THE FUTURE OF FINANCE IS OPEN

How open source technology can accelerate digital transformation in financial services

E-BOOK

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INTRODUCTION

NEW COMPETITION CREATES A NEED FOR CHANGE

The financial services sector is experiencing widespread digital disruption. Banks, insurers, and wealth management firms are not only competing for customers' attention and loyalty with direct rivals, but also with pioneering consumer and technology brands offering a seamless experience that is redefining expectations. Customers want financial experiences to be as simple and intuitive as online shopping—see it, select it, buy it—and are frustrated when their financial services providers cannot provide that same experience.

Most banks, insurers, and asset managers have put some effort into building digital customer experiences or reducing costs across their organizations, but these efforts are no longer enough. Established leaders are facing loss of market share and revenue as digitally-native companies build new, agile technology platforms, unburdened by decades-old infrastructure.

It's now possible to quickly and cost-effectively build a completely new, digitally-native financial services firm with modern, highly scalable technologies. With fewer barriers, both financial services startups and established firms can take advantage of data more effectively, resulting in more targeted offerings and services for better customer experiences.

ESTABLISHED INSTITUTIONS FACE COMMON CHALLENGES

Common challenges in the financial services sector include existing, traditional systems, isolated data, and the struggle to gain the essential single view of the customer.

A typical bank has thousands of systems and interfaces in its inventory, across several generations of technology. Many large institutions still rely on core banking systems built with COBOL (Common Business-Oriented Language) and mainframes, and they now face a looming skills gap as programmers with these skills approach retirement. Making one change has consequences across multiple systems and can slow down firms' rate of transformation.

Financial institutions that rely on proprietary software are also finding that their ability to innovate is only as good or as fast as their software provider's capabilities. Reduced choice and control over their own growth creates obstacles to building and delivering new products and services, increasing digital engagement, and improving transactional efficiency.

FIRMS NEED TO BUILD ON WHAT THEY ALREADY HAVE

However, digital transformation isn't as simple as adding a digital interface to front-end systems. There are profound implications for the systems that often get overlooked when creating a cohesive customer digital experience. Effective transformation cannot occur without addressing the technical and operational back-end systems that support digital interfaces—or rethinking traditional approaches to projects.

A rip-and-replace approach to digital transformation is not an option when business must be maintained as usual. Instead, a progressive model—often called change the bank and run the bank—offers a gradual alternative to modernization that starts with system enhancement and continues with digital evolution, creating a path to successful digital transformation while maintaining the stability needed.

Figure 1. The progressive path to digital transformation

Writing a successful financial future requires an agile and adaptable technology foundation that lets even the most established firms strategize and innovate like fintech startups.

