How Financial Service Companies Can Successfully Migrate Critical Applications to the Cloud

RTInsights.com

Cockroach Labs

Chapter 1: Why every bank should aspire to be the Google of FinServe

Introduction

Fintech companies are disrupting the staid world of traditional banking. Financial services institutions (FSIs) are trying to keep pace, be competitive, and become relevant by modernizing operations by leveraging the same technologies as the aggressive fintech startups. Such efforts include a move to cloud and the increased use of data to derive real-time insights for decision-making and automation.

While businesses across most industries are making similar moves, FSIs have different requirements than most companies and thus must address special challenges. For example, keeping pace with changing customer desires and market conditions is driving the need for more flexible and highly scalable options when it comes to developing, deploying, maintaining, and updating applications. That's where cloud helps. It offers a low(er) cost delivery path versus traditional on-premises models. Additionally, customers are demanding highly responsive data-rich applications. The modern economy is built on such applications.

A major differentiator when FSIs develop applications or move to the cloud is that the stakes are much higher. The transactions they support and the business they conduct are the bedrock of the global economy. FSI applications are typically distributed and use many types of different data. They must easily scale, be always on, have low latency access to data, and have data that is always correct.

Certainly, every business is concerned about application performance. But FSI customers today have high expectations. They are accustomed to Facebook- or Instagram-type interactions and expect nothing less. Everything must happen in real-time. An existing customer applies for a loan, and they want an instant quote on rates. Or when a potential new customer tries to set up an account, they want it to be created on the spot.

Another differentiator when FSIs develop applications or move to the cloud is that they have an installed base of legacy systems. Specifically, FSIs have significant amounts of risk because they have legacy systems and mainframes that have been around for 20, 30, or more years. There are countless mission-critical, high-risk workloads wrapped up in legacy technology not fit for the cloud.

The risks related to these legacy systems can be bucketed into a handful of groups. Most FSIs don't or won't have staff who can manage these older systems; there are great costs associated with keeping them going; and any migration presents a significant risk.

Every business is an IT company

Just as Google and Facebook are IT companies, most organizations, including FSIs, are becoming IT companies or have already become IT companies, even if they do not think of themselves as such. A quick search of LinkedIn quantifies this trend. Such a search finds that the number of people employed at the top FSIs with the title of engineer, database administrator (DBA), or developer is:

- ✔ 36,000 at JPMC
- ✔ 26,000 at Wells Fargo
- ✔ 8,800 at Deutsche Bank
- ✔ 8,600 at Goldman Sachs

Many have been moving in that direction for a long time. They need to scale like the biggest and best IT companies, and they must modernize their applications and infrastructure. However, they face many risks versus rewards challenges when trying to meet demanding customer expectations and attract the top talent to keep ahead of the competition.

The only option is for FSIs to move to the cloud using the latest technologies that deliver unparalleled performance and enable FSIs to offer more services, meet fast-changing customer demands, and undergo a digital transformation.

Focus on infrastructure

When making a move to cloud, FSIs will have to deal with infrastructure performance and reliability issues. One major hurdle FSIs face is the need to interface to and interact with legacy systems, which run the back end of many critical industry apps. Many of the mainframes deployed decades ago in financial services are still prized for their high performance, availability, and security. Most other industries do not have such systems. FSIs must expose and incorporate data and services from such systems into their modern distributed applications. All the while, they need a way to maintain performance, reduce latency, and secure the data.

To address these issues, many FSIs are moving to application strategies based on cloud-native architectures and microservices. They are taking a forward-looking approach, rearchitecting their infrastructures for three and five years out. Compared to traditional monolithic FSI apps, such an approach offers great speed and flexibility to respond to new opportunities or provide new services, as well as the ability to scale-up to meet growing demand.

When migrating to the cloud, the main challenge is how to maintain overall application performance. What these new distributed applications require is an always-on capability, resiliency to disruptions, an ability to support real-time processing/transactions, and a way to ensure compliance with any local data protection and privacy laws. An additional challenge is that they also must develop the internal expertise to build and operate these data-rich applications at scale.

What can significantly help is an easy-to-use, high-availability, high-performance database built to address cloud scalability and performance issues. CockroachDB excels at this. CockroachDB is in use in some of the world's biggest banks, helping accelerate the transition towards cloud-first infrastructure and applications. CockroachDB gives developers a way to easily take advantage of high availability and elastic scalability features to deliver data-intensive applications that offer consistent transactions.

