

Modernize Your Payments Architecture

Why and how to bring your database
into the twenty-first century



1. Navigating a Rapidly Changing Payments Industry

Can your data architecture handle continuously evolving requirements?

The payments industry is going through a period of massive disruption. Consumers increasingly expect a fast, easy payment process, coupled with immediate, uninterrupted access to account information and services.

Merchants demand rapid settlements and value-added services, including customer insights. Meanwhile, new regulations for data privacy, data governance, and payment response times are adding volatility to an already uncertain environment. Incumbent banks, insurance companies, and payment service providers (PSPs) can't afford to stand still. Sensing opportunity in a \$2 trillion industry, venture capitalists poured \$34.5 billion into new fintech startups in 2019 alone.¹

At the same time, technology behemoths such as Apple, Facebook, and Amazon are diving into the payments industry, bringing tremendous financial and technological resources. They're using state-of-the-art technology, and they're able to learn from and iterate on data in a way that is startlingly fast. The result: These new entrants entice customers and merchants away from incumbents by driving down transaction fees and offering superior user experiences.

In many cases, the incumbents are hobbled by legacy technologies. At institutions with generations of history, the underlying technologies that power payments haven't changed in more than three decades. These technologies were introduced long before people could conduct payment transactions with a few taps on a screen or even check bank balances 24/7. Today, outdated technologies are responsible for critical

components of large, complicated architectures that are expensive to maintain and unable to keep pace with the industry's continuous change.

To stay competitive in payments, many businesses will need to update their foundational data architecture, especially their database. Without a robust, modern database, new apps and other services won't be able to deliver significant value to the business.

What kind of database can meet the rigorous demands of today's payments industry? It must be flexible enough to accommodate changing technical requirements while running on cost-effective commodity hardware or in the cloud. The right database will meet user expectations for strong performance and availability. And it will facilitate the production of new customer insights that can help businesses develop differentiating services.

Many payments industry organizations rely on technology developed long before e-commerce and mobile devices.

¹ CB Insights, ["The State Of Fintech: Investment & Sector Trends To Watch,"](#) Q4 2019



2. Drivers of Industry Disruption

Changing consumer and merchant expectations, shifting regulations, and new entrants are causing massive disruption.

Multiple factors are combining to create significant disruption in the payments industry, and technology is the common thread. It enables consumers to make payments in new ways, spurs the creation of new regulations, and allows new entrants to create inroads at the expense of established players.

Changing consumer expectations

The continued rise of e-commerce and mobile technologies have dramatically changed both consumer and merchant expectations for payments. Whether taking a taxi or buying groceries, consumers expect to be able to pay for goods and services with mobile devices. They also want to pay utility bills online, receive tax refunds electronically, and send money to relatives in other countries through simple mobile apps.

Consumers expect all payment transactions to be fast, easy and real-time – whether they are tapping on a mobile device screen, using a point-of-sale device in a store, interacting with a call center, or visiting a bank branch. They expect access to their account information to be similarly seamless. Merchants also have high expectations – for faster settlement of funds, insight into customer transactions, and automated maintenance of systems.

While these expectations may seem high, players that can't deliver put themselves at risk. Today it is easier than ever for consumers to switch banks, and for merchants to swap in a service provider capable of delivering superior customer experiences.

Shifting regulations

Government agencies and industry standards bodies are continuously producing new regulations to protect consumers, thwart criminal activity, strengthen financial stability, establish standards, and foster innovation. These regulations have important implications for the technologies that support payment processes.

- **Anti-money laundering (AML)** and Know Your Customer (KYC) regulations are spurring a transition from batch-operated weekly payment reporting to real-time reporting.
- **The ISO 20022 standard**, which establishes a common language for financial communications, requires businesses to store and manage more data, in larger data messaging packets, for longer periods of time.
- **The European Union's Revised Payment Services Directive (PSD2)** and open banking directives are driving financial institutions in Europe and elsewhere to develop and implement new payment application programming interfaces (APIs) to facilitate access to consumer data.



Compliance can place significant strains on technology infrastructures and budgets. Many businesses already spend a significant percent of their payment budget on compliance. For businesses using aging, expensive technologies such as mainframes, the costs of compliance will only keep rising.