FINANCIAL SERVICES PRIORITIES

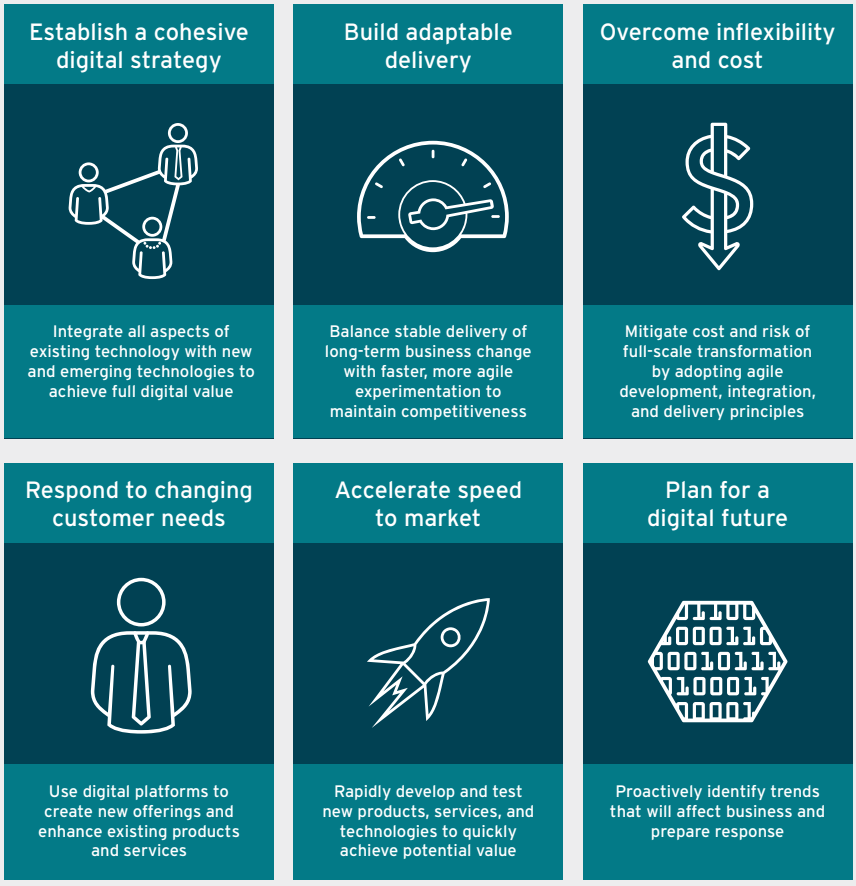

Figure 2. Key financial services priorities

BANKING

Various industry commentators are predicting the demise of the traditional bank. The emergence of new competitors and business models is accompanied by sweeping branch closures as digitally savvy customers turn to mobile and online banking.

Banks will continue to be a valuable source of financial services, but institutions will need to choose how to respond to market shifts—whether by leading the future, becoming fast followers, or managing change defensively. Doing nothing is not an option.

Digital-first—often digital-only—startups have joined the market quickly using limited budgets, without the restrictions of existing systems and costs facing traditional banks, to instantly compete against established institutions. Lacking the trust of well-known brands, these startups differentiate themselves with sophisticated, seamless technology that sets a new standard for interactive service. Technology companies have flourished in this space, offering innovative crowdfunding and peer-to-peer financing platforms. These new models raise questions about the fundamental nature of banks and who can provide banking services.

To keep pace with digital-first disruption, banks must apply technology to adopt new delivery channels, simplify spending, managing, and investing money, and introduce products and services that deepen customer relationships. But opportunities are growing faster than IT budgets, and established banks must balance transitioning to fully digital organizations while maintaining business as usual. In addition, new open banking reforms compel banks to restore data ownership to customers and connect existing and emerging IT ecosystems securely.

To rethink operations beyond the branch, banks must prioritize digital engagement for consumers and business customers alike, with a focus on faster, lower-cost payments, seamless integrations, and greater real-time visibility. Achieving these improvements means investing in digital capabilities across front- and back-end systems and expanding analytical capabilities to provide connected insights across customers' financial journeys. Automated workflows will play a crucial role in transactional efficiency, with business rules providing faster, more accurate retrieval and delivery of data, as well as greater continuity. Building a modern banking platform requires agile integration, an architectural approach based on application programming interfaces (APIs) and effective API management.

INSURANCE

Emerging technology providers are both a threat and an opportunity for incumbent insurers. Like fintech companies, insurtech businesses are digitally-native and integrated from the start to provide consumer-centric offerings. These businesses employ personalized, "segment of one" design based on extensive customer insight. They orchestrate services around integrated customer needs, as well as connected object ecosystems with real-time monitoring to reduce risk. From pay-as-you-drive insurance and crowd-sourced insurance pools to on-demand ride- and home-sharing coverage to as-a-service pricing for rarely-used possessions, innovative business models have quickly entered the market.

To support these new models, insurtech pioneers rely on a combination of big data analytics, artificial intelligence (AI), cloud computing, and the Internet of Things (IoT) to gain insight and develop responsive products and services.

Meanwhile, many traditional insurers struggle to deliver the products, services, and experiences customers have come to expect—such as self-service dashboards, faster claims, simpler comparison, and instant enrollment—using outdated systems. Managing a vast amount of content and case processing using niche or non-core applications often results in a partial view of information. This approach does not scale well to handle the influx of data from embedded IoT sensors, drone-generated images, or social media status reports. Patching together systems that were never designed to be integrated leads to duplicated or incomplete data, further stifling innovation.

