and older data—break down the silos. Tag data and metadata to facilitate searches and simplify compliance. By creating large, pooled data sets, you can enhance the power of AI and reuse data in ways you can't even imagine yet.

Consider security and compliance needs: Security needs may be dictated by the specific content of the data set (e.g., personally identifiable information), and/or the context (e.g., proprietary decision algorithms).

- First, ensure you have a security policy that governs how the data and apps are stored and handled, addressing access, encryption, availability, and compliance requirements. The security policy should be applied consistently across hybrid domains (cloud or premises).
- Next, ensure that each stakeholder—developers, administrators, and employee users—is trained on the security policy and has appropriate access permissions. Tie your permissions to your HR data base, so that permissions are revoked when employees leave.
- Finally, regularly review the policy for suitability and internal compliance.

Build data management into your Dev/Ops processes: Too often, developers build and test an app in the cloud—only to discover that in the production environment, application performance suffers from network-induced latency. Conversely, an app developed and tested on premises using legacy storage may not scale as needed. To speed time-to-market and improve app performance, developers and ops teams should ensure that data-intense workloads operate in a hybrid environment, comprising both on-premises and cloud storage.

Engage an expert partner: Incorporating an effective data strategy into digital transformation initiatives can be daunting, especially for firms that have limited resources and expertise on staff. That is why financial services firms are turning to experts for assistance. Fully 96% of financial firms engage a third-party for assistance in developing, implementing, and managing their digital transformation. Just be sure your choice of partner has particular expertise in data management.

THE LAST WORD

In the future, even more than today, the success of financial services firms will depend on their ability to create value from data. IT leaders can prepare their firms for future growth by implementing a comprehensive and cohesive storage solution. The right solution can help the organization determine:

- What data they have at their fingertips, and how to maximize business insights.
- Why certain customers leave for competitors, and what activities will convince them to stay.
- How the organization can comply with regulations, with minimal investment of time and budget.
- When to upgrade or migrate legacy storage solutions, to maximize application performance.
- Where to place storage (cloud or on-premises, or both) for optimal cost-effectiveness.

As stewards of private customer data, as well as their companies' proprietary operational data, financial institutions have a responsibility to safeguard and manage it in ways that meet regulatory requirements, business standards, and the organization's business goals. A flexible, hybrid, multi-cloud storage solution is essential to success.

FROST & SULLIVAN

SILICON VALLEY | 3211 Scott Blvd, Santa Clara, CA 95054
Tel +1 650.475.4500 | Fax +1 650.475.1571

SAN ANTONIO | 7550 West Interstate 10, Suite 400, San Antonio, Texas 78229-5616
Tel +1 210.348.1000 | Fax +1 210.348.1003

LONDON | Floor 3 - Building 5, Chiswick Business Park, 566 Chiswick High Road, London W4 5YF
TEL +44 (0)20 8996 8500 | FAX +44 (0)20 8994 1389

Frost & Sullivan, the Growth Partnership Company, works in collaboration with clients to leverage visionary innovation that addresses the global challenges and related growth opportunities that will make or break today's market participants. For more than 50 years, we have been developing growth strategies for the Global 1000, emerging businesses, the public sector and the investment community. Is your organization prepared for the next profound wave of industry convergence, disruptive technologies, increasing competitive intensity, Mega Trends, breakthrough best practices, changing customer dynamics and emerging economies?