New market participants

Payments data is becoming increasingly valuable, as merchants leverage it to optimize advertising, promotions, and product selection. New entrants into the payments industry – especially major technology enterprises such as Google, Amazon, Facebook, and Apple – see a tremendous opportunity to capitalize on growing collections of consumer data and to use modern technology to drive down transaction fees.

A tidal wave of new payments industry entrants

\$243⁺B

Combined valuation of fintech unicorns at the end of 2019²

\$5B

In small business loans from Amazon³

\$440M

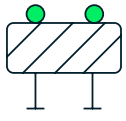
Apple Pay users⁴

² CB Insights, [“The State Of Fintech: Investment & Sector Trends To Watch,”](#) Q4 2019

³ The Motley Fool, [“Amazon and Goldman Sachs Wade Deeper Into Financial Services,”](#) February 2, 2020

⁴ J. Clement, [“Apple Pay usage among iPhone user base worldwide 2016-2019,”](#) December 16, 2019





3. Is Your Architecture Holding You Back?

Legacy technologies are often unable to provide sufficient agility, deliver responsive customer experiences, avoid downtime, or control costs.

Competing effectively in payments means adapting to changing requirements, delivering responsive customer experiences, and controlling costs – and for that, it's essential to move beyond legacy technologies.

Lack of agility

Consumer trends, such as the move to contactless payments, mobile wallets, peer-to-peer transfers, and cryptocurrency, require new data types that legacy systems often can't handle. Meanwhile, data volumes are exploding, straining existing database capacity. New regulations will require organizations to store more data, generate reports faster, and support new payment schemes.

An outdated and complex architecture makes it extremely difficult to accommodate these changes. And attempting to develop new, modern apps with older systems can result in slow, multi-month release cycles. Applications need to be built faster and continuously evolve. Software developers are constrained by siloed data and the tight coupling of payment platforms with legacy systems. Without easy access to data and scalable cloud resources, developers cannot create innovative apps.

Poor customer experiences

Delivering the responsive experiences that customers demand is difficult even using modern technology. But now applications have to serve millions, not thousands—something that's almost impossible without a distributed database. Locking the data in silos only makes it worse. Storing user attributes, activity data, and payment histories in separate tables or databases slows fraud decisions, introduces payment delays, and makes it difficult to serve up the holistic

account information customers want. Siloed data also keeps you from truly understanding your customers. Without a 360-degree view of customer attributes and behaviors, new experiences come to market slowly, if at all.

Environments that require batch-processed analytics make it even more difficult to generate meaningful customer insights quickly enough to act on them.

Resiliency issues

Outdated payment platforms and aging software also can struggle with resiliency. Planned maintenance – and the downtime that results – is bad enough. Then there are the unexpected outages when running old, monolithic codebases on legacy relational databases. Ask 50 or more databases to interact, and an outage for one will quickly create a cascade of problems. Downtime frustrates customers and can thwart service-level agreements (SLAs), resulting in costly penalties.

High costs

Costs escalate as your mainframe does more work and stores more data – and mobile transactions are causing an explosion of work and data. A complex infrastructure with multiple legacy databases often imposes high ongoing costs for IT administration. All of these costs impose barriers to innovation. They only rise as transactions grow and regulations require longer-term data retention.





4. Defining Database Requirements

What capabilities do you need from a new database?

To deliver rich, responsive customer experiences, comply with new regulations, and control costs, organizations need to address the pain of outdated architecture. And that requires a reevaluation of your database platform.

By its nature, the payments process is unusually data-heavy – from validating a PIN at a point-of-sale terminal, analyzing a transaction for potential fraud, and checking available credit, to sending daily transactions from a merchant to a PSP, transmitting information to card associations, and transferring funds among banks. And each step could involve multiple databases.

Moving to a modern database platform is vital to accelerating the payment workflow, improving operational efficiency, and gaining flexibility for change. Here's how a modern database can help.

Flexible data model

A modern database enables you to simply and easily model data in ways that fit the changing needs of payment applications. It should be able to integrate a wide variety of source systems quickly. For many organizations, the best way to meet these requirements is to turn away from rigid relational databases and adopt a flexible document-based model.