In this dynamic market, insurers need platforms that connect and extend legacy systems to create a bridge from current, functionally-limited systems to an agile, responsive, and digital future. A technology foundation that can support comprehensive change, complemented by efficient, enterprise-wide approaches, will embed agility into every function.

INVESTMENT FIRMS

Capital market firms have traditionally focused on data analytics and high-performance computing (HPC) to reduce transaction times by milliseconds. After transitioning their analytic compute needs, they can now focus on making even faster, smarter trade decisions based on historical and real-time intelligence.

To improve efficiency, revenues, and margins, investment firms need to derive insight from streaming data—sourced from a number of external feeds—by rapidly ingesting and indexing data as the transactions are occuring, then visualizing the results.

Data analytics can help investment firms influence how they interact with customers, competitors, regulators, shareholders, and the market as a whole. For example, stock trade information, gathered at various stages of the trading process, can be aggregated for evaluation. Dynamic alerts can notify decision makers when a certain trade crosses a predetermined threshold to begin anomaly identification, a process that will become increasingly proactive with the addition of machine learning capabilities. One of these capabilities, deep learning, can be embedded into streaming trade activity to improve market predictions. In this algorithmic trading approach, systems are built using various methods, including technical analysis, textual analysis, and high-frequency trading.

To reduce the burden of manual compliance, emerging regtech supports compliance with regulatory requirements through monitoring and reporting based on real-time data and analytics. In addition, the growing use of automation is helping asset managers aggressively expand to downmarket customers by sharing insights previously only offered to the most affluent clients. The sector as a whole is shifting from a product-centric view to a client-centric one, with increased investment in customer experiences.

"Open source use has become commonplace among tech and non-tech companies alike with 72% of companies frequently using open source for non-commercial or internal reasons and 55% using open source for commercial products".[1]

NEW POSSIBILITIES WITH ENTERPRISE OPEN SOURCE TECHNOLOGY

According to the Linux Foundation, "Open source use has become commonplace among tech and non-tech companies alike with 72% of companies frequently using open source for non-commercial or internal reasons and 55% using open source for commercial products".[1] Financial institutions are starting to evolve from monolithic, rigid technology structures dominated by a handful of major vendors to adopting open source enterprise technologies.

Developed collaboratively, open source technology shifts power from IT providers to users, with standards that ensure portability and interoperability. It offers a cost-effective way to release new products and services and re-engineer expensive, non-performing architectures with less risk compared to established, proprietary alternatives. With open source, organizations can gain competitive speed advantages over rivals still using proprietary solutions, and teams can do more with fewer development resources.

However, many financial services firms have only experimented with open source by tactically deploying these technologies in ad hoc projects. The broader strategic use of open source technologies can give organizations exponentially greater benefits than limited deployments.

Open source reduces the overall cost of managing vast technology infrastructures through the use of common underlying technologies and the reuse of one technology or platform for multiple business use cases. Instead of recreating existing code, firms can refocus resources on differentiation. Developers can be set free to innovate and extract new value from existing enterprise applications using the latest tools, with a distributed development model providing rigorous testing, hardening, security, and support to mitigate risk. With common tools, support team, and knowledge base, open source technology can reduce the complexity and cost of hiring, training, and transferring staff between projects. Rather than recruiting COBOL programmers from a shrinking talent pool, financial institutions can focus on attracting long-term talent from a broad pool of those who use and contribute to open source communities

By offering these improvements, open source technology will be instrumental to cost-effective innovation, including open banking, digital engagement and transaction efficiency, through a combination of:

- **Applications as services** to help firms compete by delivering cloud-native applications.
- **Multicloud and hybrid cloud environments** to unite applications and operations teams across infrastructures.
- **Management and automation tools** to mitigate manual intervention where appropriate in the customer journey.
- **Connectivity** to help Agile teams to connect applications more quickly.

