Couchbase

SOLUTION BRIEF

Financial Services Industry

Introduction

The financial services industry is undergoing a profound digital transformation fueled by shifting consumer expectations, emerging technologies, and intensifying regulatory demands. Customers increasingly expect real-time, personalized services on par with digital-native experiences, while financial institutions must modernize legacy infrastructure to stay competitive. According to Deloitte, 45% of financial institutions, who are considered pioneers in generative AI (GenAI), are already piloting use cases, including hyper-personalized advice and automated compliance workflows.

A recent report from the World Economic Forum revealed that financial services firms invested $35 billion in AI in 2023 alone, with that figure projected to nearly triple to $97 billion by 2027—underscoring the sector's leadership in technology adoption in this area. However, the report also highlights an important nuance: while AI has improved processes like fraud detection, risk analysis, and customer engagement, most organizations have yet to fully reimagine their business models around these capabilities.

To thrive in this environment, financial institutions need agile, scalable platforms that support always-on applications, real-time intelligence, and seamless integration with AI systems—all while maintaining robust security and compliance. This is where Couchbase provides a significant competitive edge.

Overcoming AI Implementation Barriers in Financial Services

While financial institutions recognize AI's transformative potential, many face significant implementation challenges that create hesitancy and slow adoption. These barriers stem from legitimate concerns about organizational readiness, data security, and operational control that must be addressed before deploying AI at enterprise scale.

Revolut

" For our customers, the loss of $100 can mean the difference between a pleasant holiday and an experience filled with frustration and resentment. Couchbase has never failed us or our customers."

— Dmitri Lihhatsov
Financial Crime Product Owner, Revolut

Organizational Readiness Challenges:

Many financial services teams lack experience with the rapidly evolving landscape of AI tools, models, and development techniques. The complexity of choosing appropriate solutions and integrating them into existing workflows creates uncertainty and slows implementation timelines.

Data Architecture and Security Concerns:

Financial institutions must balance AI's need for comprehensive data access with strict requirements to protect proprietary information. Traditional architectures struggle to provide secure data sharing mechanisms that prevent oversharing sensitive enterprise data while still enabling effective AI training and inference. Sharing proprietary data with LLMs introduces risk, and organizations need rigorous control over data pipelines, models, and decision logs.

AI Hallucination and Validation Issues:

Without targeted prompting techniques like RAG and proper validation frameworks, institutions will not trust AI responses or allow autonomous actions. The risk of AI generating incorrect or misleading information poses significant regulatory and reputational risks. This requires contextualization via retrieval augmented generation, alongside prompt questions posed to large language models (LLMs) so the models provide their best answers. Also, the subsequent capture of conversational transcripts should be evaluated for accuracy through robust verification processes before AI recommendations can be acted upon.

RAG Implementation Complexity:

RAG workflows require sophisticated data handling across multiple stages—from initial data ingestion and vector creation to conversation management and post-processing validation. Each stage generates JSON-formatted data that must be stored, queried, and analyzed at scale with millisecond response times.

Guardrails and Human Oversight Requirements:

Enterprises need comprehensive controls to prevent drift or rogue automation. The fear of uncontrolled autonomous behavior demands guardrail mechanisms and human-in-the-loop approval processes.

Couchbase helps address these AI implementation barriers by coordinating data exchanges among itself, AI models and the software programs (agents) driving them. It is important to note that information exchanges with GenAI models are text-based, which is why these AI workflows are best implemented using JSON, a text-based data model format. JSON is why Couchbase can support the entire AI data life cycle. From storing diverse data sources for RAG workflows to maintaining conversation transcripts for validation models, Couchbase provides the high-performance, secure foundation that enables confident AI deployment for financial services applications.

FICO

" We looked at Couchbase, we looked at Cassandra, we looked at Mongo. We found that the replication technology across data centers for Couchbase was superior, especially for the large workloads.