Data access

A legacy architecture that cobbles together multiple systems makes it difficult for applications

to access all the necessary data when it's needed. Typically, only a select set of data is available in real time. That makes it much more difficult to draw insights from data and to monetize those insights. It also creates challenges for institutions that need to meet new data retention rules. A modern database should provide API-based data access, allowing additional or modified application connections to pursue new opportunities and meet changing needs.

Availability

A modern database platform must maintain the round-the-clock availability that consumers expect and regulations require. It should enable you to maintain multiple copies of data and automate recovery – without adding excessive complexity.

Scalable performance

As transactions grow and regulations require the retention of greater volumes of data, databases need to scale – without sacrificing performance or incurring excessive costs. Often, the best solution is a horizontal, scale-out approach using low-cost, commodity hardware – either on premises or in the cloud.

Global coverage

To maintain performance at scale, data needs to be where the users are. Global retailers, insurance companies, and banks are moving databases to branches and edge locations in pursuit of low-latency performance. Moving databases to clouds at the edge can help avoid the high costs of building infrastructure and maintaining a workforce in dispersed locations.

Workload isolation

Generating timely insights requires analysis of the latest, most up-to-date data – without slowing the performance of payment applications. The right database will allow analysis of operational data in real time without an impact on payment processes.

Data locality

To deliver a low-latency experience to global customers or comply with data sovereignty regulations, it's often necessary to keep data in multiple geographic locations around the world. A database platform should make it easy to keep data where it needs to be, without adding management complexity.

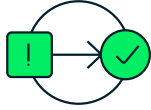
Portability

A database should provide the freedom and flexibility to move data to a private, hybrid, or public cloud environment – on any timeline. A futureproof platform eliminates vendor lock-in, allowing each workload to run on the cloud that makes the most sense.

What makes a document database different from a relational database?

- Intuitive data model simplifies and accelerates development work
- Flexible schema allows modification of fields at any time, without disruptive migrations
- Expressive query language and rich indexing enhance query flexibility
- Universal JSON standard enables you to structure data to meet application requirements
- Distributed approach improves resiliency and enables global scalability

[Learn more](#)



5. Transforming Your Payments Architecture With MongoDB

Address current challenges and prepare for the future with a document-based, distributed database.

MongoDB is a document-based, distributed database that can help modernize payment architectures. It provides the foundation for superior customer experiences, ongoing regulatory compliance, and reduced costs and complexity.

Deliver better customer experiences

High availability

Distributed fault tolerance and automated data recovery capabilities enable MongoDB to deliver five-nines availability, matching mainframe reliability. Avoid the unexpected outages and slow performance that frustrate consumers and merchants, and spur them to take their business elsewhere. By enabling you to create replica sets and conduct rolling maintenance, MongoDB helps minimize downtime and performance issues.

Elastic scalability

The cloud-based MongoDB Atlas service enables seamless on-demand scalability for growing transaction volumes. MongoDB Atlas delivers

robust performance even during sudden spikes in transactions, such as those caused by Black Friday, Boxing Day, and Singles' Day.

Real-time intelligence

Workload isolation allows you to query operational data in real time without affecting performance, making it easier to generate the customer insights that can lead to new features or services. Integrated data visualization, business intelligence tools, and data lake capabilities provide a solid foundation for advanced analytics.

Support for new payment models

You can easily onboard new payment models to meet consumer expectations, without disruption. With MongoDB, changing payment standards do not require data schema modifications or changes in the complex object relational mapping (ORM) that tracks relationships between relational tables.

Built for agile development

With flexible schemas and a document data model that naturally maps objects to code, MongoDB can cut development cycles dramatically. That means faster time to market for new applications and services, while lowering risks.

Run MongoDB on premises or in the cloud

MongoDB Enterprise Server

A powerful distributed document database that runs on your own infrastructure.

MongoDB Atlas

A fully managed, cloud-based service, available on AWS, Azure, and GCP.

Which deployment is best for you?

www.mongodb.com/try

Keep up with shifting regulations

Flexible document data model

MongoDB uses a JSON document data model that enables you to easily adopt different payment

schemes and structures, with different fields. It's simple to add new fields over time to keep pace with regulatory change. In addition, you can enhance payment data in real time by annotating data – including SWIFT messages – for AML and KYC compliance.

