Database Automation in the Finance Industry

Juggling Innovation With Security

DBmaestro™

Executive Summary

FinTech has significantly disrupted and shaken the financial world in recent years, bringing banking to the forefront of technological innovation. The pressing need for agility and technological development to meet consumer demands and keep up with the speed of the industry has driven planned spending increases in technology for many financial institutions in recent years.

In this eBook, we'll examine the overarching technology needs of financial institutions related to development processes, review recent data on adoption of DevOps practices for the database in the financial industry, and identify the primary challenges in adopting database automation. Finally, we'll discuss how adopting automation in database development can enable financial institutions to overcome these challenges and achieve business goals.

While many financial institutions are on par with general trends in adoption of CI/CD practices, only 1 in 3 financial organizations has implemented these practices for the database. Yet this is precisely an area ofinnovation that offers tremendous benefits for financial institutions, addressing key challenges such as the need of faster time-to-market, reducing errors that lead to costly downtime, and improving regulatory compliance.

Managing Demands for Innovation

The financial services industry has made a huge shift as the next generation of consumers are increasingly using digital platforms to manage and monitor their finances. In the face of increasing threats to cybersecurity and harsher compliance regulations, financial institutions are struggling to balance security with technological innovations that bring speed, efficiency and ease – three adjectives not often associated with the finance world.

FinTech start-ups have sprung up like mushrooms in recent years, making financial management more accessible to a world that has become accustomed to getting things done at the speed of swipe. The cumbersome banking world is being forced to keep up, while often sporting multiple legacy systems, a mishmash of different platforms and many decades worth of heavy data.

In response, banks are stepping up planned technology investments and shifting the focus to human capital. Gartner[1] estimated that $519 billion would be spent on IT in 2018 by the global financial sector, an increase of around 4% over 2017.
Some financial institutions are shifting their technology investments towards human capital. At an April 2018 conference, David Solomon, President and COO of Goldman Sachs, revealed that the firm employs over 9,000 computer engineersii. With a global manpower estimate of around 36,000, this means that roughly one quarter of the organization's employees are computer engineers[2].

While **innovation** is a necessity for survival nowadays, technology also poses new challenges for financial institutions. Banks, for example, can no longer afford to work during "business hours" only. Like online shopping, banking has become a 24/7 service, with consumers expecting to have access to their financial data and associated services readily available from anywhere at any time.

To provide this always-on, always-accessible service, financial institutions now manage many applications simultaneously. These organizations are leveraging databases with extreme volumes of data, and these databases are in constant flux. This results in the increased likelihood of errors in development that can cause critical applications to malfunction, or worse, crash entirely.

Providing **business continuity** with zero outages isn't just desirable; it's critical. The estimated cost of an unplanned outage in the financial services industry rises every year, and can vary significantly depending on scope. A Ponemon Institute report[3] found that financial institutions suffer an average cost of $994,000 due to unplanned outages, more than any other industry. Downtime and outages can prove much more tumultuous, especially when they drag on. The most recent crash suffered by the British TSB bank-still not completely resolved at the time of publication-has already cost the bank an estimated £60 million in fines and compensation alone[4] ,this number doesn't even include resources invested towards repairing the glitch and managing the multitude of security and fraud breaches that have occurred during the outage.

In the ever-competitive modern landscape of financial services, today's financial institutions simply can't afford these costly mistakes.

Finally, **risk and compliance** is another overarching area of complication for today's financial institutions. Deloitte[5] identifies three top trends that are redefining the back office of financial institutions today, highlighting regulatory changes and risk mitigation as a top priority in dealing with cyber threats. GDPR, which has become a household term and inbox-flooding nuisance in recent months, is also changing the way banks manage data. Today's financial institutions are less likely to engage in risky lending behaviors, for instance, and now invest and recruit heavily in compliance to meet new regulatory requirements.

Embracing DevOps: Agility in the Face of Risk

Move Fast and Break Things?