— Claus Moldt, CIO, FICO

What Couchbase Does

Couchbase is the developer data platform for critical applications in our AI world that provides fast, scalable, and flexible data solutions that power modern applications. It is a multi-purpose database that consolidates data caching and storage, SQL++ query techniques, full-text search, analytics, vector indexing and search, and real-time data synchronization into a unified JSON-centric architecture. The platform supports sub-millisecond responsiveness, making it ideal for mission-critical applications such as fraud detection, personalized digital banking, and real-time trading systems. By combining a distributed, memory-first architecture with flexible JSON data modeling, Couchbase overcomes many of the pitfalls associated with rigid, traditional, relational databases. The architecture delivers continuous availability, and unparalleled scalability – key ingredients for any financial services company seeking to thrive in today's fast-paced environment. Couchbase is deployable across on-premises, hybrid, cloud, or multi-cloud environments, supporting use cases from real-time mobile apps to AI-powered edge computing. It also offers built-in security features, including role-based access controls, encryption, and audit logging, ensuring compliance with data protection regulations.

Problems Faced by Financial Services Companies

Financial institutions operate in an environment of sky-high client expectations and relentless competition. Furthermore, organizations are often navigating complex digital transformations while contending with legacy systems and evolving regulatory expectations, and heightened client demands. The need to modernize infrastructure, unify data, and enable real-time intelligence is urgent—but many firms remain constrained by outdated architectures and fragmented data ecosystems. Below are the most pressing challenges they face today:

- **Legacy Infrastructure:** Many financial services teams still rely on decades-old core systems that were never designed for modern workloads. These monolithic platforms make it difficult to roll out new digital services, integrate APIs, or support real-time analytics—slowing innovation and increasing technical debt. Upgrades are often expensive and risky, requiring lengthy planning and compliance review.
- **Siloed Data Systems:** Data is often dispersed across lines of business and regional systems, making it hard to deliver a unified client experience. This fragmentation leads to duplicate records, incomplete profiles, and delayed insights—creating operational inefficiencies and hindering fraud detection, marketing personalization, and compliance efforts.
- **Rising Regulatory Demands:** Compliance expectations are rising across the globe, from AML and KYC to emerging ESG reporting mandates. Regulators now require granular data lineage, audit trails, and real-time visibility into transactions. Many traditional systems are too rigid to accommodate the frequent updates and reporting agility needed.
- **Cybersecurity and Fraud Threats:** As digital transactions grow, so do opportunities for fraud and cyberattacks. Institutions need to identify and respond to anomalies within milliseconds—not hours. But legacy platforms often lack the real-time data pipelines and event-driven architecture required to flag suspicious behavior before damage is done.

- **Client Demands for Personalization:** Financial clients increasingly expect Amazon-like experiences: proactive advice, dynamic content, and offers tailored to their life stage and behavior. Without the ability to capture and act on real-time signals, financial institutions fail to meet client expectations around customized product recommendations, contextual insights, and tailored financial journeys.
- **High Operational Costs:** Operating multiple, disconnected systems drives up infrastructure and personnel costs. Integrating data across these systems often requires manual processes or expensive third-party tools. This complexity diverts budget and attention away from innovation and increases time to market for new products.

How Competitors Are Struggling to Address Financial Services Challenges

Traditional relational databases are increasingly inadequate for the demands of modern financial services applications. These systems were not designed to accommodate the speed and scale of unstructured data that today's financial applications require. As financial institutions pursue real-time fraud detection, AI-powered personalization, and dynamic pricing models, many competitors fall short—lacking native support for real-time processing and machine learning integration. This limits the ability of financial institutions to deliver intelligent, responsive client experiences and puts them at a disadvantage in fast-moving markets.

Moreover, many competitors offer limited or no mobile synchronization capabilities, resulting in poor offline functionality and frustrating user experiences in low-connectivity environments. Their fragmented architectures may require separate tools for caching, full-text search, analytics, and data storage—introducing latency, raising infrastructure complexity, and increasing administrative burden. Robust security control and governance issues compound across these siloed technologies, which makes regulatory compliance harder to enforce across global, distributed systems. These platforms also often lack the elasticity to scale during high-traffic events leading to service degradation or outages at critical moments. Ultimately, financial institutions are forced to cobble together multiple vendors and technologies to meet their needs, increasing costs, complicating operations, and adding long-term technical debt.