1 *Olin, Emily. "Corporate Open Source Programs are on the Rise as Shared Software Development Becomes Mainstream for Businesses." The Linux Foundation. Aug. 2018. https://www.linuxfoundation.org/uncategorized/2018/08/corporate-open-source-programs-are-on-the-rise-as-shared-software-development-becomes-mainstream-for-businesses/*

THE BENEFITS OF OPEN BANKING AS A BUSINESS STRATEGY

While the concept of open banking has existed for more than a decade, a challenging competitive landscape, coupled with new regulatory mandates and government directives, has accelerated banks' adoption. Executives must prioritize open banking development as a monetized, legitimate business model that supports current and future products and services.

READ THE BROCHURE

FOUR PILLARS TO DELIVERING A SUCCESSFUL OPEN BANKING INFRASTRUCTURE

Open banking practices coupled with modern approaches can provide desired agility and speed, reduce technical debt, create an adaptable environment for both short- and long-term compliance, and build competitive advantage.

READ THE DATASHEET

ADOPT OPEN BANKING

THE BUSINESS PERSPECTIVE

Bank customers increasingly expect instant transactions and easy access to accurate financial insights. Open banking offers new and compelling ways to reshape consumers' and businesses' financial service experiences.

To date, fintechs typically produced niche solutions—offering aggregation, analysis, monitoring, automation, and recommendation capabilities—faster than traditional institutions. In the future, consumers might use Google or Facebook to pay bills, transfer money, or analyze their spending, distancing them from established banks that then lose revenue.

However, the size of existing banks' market reach and customer bases, built up over decades, remains a significant advantage. As a result, fintechs are now seeking direct access to these large sets of prospective customers and their data by abandoning their founding missions to disrupt established competitors and instead are actively seeking bank partnerships to ensure mutual survival.

This shift is resulting in connected ecosystems that not only include financial institutions, but also retailers, technology companies, social media and crowdsourcing platforms, and potentially anyone or anything related to financial information or transactions. Open banking partnerships and practices provide banks with much-needed agility and speed, as well as opportunities to extend existing relationships by collaboratively delivering the best customer outcomes.

The key technology behind open banking is cloud-native APIs and API management. They help disparate businesses seamlessly and securely link their services to create a better customer experience, similar to how ride-sharing companies integrate their booking software with Google Maps.

To fully take advantage of open banking and defend themselves against commoditization, banks will need to develop four key capabilities:

- **Active partnerships** with the broader ecosystem, promoting innovation
- **Faster cycle time** through automation and organizational alignment
- **Focus** to identify and concentrate on unique value
- **An open platform** based on portable, microservices-based cloud computing, container technology, and application services.

THE TECHNOLOGY PERSPECTIVE

New regulatory mandates and government directives—such as the European Commission's Revised Payment Service Directive (PSD2)—have accelerated banks' timelines for adopting open banking. However, established banks are finding themselves hindered by decades-old infrastructure with convoluted networks that can only support traditional business models.

Technology teams must build for tomorrow amid uncertainty around currently undefined standards. Fundamental to adopting open banking is establishing an API strategy and an innovative service-provider platform that connect existing financial infrastructure. Both fintechs and traditional banks need these platforms to speed adoption of one another's solutions and to market their APIs as products.

CUSTOMER SUCCESS WITH DIGITAL ENGAGEMENT

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Using well-managed APIs as part of an open banking platform can provide banks with the necessary level of responsiveness. While the growing number of intermediaries might seem daunting, disconnected networks can be successfully integrated with open API technologies. A platform supporting open standards lowers risk and and groups ecosystem participants and networks quickly and securely, helping all parties contribute to and benefit from the API-based economy.

THE ROLE OF BLOCKCHAIN IN OPEN BANKING DATA SECURITY

One of consumers' primary concerns related to adopting new financial services is trust. While consumers largely trust their banks, they may be reluctant to trust little-known third parties to protect their data. Putting consumers in charge of their own data, per the open banking model, gives them both the data control and risk, shifting the burden of what data to share, with whom, and when from the business to the individual.