The finance world is often associated with bureaucracy, sluggishness, and process; these associations are strongest when one thinks of dealing with the banking system. Transactions often take days to complete, especially if they involve other institutions or cross-border activities. With the birth of online banking, digital payments, e-wallets and FinTech startups, customers have grown accustomed to accessing and moving their money-now-and preferably without involving another human (on the phone or otherwise).

This proves as quite a challenge on the back end, more in perception than execution. Speed is often associated with recklessness, and the concept of shortening lead-time and drastically increasing the number of version releases per quarter can be perceived as dangerous. This rings especially true in banking, where the data is both vast and highly sensitive; with multiple databases, decades of patchwork and a mixture of new and old tech, speed is not associated with security.

In reality, however, the opposite approach of pushing infrequent, heavy releases is riddled with risk. Darya Shmat, business development representative at Iflexion, outlines some of the main risks to following the waterfall approach in the financial industry[6]:

Comprehensive knowledge of the systems-often older, complex, and built over years of development-is rare. It's unlikely that the institution has an in-house expert who knows all the ins and outs, patches and history of the changes made.

Evolution

It can take months (or even years!) for changes to make it from the drawing table to production. In that time, requirements are likely to change, but won't be reflected in the end result. Furthermore, manpower turnover is inevitable, and documentation for the rationale behind the changes is likely to be lost or incomplete by production time.

Piggybacking

When deployments are infrequent, smaller changes are often tacked on to bigger releases. Their impact is often underestimated and under-tested, meaning they can cause more trouble than anticipated.

Practice

When deployments are infrequent, each one is a big deal. The teams involved aren't well-versed in implementing changes, detecting errors quickly and managing crises. The result is often massive rollbacks to earlier versions, reassessment of problems and many more attempts at getting it right. There are often unplanned time and efforts needed to manage problems with big deployments.

Response

Problems that may arise in between deployment cycles, especially security or functionality problems, can't be addressed and fixed quickly unless teams shift to emergency-mode.

For all of these reasons and more, adopting a CI/CD approach (among other DevOps approaches), with small, frequent releases, is not only a recommended method of action, but a must for mitigating risk.

From Culture to Practice

As with many large organizations, adopting DevOps practices means adopting a culture change before all else. Changing the approach, ideas, and everything the organization has known to be "true", is no easy feat. Dmitry Mihailov, a DevOps Engineer at Accenture, sees this first-hand on a regular basis. "Big ships are harder and slower to steer in the right direction," he points out.
This rings even truer when considering financial institutions, which are particularly averse to risk and reluctant to make significant changes to the way things are done.

Once the ball has dropped, however, financial institutions stand to gain plenty from adopting the tried-and-true DevOps practices.

Continuous deployment (CD) and it's precursor continuous integration (CI), allow financial institutions to issue rapid releases and mitigate risk, reducing costly downtime and accelerating development cycles.

Financial institutions around the world are reaping valuable benefits by implementing CD, especially in the database space. Proper database automation and version control provides peace of mind that the database can run itself and adapt on the fly, responding to the need for rapid change in the current landscape, while also saving 80-95% of the time it would normally take to manually process changes. Implementing continuous deployment best practices for the database, therefore, provides a clear ROI for financial institutions today.

Databases in the Financial Industry: Severely Siloed

When it comes to adopting DevOps practices, the financial industry has certainly gotten the memo. The 2018 Global CIO Report by Dynatrace shows that 74% of organizations in the financial services industry have either implemented or are exploring the possibilities of implementing DevOps culture to improve collaboration and drive faster innovation[7].

While this is great news, the finance world still has quite a ways to go. On the road to DevOps adoption, it seems, the financial services sector has neglected to include the database-and they're not alone: A recent global survey[8] was conducted among 244 IT professionals from a multitude of industries revealed the current state of DevOps adoption, focusing on implementation of DevOps practices and functionalities for databases. The results show that while DevOps practices are widely adopted for application development and testing processes, only 1 in 3 organizations have adopted the same processes for database activity.