Horizontal scalability

MongoDB simplifies compliance with data retention rules. Organizations can keep years of data online in a queryable form at a fraction of the costs of legacy systems while maintaining consistently low response times.

Real-time analytics and reporting

Workload isolation allows anti-fraud analytics and real-time reporting to run without affecting performance.

Data locality, global coverage

MongoDB takes the complexity out of putting payment data where it needs to be – to comply with data localization regulations, to provide superior customer experiences, or for economic benefits.

Data sovereignty compliance

The cloud-based MongoDB Atlas service has been independently audited and confirmed to meet compliance standards for data safety, privacy, and security.

Reduce costs and complexity

Lower infrastructure costs

Because MongoDB runs on cost-effective commodity hardware on premises or in the cloud, it can help reduce or eliminate the high CPU costs for payment transactions incurred by outdated legacy technologies.

Reduced code complexity

Support for multi-document transactions reduces the complexity of application code, making it easier for DevOps teams to create, run, and manage applications. MongoDB Realm services and SDKs can help accelerate mobile and web development through faster iteration.

Multi-cloud flexibility

Optimize costs and tap into innovative services by capitalizing on a multi-cloud strategy. MongoDB Atlas eliminates vendor lock-in, providing the freedom to choose – and change – the cloud partners and ecosystems that best fit your requirements.

Consistency

MongoDB runs the same everywhere – on premises, in hybrid environments, and in public clouds. Move to the cloud on your timetable without refactoring.

A shared belief for innovation

At illimity, MongoDB Atlas is being used to build a 360-degree single view to improve customer experience, fight fraud, and comply with the GDPR. The key innovations include:

Internet & Mobile Banking

MongoDB Atlas has reduced delivery times for both its web and mobile banking apps.

Security & Compliance

Continuous backups, high availability across multiple regions, and detailed audit logs let the bank track operations in real time.

Non-Performing Loans

MongoDB's expressive query language, indexing, and aggregation capabilities make it possible to find and filter data, no matter how illimity needs to access it.

Credit Acquisition

These activities normally need months of calculations. Now, with a central repository and real-time analytics, illimity can better navigate data and pull results in just days.

[Find out more](#)



6. Achieving Tangible, Real-World Results With MongoDB

From well-established banks to global payments services providers, MongoDB helps businesses gain a competitive advantage in a quickly evolving field.

Laying the foundation for efficiency and innovation at Nets

A leading provider of digital payment services in Europe, Nets processes more than 8 billion card transactions annually and manages 9.1 million digital identities.

Challenges

- Consolidate a complex environment that was slowing development of modern services
- Enable fast, frictionless payment experiences

Solution

By implementing MongoDB, Nets consolidated an environment that included a variety of mainframe, custom-built, and commercial solutions.

Benefits

- Simplifying regulatory compliance
- Delivering fast, frictionless payments
- Accelerating development of new, modern services
- Gaining multi-cloud flexibility for the future

[Watch the webinar.](#)

Streamlining compliance and increasing agility at ANZ

With a history spanning more than 175 years, the Australia and New Zealand Banking Group Limited (ANZ) today operates in 32 markets with a combined customer base of 8 million customers.

Challenge

Streamline compliance by eliminating traditionally manual process

Solution

ANZ digitized documents and policies, making them scalable and customizable through an application framework based on MongoDB Atlas.

Benefits

- Simplified auditing of compliance checks and balances
- Gained the ability to dynamically manage the company's risk and compliance framework
- Accelerated responses to regulatory and market changes – the bank can now respond in days instead of months

[Explore webinars.](#)



Ready to get started?

The pace of change in the payments industry shows no signs of slowing.

To stay competitive, banks, insurance companies, PSPs, and other industry participants need to reassess their technology architecture. Replacing legacy relational databases with a new document database can enhance agility for continuously evolving requirements.

MongoDB is a modern, document database platform that can help you not only address industry challenges but also capitalize on fast-emerging opportunities. Making the move to MongoDB is a key step toward better addressing consumer expectations and achieving compliance with new regulations while controlling costs and complexity.

Begin modernizing your payments architecture today with MongoDB.



Or [contact us](#) to find out more!