How Couchbase Helps Address These Problems and the Value it Provides

As financial institutions strive to modernize operations, meet growing regulatory demands, and deliver real-time, personalized services, legacy technologies often fall short. Couchbase offers a unified, high-performance data platform purpose-built for today's digital financial landscape. Unlike fragmented systems that require multiple point solutions, Couchbase combines caching, synchronization, search, and analytics with optimized data persistence and indexing into a single architecture. This allows financial services organizations to eliminate bottlenecks, accelerate innovation, and streamline their infrastructure—all while ensuring compliance and scalability.

Couchbase addresses these challenges through a single platform that meets the diverse operational and regulatory needs of financial services organizations:

- **Scalable Architecture:** Couchbase's distributed design supports both vertical and horizontal scaling across multiple nodes and geographies, enabling financial institutions to build applications that can handle millions of concurrent users and real-time transactions. Features like automatic sharding, replication, and workload isolation help applications maintain performance and resilience, even during market surges or infrastructure migrations.
- **Real-Time Data Access:** With Couchbase, financial applications can access and act on operational data with sub-millisecond latency, allowing for up-to-the-second visibility into customer transactions, fraud signals, and compliance metrics. This enables use cases such as dynamic credit scoring, real-time AML monitoring, and instant loan approvals.
- **Mobile and Edge Support:** Couchbase Mobile ensures seamless data synchronization and offline availability across mobile apps, field service devices, and ATM networks. This guarantees consistent user experiences, even in low-connectivity environments, while preserving security and compliance standards.
- **AI-Ready Infrastructure:** Built-in full-text search, vector indexing and search, and Enterprise Analytics provide an ideal foundation for supporting AI-enabled applications. Whether training fraud detection models, building agentic systems, or powering hyper-personalized financial recommendations, Couchbase provides fast, reliable access to real-time and historical data financial institutions can rely on.
- **Security and Compliance:** Couchbase meets rigorous security requirements with enterprise-grade features such as role-based access controls, encryption for data in motion and at rest, and detailed audit logging. These capabilities help ensure compliance with evolving financial regulations, including PCI DSS, GDPR, and local data residency mandates.
- **Operational Efficiency:** By consolidating caching, database, search, and Enterprise Analytics into a single platform, Couchbase reduces architectural complexity and integration overhead. This streamlines development cycles, accelerates time to market, and significantly lowers maintenance and operational costs—freeing up resources for innovation.

The Value Couchbase Provides

- **Unmatched Speed and Availability:** Enables sub-millisecond latency and 24/7 uptime, even during peak loads, ensuring timely trade execution, fraud alerts, and customer service.
- **Lower Total Cost of Ownership:** Consolidates database capabilities (e.g., caching, vector and full text search, analytics) into a single platform, reducing licensing and operational overhead.
- **Improved Developer Velocity:** Flexible JSON schema, SQL++ queries, and developer SDKs accelerate feature development and reduce time to market.

- **AI Enablement:** Real-time ingestion and analysis of data feeds allows financial institutions to deploy responsive AI applications for use cases ranging from underwriting to risk analysis.
- **Cloud Flexibility:** Deployable in hybrid, multi-cloud, or on-prem environments, Couchbase meets the varied infrastructure strategies of global financial institutions.

Couchbase Features for Financial Services

Here's how Couchbase's features solve the technical challenges faced by financial institutions:

Root Cause (Technical)	Couchbase Feature/Function	Couchbase Advantage
Legacy infrastructure and slow performance	In-memory caching and distributed architecture	High-speed, real-time data access
Siloed data and delayed processing	Multi-model data + full-text + operational analytics	Unified view and quicker insights
Fraud and anomaly detection	Vector search, online feature store and event-based triggers	Instant detection of suspicious behavior
Mobile and offline banking	Couchbase Mobile and Sync Services	Seamless sync and continuity even without connectivity
Data governance and audit	Role-based access, encryption, audit logs	Regulatory compliance and secure operations

AI Applications and Examples

AI is no longer a futuristic investment for financial services companies—it is an operational imperative. Banks and financial institutions are doubling down on AI to enhance underwriting accuracy, optimize client interactions, and mitigate risks in real time.