Chapter 2: Reducing latency and other delays that are detrimental to FSIs

Introduction

Every business is concerned with the performance of data-rich applications. But most efforts focus mainly on one aspect of performance. They look to accelerate computational speed. That could be accomplished in several ways. More processing power, memory, or high-performance storage might be added to run algorithms faster. But a different aspect plays a major role in the applications run by Financial Services Institutions (FSIs). That factor is latency.

Compared to other businesses, a small delay in a data exchange or an outage can incur extreme financial consequences. For instance, with High Frequency Trading (HFT) applications that make millions of decisions in fractions of a second, receiving data even a single millisecond faster than a competitor's systems can equate to a distinct advantage and generate significant profits. Most other businesses do not have such demands.

The importance of reduced latency can easily be put into perspective when one considers the extremes FSIs go through to reduce it. For example, in 2014, Spread Networks, which has since been acquired by Zayo Group Holdings, tunneled through the Allegheny Mountains of Pennsylvania to install a fiber-optic cable that would shave three milliseconds off communication time between the futures markets of Chicago and the stock markets of New York. The estimated cost of the project was in the hundreds of millions of dollars range. Not to be outdone, several companies have since entered the market, offering air-based transmission to cut the transmission time further.

Location, location, location

Traditionally, the main driver to reduce latency was to speed transactions, which leads to increased revenues and helps in meeting customer expectations. But now, two other significant latency aspects come into play with FSI applications. They include:

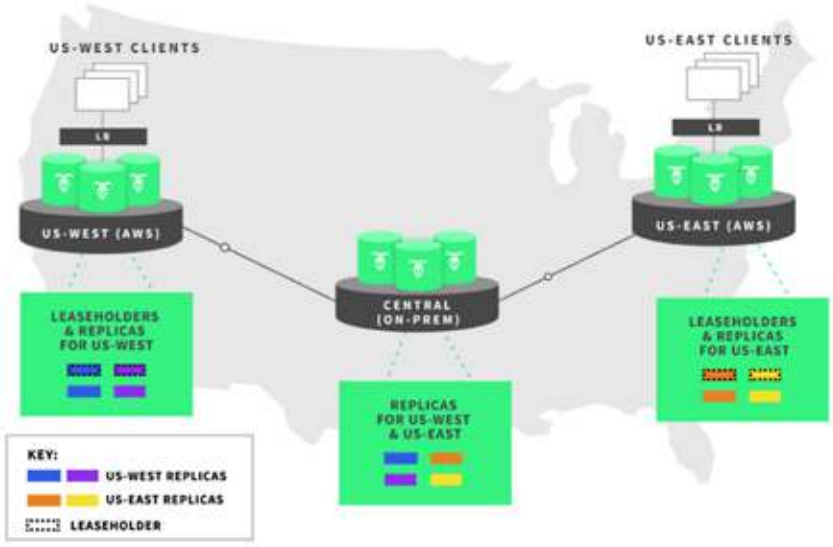
- ✔ Financial services execs and data scientists need faster access to data to make real-time intellgence business decisions.
- ✔ The increased use of AI for real-time fraud detection and regulatory compliance benefits are latency-dependent.

High-speed transmission links are one way to reduce latency in FSI distributed applications. But in most cases, companies do not have the luxury of boring through mountains and installing their own dedicated transmission lines.

Most data exchanges between elements of a distributed application run over public networks. As a result, regional, and more importantly, global distribution of customers and internal data users presents latency challenges as they expect instant, real-time access and interaction in the sub 100ms range.

Latency issues are typically addressed using fast links and high-performance switches and routers. However, even with the optimal infrastructure in place, latency remains a problem when elements of a distributed application are separated by great distances. The reason: The fastest a signal can travel between two points is limited by the speed of light. A distributed application with elements in, say, the U.S. and Singapore would experience a 200-millisecond or more round-trip delay compared to the same elements operating in the same location.

FSIs can address latency issues by putting data closer to the application or customer. In this way, data is served faster. What's needed to reduce latency is to use a distributed architecture that also supports geo-partitioning of data, keeping data close to its applications and users.



Killing two birds with one stone

Besides reducing latency and speeding analysis, putting (or retaining) data closer to the application or customer can help in another very important way: by helping manage regulatory requirements for the privacy and protection of data.

The number of countries with data protection laws is constantly growing. At the start of 2020, more than 120 countries had put legislation in place to protect data and privacy. They range from state-wide mandates like the California Consumer Privacy Act of 2018 (CCPA), which gives consumers more control over the personal information that businesses collect about them, to more expansive and impactful mandates such as the European Union's General Data Protection Regulation (GDPR).