In practice, financial institutions only gain data access when permission is granted by the consumer, who can also revoke access after the data has been used for its intended purpose. In an open banking ecosystem, blockchain technology can produce an immutable ledger of transactions shared among all stakeholders. Blockchain-based identity management lets institutions focus on core business imperatives and could also accelerate financial transactions once currently accepted practices for identity verification, such as single sign-on, are no longer needed.

For more information on blockchain and Blockchain-as-a-Service, read this brief from BlockApps and Red Hat:
redhat.com/en/resources/blockblockchain/blockapps-blockchain-as-a-service-solution-brief

GROW DIGITAL ENGAGEMENT

THE BUSINESS PERSPECTIVE

Banking has always relied on relationships, but the threat of disintermediation is increasing as customers' needs evolve. The sophistication of a bank's online capabilities and self-service experience are key considerations for consumers. However, while customer acquisition remains a high priority, the core industry challenge is generating consistent near-term value while building and maintaining long-term customer relationships.

Historically, banks have been transaction-focused rather than customer-centric, with isolated technology architecture often resulting from distinct product groups. Modern consumers, who want the convenience of viewing account balances or making loan payments online, quickly become frustrated if they cannot accomplish a task in a single interaction.

If traditional approaches continue, banks are at risk of becoming little more than transaction providers and deposit holders. There are tangible benefits to be gained from fully engaged customers who have emotional attachments to their banks: increased revenue, greater loyalty, digital data insight for more targeted communications, and increased brand advocacy.

To achieve these benefits, institutions must consider how they can broaden their services—for example, by offering new money management tools, simplifying access to real-time information, introducing actionable reporting and alerting, and creating seamless, contextual omnichannel interactions. However, providing a human touch for more complex queries or needs remains a key component of the customer experience, complemented by bots and automated workflows.

CUSTOMER SUCCESS WITH TRANSACTIONAL EFFICIENCY

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Younger consumers in particular, burdened with student debt or saving to buy homes, want to more actively manage their finances. The integration of multiple accounts or products, paired with data analytics, can play a key role in helping tech-savvy customers make more informed decisions. Banks must enhance traditional monthly statements by blending account data with external data sources to provide actionable insights—for example, through customer dashboards with widgets for frequently performed transactions, such as peer-to-peer payments.

Yet banks should not overlook their business customer experience. Similar to consumers, business owners want easy, unified access to information—particularly with multi-entity data views to monitor subsidiary accounts. In reimagining the customer journey, banks should therefore focus on building services that are relevant, seamless, and personalized using flexible digital and mobile technology.

THE TECHNOLOGY PERSPECTIVE

Technology is reshaping the financial services workforce by streamlining processes. Digital tools and automation are doing more, freeing staff to focus on more complex, valuable functions, such as cross-selling and relationship building. But to avoid an impersonal experience, financial service providers need to provide an expression of digital empathy by using advanced analytics and awareness of significant life moments to develop tailored offerings that fit customers' needs in the moment. For example, banks might combine virtual assistants with real-time sentiment monitoring tools, creating a flow that directs the customer to a human agent to resolve more convoluted queries.

There is a wealth of untapped value to extract from operational systems, but releasing and maximizing that value depends on an institution's ability to take advantage of digital technology. Outdated back-end processes and systems still hinder many firms' efforts to improve operations, expand services, and simplify interactions.

Transaction-focused organizations will need to prioritize their customer experience and bring the back office to the center of financial services. By combining modern technologies that they can implement today, these organizations can avoid a dramatic short-term overhaul of their existing IT infrastructure. Cloud computing technologies, advanced data analytics, and process automation can be used to cost-effectively upgrade and optimize customer-facing interfaces.