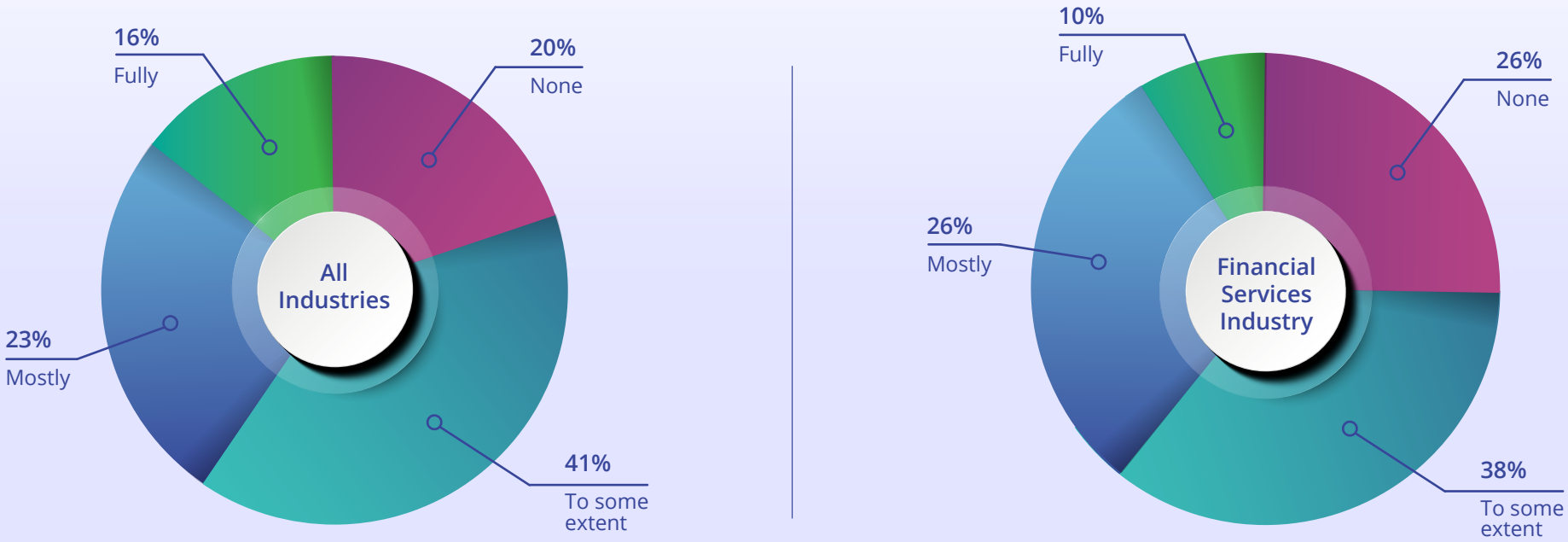
Database development is treated differently than other development processes, and wrongfully so. Positioning the database as its own entity that operates almost independently from the rest of the organization's activity, forces a siloed structure that doesn't afford the database the same benefits that other systems enjoy. As organizations integrate processes and technology aimed at speeding up delivery, shortening lead-time and enabling faster updates, they often diminish the major role the database plays in enabling all of the above.
For financial services, which so heavily rely on database health for smooth operations, leaving the database out of the DevOps equation can turn out to be a deadly sin.

How Does It Manifest?

What's arguably most concerning, is the manner in which IT teams are set up to begin with; when compared to all industries, the financial sector stands out-in a bad way. When asked to what extent DBAs are integrated with the organization's DevOps teams, 26% of respondents in the financial services industry reported that DBAs weren't integrated at all. When comparing to cross-industry data, that number is 23% lower.