The General Data Protection Regulation (GDPR) applies to the processing of personal data. Processing covers a wide range of operations performed on personal data, including by manual or automated means, according to the European Commission. It includes collecting, recording, organization, structuring, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, restriction, erasure, or destruction of personal data.

What's needed to reduce latency and address data protection and privacy regulations is a distributed architecture database that also supports geo-partitioning of data. An excellent example of this is CockroachDB from Cockroach Labs. CockroachDB has geo-partitioning features that keep data close to the customer even when they are moving/traveling which is relevant for payment applications. Geo-partitioning also keeps data close to the data scientist using the data. Developers can designate where data should be stored at the database, table, and row-level for low-latency reads and writes and regulatory compliance.

Chapter 3: A look to the future of transaction services in the face of modernization

Introduction

Like many industries, financial services institutions (FSIs) are undergoing dramatic change. In response to the whole world going digital and the explosion of data available to drive decision-making and customer experiences, banks are pursuing aggressive innovation in new applications and cloud infrastructure.

One thing has become clear in recent years: banks will need a new data platform to support these new requirements, ultimately replacing Oracle, IBM DB2, NoSQL, and other legacy systems.

Emerging fintech companies are challenging many FSIs. Retaining existing customers and gaining new ones will require a continuous rollout of new and innovative services. Accomplishing this will require that transaction services play a larger role in the digital transformation of FSIs. Examples of what new services are needed include:

- ✔ Dynamic pricing
- ✔ Hyper-personalized recommendations, content, and offers
- ✔ Real-time fraud analysis
- ✔ Real-time business process optimization

Supporting such services will require that FSIs make use of transaction data across the many channels their customers use when engaging the organization. FSIs must also make use of the latest advances in analytics.

A cloud-native foundation

Accomplishing all of this requires FSIs to adopt best practices for modern application development and deployment. Increasingly, that means using cloud-native architecture. Cloud-native applications or services are loosely coupled and highly distributed, as is the norm with many modern applications.

Fundamentally, a cloud-native architecture uses microservices and containers that leverage cloud-based platforms as the preferred deployment infrastructure. Microservices provide the loosely coupled application architecture, which enables deployment in highly distributed patterns.

Containers are important because developing, deploying, and maintaining FSI transactional service applications requires a lot of ongoing work. Containers offer a way for processes and applications to be bundled and run. They are portable and easy to scale. They can be used throughout an application's life cycle from development to test to production. With such an approach to creating new services, businesses get a highly dynamic system composed of independent processes that work together to provide business value.

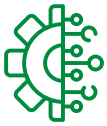
Required: Performance plus flexibility plus scalability

FSIs, and companies in other industries, have found that the move to a cloud-native approach for applications and services introduces new problems. Many traditional data platforms were not designed for distributed environments. Some may be able to scale as transaction volumes grow, but most break down as the complexity of new applications and services grows.

What's needed is a flexible, highly scalable database solution that can deliver the fast transaction rates needed while providing easy access to the transaction data for other purposes to support new services and a more personalized customer experience. Some key properties and features that help include:

Scalability: A suitable solution should be able to scale by simply adding new nodes and avoiding any manual manipulation of data. It should automatically rebalance and replicate data throughout a distrusted system.

Consistent transactions: An appropriate database should ensure that transactions only change affected data and any data written to the database is correct and valid.



Built for Kubernetes: A suitable database should be architected and built from the ground up to deliver scalability and survivability in a Kubernetes environment. It should be able to distribute data across nodes and survive any failure.

Familiarity: Any database used to support new applications and services should let a company leverage its existing SQL expertise. It should work with your current applications, align with current development approaches, and empower the data scientists.

Deployment flexibility: A database should be architected for the cloud, meaning it is designed and built from the ground up to take advantage of the scale and resiliency of the cloud. Yet, it should be capable of being deployed on-premises or across any cloud.