According to a recent NVIDIA Survey, 98% of financial leaders plan to increase AI infrastructure spending in the coming year. More than half of firms now view AI as essential to their long-term success, underscoring the technology's strategic role across the enterprise. Encouragingly, industry-wide barriers to adoption are receding: there are 50% fewer reports of AI budget constraints, and significantly fewer institutions cite data readiness as a limiting factor. As a result, financial institutions are rapidly deploying AI to drive operational efficiency, competitive differentiation, and client loyalty. To fully capitalize on this momentum, they require a high-performance database platform that delivers real-time performance, secure scalability, and seamless integration with machine learning pipelines—capabilities that Couchbase was purpose-built to support.

WELLS FARGO

"We have a lot of data in Oracle, which is mainly used for reporting purposes. But the heart of the data – where the decisions are made – is in Couchbase because that is where high-performance throughput is needed."

— Piyush Sharma, Vice President, Wells Fargo

1. **Real-Time Fraud Detection:** Financial firms can use AI models to analyze transaction data in real time and detect anomalies indicative of fraud. Couchbase's low-latency data access supports immediate detection and response.
2. **Hyper-Personalized Banking:** Machine learning algorithms leverage behavioral, transactional, and contextual data to deliver personalized insights and product recommendations. Couchbase ensures that models have instant access to live data.
3. **Credit Risk Scoring:** AI-based credit models now factor in non-traditional data sources like rent payments, utility bills, and employment history. Couchbase's flexible data model supports ingesting and querying diverse data types quickly.
4. **Automated Compliance Monitoring:** Natural Language Processing (NLP) and AI tools monitor communications and transactions for regulatory violations. Couchbase delivers the real-time throughput needed for effective oversight.
5. **AI-Driven Client Support:** AI-powered chatbots need instant access to client data to resolve issues. Couchbase provides this real-time connectivity, improving resolution rates and client satisfaction.

Questions to Ask Yourself

1. Is your current database infrastructure capable of supporting AI at scale?
2. Are you able to provide clients with real-time, hyper-personalized experiences?
3. Can your systems scale elastically to meet transaction peaks without degrading performance?
4. Are mobile and offline use cases fully integrated into your data strategy?
5. How much are you spending maintaining legacy infrastructure and disconnected services?
6. Can your systems deliver the auditability and security necessary to meet global regulatory demands?
7. How would a single modern data platform for operational, analytical, and AI workloads simplify your architecture and speed development?

"Couchbase's elasticity gives us the ability to scale up and scale down as needed to handle peak times. Our cloud deployments play a big role in optimizing costs."