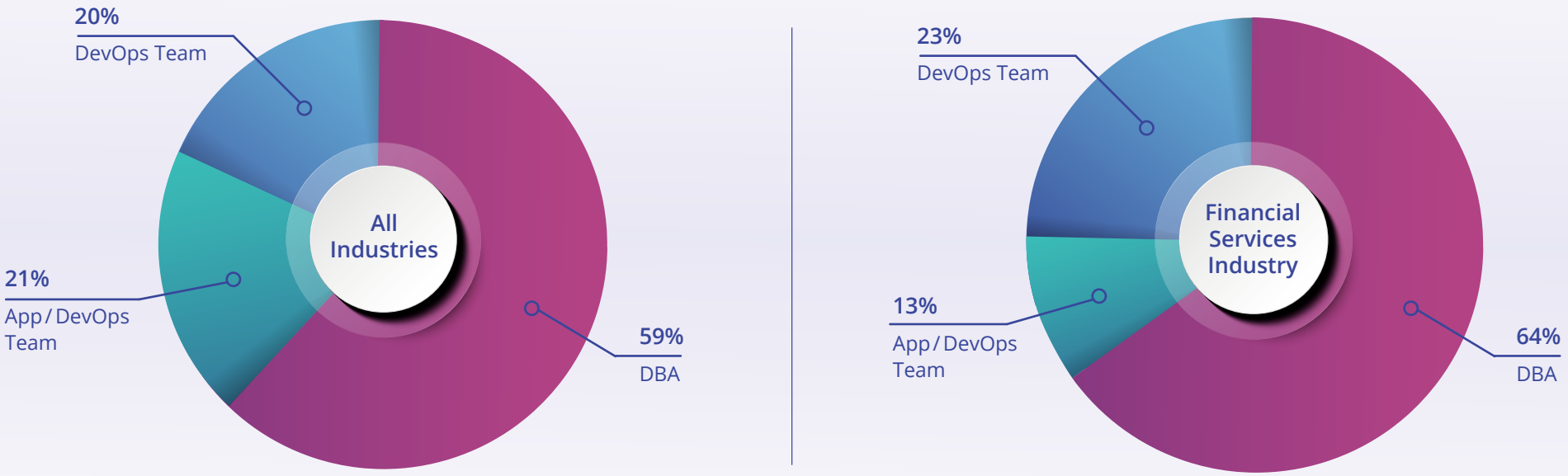
Similarly, at the other end of the spectrum, only 10% of respondents in the financial industry reported that DBAs are fully integrated. Cross-industry, that number is much higher – 16%.

Integration of DBAs with DevOps Teams



In light of this data, it shouldn't really come as a surprise that the DBAs are the kings of their database.