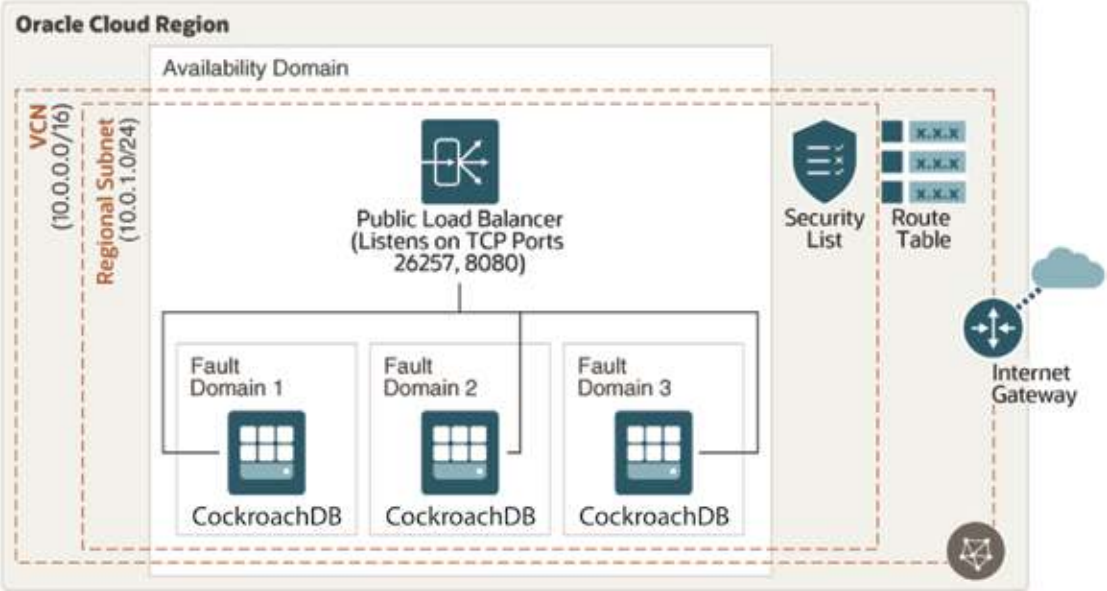
Support for geo-partitioning of data: Developers and FSIs should have the option to designate where data resides to reduce latency and thus increase performance. Geo-partitioning also is essential to meet the requirements of data protection and privacy mandates.

ACID compliance: A suitable database will guarantee ACID (atomicity, consistency, isolation, and durability) compliance in a distributed transaction across a distributed database, where no single node is responsible for all data affecting a transaction.

Selecting a technology partner

For FSIs to be more responsive to customer needs and stay ahead of the competition requires a special kind of distributed database. Like many other technologies, a company can look for a free solution and then cobble together other elements to add the essential enterprise features needed to run the thing in a production environment. Or they can partner with a solutions provider that brings both the technology and deep industry expertise needed for modern FSIs applications and services.

One company that fits the bill is Cockroach Labs, which was founded by a team of engineers dedicated to building cutting-edge systems infrastructure. It is the company behind CockroachDB, the cloud-native, distributed SQL database that provides next-level consistency, ultra-resilience, data locality, and massive scale to modern cloud applications.



CockroachDB delivers distributed SQL, combining the familiarity of relational data with limitless, elastic cloud-scale, and bulletproof resilience. CockroachDB is:

- ✔ Simple to scale as it automatically distributes data and workload demand
- ✔ Architected to handle unpredictability and survive machine, datacenter, and region failures
- ✔ Guaranteed for ACID-compliant transactions
- ✔ Cloud-native and designed for Kubernetes
- ✔ Geo-partitioning friendly, letting FSIs pin data to a specific location to reduce transaction latencies and comply with data privacy regulations.

CockroachDB is in use at a number of major banks, and enables FSIs and developers to deliver on all the promises of data-driven, modern transaction services that meet today's demanding and evolving customer expectations.

RTInsights is an independent, expert-driven web resource for senior business and IT enterprise professionals in vertical industries. We help our readers understand how they can transform their businesses to higher-value outcomes and new business models with AI, real-time analytics, and IoT. We provide clarity and direction amid the often confusing array of approaches and vendor solutions. We provide our partners with a unique combination of services and deep domain expertise to improve their product marketing, lead generation, and thought leadership activity.

Cockroach Labs is the creator of CockroachDB, the most highly evolved cloud-native, distributed SQL database on the planet. Helping companies of all sizes—and the apps they develop— to scale fast, survive anything, and thrive everywhere. CockroachDB is in use at some of the world's largest enterprises across all industries, including Equifax, Bose, Comcast and some of the largest companies in banking, retail, and media. Headquartered in New York City, Cockroach Labs is backed by Altimeter, Benchmark, Greenoaks, GV, Firstmark, Index Ventures, Lone Pine, Redpoint Ventures, Sequoia Capital, Tiger Global, and Workbench. For more information, please visit cockroachlabs.com