AUTOMATE AND SCALE TRANSACTIONAL EFFICIENCY

THE BUSINESS PERSPECTIVE

Banks need to operate as efficiently as possible to remain competitive by protecting margins—or price their products more aggressively to win new business. Yet most banks still separate their operations and technology platforms, resulting in disjointed cross-channel journeys. Customers simply want to manage their money wherever, whenever, and however is convenient, sometimes initiating a process in one channel and concluding it in another.

To offer this seamless transition, institutions must evolve their digital experiences beyond impressive user interfaces to eliminate barriers between branch, ATM, online, and mobile app banking. Integration not only provides the seamless journey users expect, but also lets firms use their vast volume of aggregated data to identify patterns or unmet needs before their competitors and roll out service enhancements faster.

FIVE BENEFITS OF IT AUTOMATION FOR FINANCIAL SERVICES

Automation is about much more than configuration management and siloed teams writing scripts—it benefit the entire IT process, end-to-end, and enables financial institutions to transform digitally, mitigate risks and lower costs.

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SIX STEPS TO DIGITAL TRANSFORMATION FOR FINANCIAL SERVICES

Digital transformation is well under way at major financial services corporations in the US and around the world. In many cases, pilots and the earliest iterations of modernization projects have gone well. But for many enterprises, it's still early. They've taken one or two steps at the onset of a lengthy journey. Now it's time to pick up the pace and take the next steps on the road to digital transformation.

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Automation can dramatically increase the speed, accuracy, and efficiency of repetitive workflows, such as data field completion. However, robotic, AI-based process automation will be key to moving beyond simple efficiency improvements to creating new, improved customer experiences. While they are not suited to every scenario, these technologies can replicate both simple and complex activities that require expert judgement or decision making, such as loan or mortgage approvals, with a scale, speed, and accuracy that humans cannot deliver. Fewer errors also means stronger compliance—a crucial capability in a heavily regulated industry.

Process automation requires collaboration between technology professionals and line of business teams to:

- **Standardize** processes and procedures for digital customer journeys.
- **Identify** supporting source systems and data elements.
- **Codify** process rules and decisions to remove human intervention.
- **Monitor** exceptions and anomalies to further refine decisions and rules.

THE TECHNOLOGY PERSPECTIVE

A key success factor in banks' ability to compete and thrive is scale—reducing concentration risk and dependency on particular customer segments, geographies, or products, as well as reducing regulatory pressure.

Large institutions typically have fragmented back-end architectures, leading to duplicated efforts across multiple sites and systems. Platform standardization using flexible modern architectures can support much-needed scalability. In addition to mitigating costs and effort, maintaining a single platform means development teams need only build product enhancements or channel capabilities once. As a result, firms can establish more flexible environments and evolve strategies in response to market conditions, including launching and scaling new offerings more easily.

Using a single, open platform presents an opportunity to increase consumer satisfaction through improved visibility while also creating cross-sell and upsell opportunities. It also helps firms meet more diverse needs of business customer with minimal effort and disruption. For example, banks can offer small business customers more sophisticated capabilities as their needs grow, without migrating them from a consumer platform to a commercial one.

However, many technology teams are opting to defer system replacement. The associated data migration poses the additional challenge of maintaining customer access to key systems during the transition.

Automation can extend the value of existing investments by integrating traditional software and newer IT systems. With automation, bots transfer data between old and new applications to orchestrate seemingly streamlined workflows. It can also give established institutions the tools to innovate like fintech startups. Applied to customer-facing services, automation can enhance legacy systems by adding convenience and quality. For example, bots can populate fields with data extracted from mobile camera images to accelerate loan applications. Or, in the field of wealth management, where investment values can change minute to minute, robo-advisory services continuously monitor market conditions and automatically alert customers to time-sensitive investment recommendations.

DIGITAL TRANSFORMATION DEMANDS A BUSINESS STRATEGY

Digital transformation is not a one-time technology project, but a business strategy. Outdated mindsets and operating models will also need to evolve to support successful transformation efforts—including shifting focus from transactions to more nuanced customer understanding.