Access to Making Database Changes

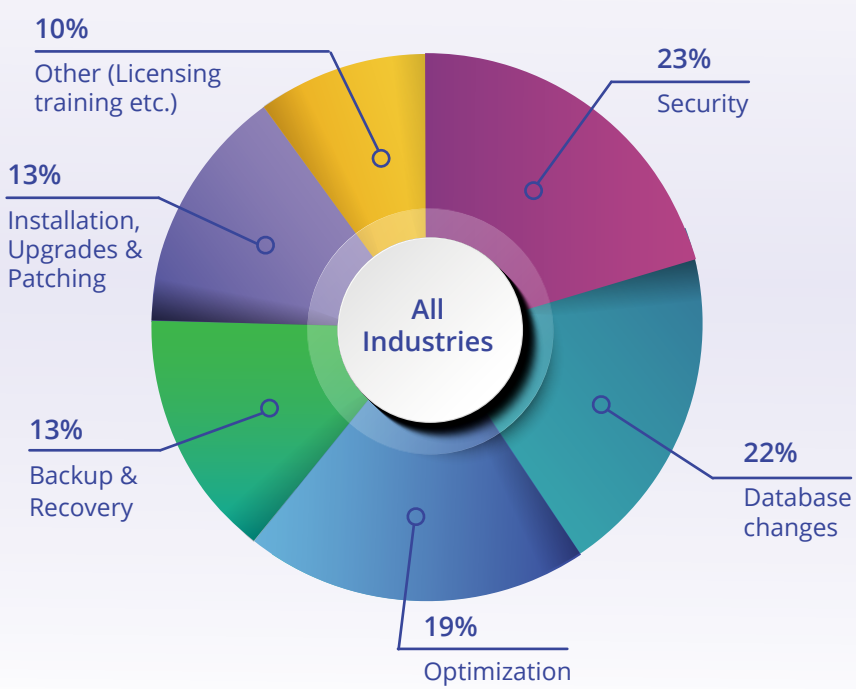


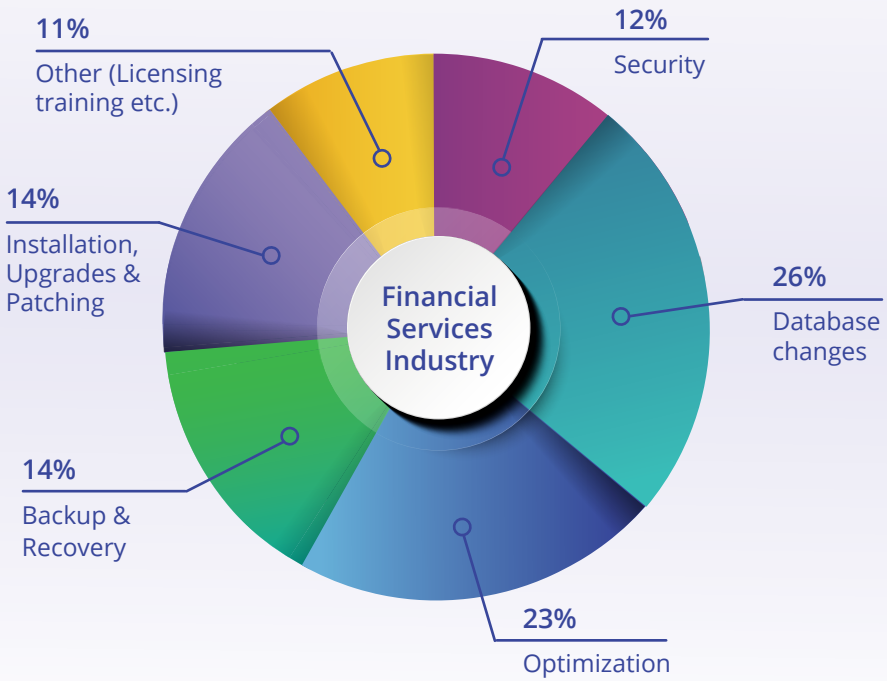
In the financial sector, respondents report that DBAs are the only ones who have access to make database changes, 64% of the time. The app/dev teams are pushed to the margin in this industry more so than others, having database access in only 13% of the cases. Giving the DBA sole access to make database changes creates tension between the development requirements for driving faster releases, and the DBAs becoming the bottleneck of this process.

When asking DBAs how they spend their time on top database activities, a surprising piece of data surfaced: DBAs in the financial sector spend significantly less time managing security tasks.

One might expect security to be the main focus of the party responsible for the organization's database, but the data tells a different story.

How DBAs Spend Their Time on Top Database Activties





It also seems DBAs in the financial sector spend more time optimizing database processes and pushing database changes; the time spent among all other activities, however, is about the same.

The acute segregation of database development from the rest of the organization is not only worrisome, but may indicate a misalignment of database activity with organizational goals. With the impending rise of security threats, as well as increased privacy regulation, database activity doesn't seem to echo organizational goals and focal points.

Automation in the Face of Regulation – The Database Challenge

Adopting DevOps practices, especially in a sensitive space like the database, can be exceedingly complex for the financial sector.

While CI/CD, for example, can speed development and help to reduce costly downtime, regulatory compliance remains a sticking point. With the fast-paced wave of regulation, technology should be serving as a tool that helps to achieve compliance and combat regulatory constraints, rather than a roadblock to meeting compliance.

Obstacles to Adopting Automation

The task of managing multiple technological projects simultaneously coupled with the need to continuously amend and improve systems to meet regulatory requirements sometimes serves as an obstacle for financial institutions on the road to adoption. These hesitations are often, but not always, based on a mistrust of automation. Common automation concerns cited by DBAs include an inability to determine who made what changes to the database and the possibility of scripts not being updated, which can result in executing the wrong revision in production, thus creating bugs or application crashes.

Those who do take advantage of modern, effective automation solutions find that it is, in fact, possible to implement the same CI/CD practices-already proven valuable in application development-for the database as well.