— Animesh Jha,
VP of Fraud Business,
Wibmo

Customers Case Studies

1. **FICO** - FICO's Falcon Fraud Manager is widely considered to be the #1 fraud detection platform in the world and utilizes AI to help protect customers from fraudulent charges. The platform handles a constantly growing number of accounts and customers – scoring 65% of the world's credit/debit cards. However, the company's relational database couldn't scale throughput fast enough to keep up. FICO chose Couchbase to support its profiling solution, storing hundreds of millions of card and account profiles with updates based on real-time consumer activity. Couchbase delivers less than one millisecond response times with its memory-first architecture, and built-in reliability keeps FICO's application running 24/7.
2. **Wells Fargo** - Wells Fargo, the world's second-largest bank by market capitalization and the fourth-largest bank in the U.S. by total assets, uses FICO's Falcon Fraud Manager, along with Couchbase's NoSQL database to support its fraud monitoring infrastructure. Wells Fargo applied machine learning analytics to internal and third-party data to identify and adapt to sophisticated fraud attacks in real time. Now, 100% of transactions are processed in real time for fraud – totaling 50+ million transactions per day – at less than 10 ms per operation.
3. **Wibmo** - Wibmo is a global full-stack PayTech company and an industry leader in payment security and digital payments in emerging markets that handles 4-5 million real-time payment transactions per day with 50 ms–1 sec response times. The company is India's largest authentication service provider and one of the world's leading digital payment markets. It also offers fraud and risk management solutions, mobile payments, prepaid solutions, and a host of merchant-acquiring services.
4. **Probayes** - Probayes was founded in 2003 and became a subsidiary of the La Poste Group in 2016. The company specializes in artificial intelligence, creating tailored SaaS solutions to assist businesses across diverse industries, including automotive, defense, finance, insurance, supply chain, and retail. Among its range of products is fraudIA, a solution designed to help financial institutions detect fraud in credit and debit card transactions. Leveraging Couchbase's in-memory capabilities significantly reduced the duration of each operation. As a result, fraudIA's processing capacity now handles 450 transactions per second – more than double its previous throughput – while maintaining transaction times between 30 and 50 milliseconds.
5. **Equifax** - Equifax is best known for providing credit lenders with the information they use to make consumer loans. When a top lender announced major changes in the amount and type of data they required, Equifax had to act fast to update their system. They decided to switch to a NoSQL database to get the high performance and scalability needed to provide 5-millisecond response times while handling 1.5 billion constantly changing records. A key factor in choosing Couchbase over MongoDB™ and Redis was that only Couchbase enabled Equifax to scale individual workloads separately.

6. **Wallbid** - Wallbid is a world-class embedded insurance enabler. The Wallbid platform is a full-stack insurance distribution platform that integrates new-generation insurance products into any digital ecosystem, enriching the customer's digital experience with easily accessible, personalized, and affordable insurance solutions in a matter of weeks, not months. The company's disruptive, scalable technology is embedded into web apps, mobile apps, and in-store systems to deliver insurance products exactly when customers need them, in any country, language, or currency. Couchbase Capella provides the performance and scalability Wallbid needed, and also lowered the total cost of ownership by consolidating its technology stack.
7. **Revolut** - Revolut developed Sherlock, a machine learning-based fraud prevention system, to counter the growing threat of financial fraud. Sherlock's high speed caching enabled machine learning algorithms to continually learn and update rules – catching 96% of fraudulent transactions for its 12+ million customers. Within the first year in production with Couchbase, a 75% improvement over industry standards saved more than $3M. Revolut selected Couchbase because of its inherent architectural advantages – including speed, agility, and scalability – that address the ever-changing data needs of users and merchants.
8. **BR-DGE** - BR-DGE is a payments technology company that powers billions of monthly global transactions for e-merchants and their customers as well as the partners in their growing payments ecosystem. BR-DGE's modular, independent payment orchestration platform is simple to integrate and adopt, enabling merchants to easily streamline payments, consolidate reporting, and speed up innovation. BR-DGE chose Couchbase to ensure they had the modern NoSQL capabilities they needed to harness vast volumes of sensitive financial data in near real time with high availability and scalability.

Conclusion

Financial services organizations must respond to rising client expectations, the threat of digital-native competitors, and the opportunities and risks posed by AI. Couchbase provides a modern, AI-ready data platform that helps institutions scale securely, operate efficiently, and innovate faster. With Couchbase, financial institutions can power digital experiences that are real-time, personalized, and resilient—while meeting the most stringent compliance and operational requirements.

Modern customer experiences need a flexible database platform that can power applications spanning from cloud to edge and everything in between. Couchbase's mission is to simplify how developers and architects develop, deploy and consume modern applications wherever they are. We have reimagined the database with our fast, flexible and affordable cloud database platform Capella, allowing organizations to quickly build applications that deliver premium experiences to their customers—all with best-in-class price performance. More than 30% of the Fortune 100 trust Couchbase to power their modern applications.

For more information, visit www.couchbase.com