Supporting the fundamental business shifts that are key to digital transformation requires an enterprise-wide strategy, openly supported by engaged senior leadership, with a holistic view of customers' financial health. This strategy should outline how the business plans to:

- **Enhance value propositions** through open banking, with highly targeted offerings for niche segments that successfully differentiate and provide customer value.
- **Reimagine customer-centric journeys** from end to end, spanning customer prospecting, financial advising, and sales processes, as well as onboarding, transactions, and administration.
- **Reshape operating models** to provide a fast, convenient digital experience, paired with human interaction for more complex products or problems.

As the boundaries between back- and front-end systems continue to dissolve, established institutions cannot afford to implement uncoordinated digital initiatives. A balanced approach combining short-term, high-impact projects with longer-term restructuring will be more effective in building momentum and commitment across the business without surrendering any competitive advantage.

The financial services sector will also need to consider how to compete against fintechs and other high-tech businesses for digital and data analytics talent, including engaging open source developers who are accustomed to agile, collaborative work. Businesses will need to adopt an organizational culture built on flexibility and a willingness to take risks to stay competitive and attract this talent. Traditional firms can emulate fintechs to launch innovative offerings quickly. In many cases, partnerships will become the most efficient way of delivering change to the financial industry.

CULTIVATING A DEVOPS APPROACH

A linear, sequential waterfall approach to software development is no longer suitable for businesses that require a flexible, iterative approach to innovation. Instead, DevOps offers a blend of practices and tools for delivering and enhancing applications and services faster than traditional software development and infrastructure management processes. The DevOps model requires integration of application development and IT operations at multiple levels: culture, process workflows, and infrastructure management, as well as application creation and delivery. This approach is a faster, more agile way to convert business innovation into customer- and user-accessible code, ultimately delivered as packaged software, mobile applications, or online business services. Small, multi-disciplinary teams—including business decision makers, application developers, and operations and infrastructure management professionals—typically focus on competencies, rather than roles, and are mutually accountable for the end-user experience.

TAKE THE NEXT STEP IN YOUR DIGITAL TRANSFORMATION JOURNEY

LEARN OPEN SOURCE THE RED HAT WAY WITH RED HAT OPEN INNOVATION LABS

Some banks have opted to set up incubation teams or even sponsor hackathons to spark innovation, but Red Hat offers a better way to experience DevOps, learn how to rapidly build prototypes, and adopt Agile workflows in an environment designed for innovation.

Red Hat® Open Innovation Labs is a focused, hands-on team engagement that helps customers quickly bring innovative ideas to market by providing the people, processes, and technologies required to meet modern business challenges. Through an Open Innovation Labs residency, customers can quickly modernize and develop innovative applications with our ready-to-use infrastructure—learning to work the open source way.

Get an inside look at Red Hat Open Innovation Labs

RED HAT: YOUR OPEN SOURCE PARTNER

As a leader in enterprise open source infrastructure and application development solutions, Red Hat can help financial services institutions use innovative technology and approaches to support business objectives. Red Hat's cloud-ready, cost-effective solutions form a reliable, high-performance foundation for digital operations.

Red Hat offers a complete enterprise software foundation for mobile IT, containers, modernization, and application portability. We also deliver business-focused solutions for risk analytics, anti-money laundering, hybrid cloud computing, and IT automation. These products and services help you optimize your customer experience—on any device, on any network, and in any location.

Our customers make inspiring improvements that affect their lines of business, organizations, industries, and even the global community every day. Currently, 100% of commercial banks in the Fortune Global 500 rely on Red Hat.[2] Whether in banking, securities, insurance, or the expanding fintech sector, Red Hat technology can help you respond faster to market changes while reducing costs and managing risk.

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2 Source: Red Hat customer data and Fortune Global 500 list, 2018.

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Red Hat is the world's leading provider of open source software solutions, using a community-powered approach to provide reliable and high-performing cloud, Linux, middleware, storage, and virtualization technologies. Red Hat also offers award-winning support, training, and consulting services. As a connective hub in a global network of enterprises, partners, and open source communities, Red Hat helps create relevant, innovative technologies that liberate resources for growth and prepare customers for the future of IT.

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