This enables true database automation that actually minimizes and controls the risk of human error, while simultaneously accelerating development cycles. The end result is less downtime, fewer errors, and a reduction in development costs – while enabling financial institutions to actually leverage technology to meet compliance requirements.

Another perceived obstacle often encountered on the road to automation adoption is regulatory compliance. Introducing automation processes means removing the manual human element and instilling automatic measures for managing data integrity and security. If anything, it is quite likely easier to meet regulatory compliance with the help of automation than without; the predictable repeatability, the checks and balances put in place, and perhaps-most importantly-the ability to prove compliance through log files. The right automation tools can take a lot of the guesswork out of creating compliant processes, while minimizing the human error factor.

Overcoming the Obstacles

Financial institutions can successfully navigate these challenges, balancing the need for innovation, fast-paced development, with risk management with regulatory compliance, by implementing DevOps solutions in the database. Doing so will enable several key competencies:

1

Controlling roles and access (down to individual objects and data), thereby completely preventing unauthorized changes to the database, maintaining the quality and integrity of the database and associated data while still enabling complete and functional access for every team member on-demand.

2

Customizing database policies to ensure that all database activity is aligned with organizational policy, including coding and naming conventions, rollout and rollback protocols, deployment schedules, prohibited and permitted statement types, and so forth.

3

Preventing configuration drift and data loss while securing the integrity of data. Automatic detection and comparison of environments can stop problematic deployments in their tracks, alerting users to the misalignment of versions. Preemptive preparation to prevent data loss is key to meeting regulatory requirements.

4

Maintaining an automatically updated audit trail of all database activity, containing detailed accounts of changes made. Auditing is not only crucial for database development health, it allows financial institutions to demonstrate compliance. A complete history on the backend is critical for the sake of security, accountability, and detecting the causes of errors.

5

Leveraging proven version control best practices, such as check-in, check-out functionality to document complete information for regulatory reporting, including who made changes to a database object, what changes were made, and when and why the changes were introduced. This results in a complete, reliable audit trail while minimizing manual documentation requirements for developers.

6

Reliable impact analysis for deployment generators, relying on baseline-aware analysis (not simple compare-and-sync), offering the ability to deal with conflicts and merges of the database code-even cross-updates from dispersed teams-and also dealing with out-of-process changes and ignoring wrong code overrides.

DevOps solutions offering these capabilities solve the key challenges financial institutions face today in technology innovation. Implementing rapid development and release cycles while reducing development costs and boosting ROI, can effectively ensure the constant availability consumers demand.

Conclusion

The primary drivers of change financial institutions face include:

- increasing demands for faster time-to-market
- the need to manage the development of multiple applications on a day-to-day basis
- reducing costly errors that result in downtime
- meeting ever-changing regulatory requirements
- streamlining delivery processes while minimizing development costs.
- Consumers demand 24/7 access to their financial services in the digital age, and with competition heating up, today's financial institutions must innovate in order to remain competitive.

Yet, automation is sometimes perceived as a risk in itself. The astronomical cost of unplanned downtime-an average cost of $994,000-can be devastating for financial institutions, necessitating a solution that effectively mitigates the risk of costly errors while simultaneously speeding development. DevOps solutions provide the tools and capabilities financial institutions require to achieve these goals, enabling true CI/CD for the database. Adopting these database DevOps solutions is no longer a choice, but a necessity for financial institutions that wish to keep pace with consumer demands for technology innovation while improving both agility and efficacy. Financial institutions choosing to sit on the sidelines through the DevOps movement are sure to be left behind.

About DBmaestro

DBmaestro brings DevOps best practices to the database, delivering a new level of efficiency, speed, security and process integration for databases. DBmaestro's Database DevOps Platform enables organizations to run database deployments securely and methodically, increase development team productivity and significantly decrease time-to-market.

The platform combines several key features for the database, including: release automation, database version control, governance and security modules and a business activity monitor.

DBmaestro serves several key players in the financial services industry, including multiple Fortune100 banks and FinTech companies.

To learn more about how DBmaestro can help catapult your organization's needs forward, request a demo.

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