WHITEPAPER

Stability with speed

Unlocking business value with robust database change management

redgate

Contents

The challenges for organizations in a data-driven world

In today's data-driven world, managing database changes with reliability and at speed is crucial to success.

But data needs are becoming ever more complex for organizations that want to thrive and scale due to two influences:

1. The shift towards integrating AI in business practices, processes and data
2. The need to launch new applications, putting the right data into the hands of decision makers faster

To meet these demands, organizations need to think not just about the technology, but also their teams. To become truly data-driven, organizations need strong database modernization strategies coupled with deep understanding for how their employees can create, maintain and evolve data.

Organizations that fail to address the modernization of the way they store and handle data risk inefficiency, security vulnerabilities and falling behind their competitors.

> **"The future of data architecture isn't just about technology – it's about enabling business agility, innovation and sustained competitive advantage."**
>
> **Elliott Cordo, "Beyond the Monolith: Building Evolutionary Data Architectures for the Future", Forbes.com, 2025**[1]

[1] Source: Elliott Cordo, Forbes Council Member, "Beyond the Monolith: Building Evolutionary Data Architectures for the Future." Forbes.com, April 2025

The rewards for becoming a data-driven organization are significant. AI is accelerating the competitive landscape for many organizations, and for those organizations to benefit from the efficiency advantages AI has to offer, organizations need a database modernization strategy that focuses on blending adaptable and scalable data environments with skills and understanding in their teams for a data-driven approach.

> **"By now, most companies know – on an intellectual level at least – that good data is essential to efficient operations, sound decision-making, and powerful AI. However, they fail to recognize the critical role that people play in the creation of good data."**
>
> **Thomas C. Redman and Donna L. Burbank, How to Make Everyone Great at Data, Harvard Business Review[2]**

Fundamental to a database modernization strategy is:

1. A robust and stable way to handle data changes, whether that's modifying or adding data, or the underlying database structure that stores the data.
2. The ability to bring data from multiple, evolving data sources to deliver new insights to the business.

Both require teams to have a fast and stable way to make changes to database schemas, so that organizations can reliably consume new and existing data for innovation and growth.

It's not enough for data-driven businesses to bring a high-performing data architecture. A database change management approach that brings resilience and flexibility to scale is crucial – whether that's adapting to customer needs, new technologies, data sources, or simply the unexpected.

[2] Source: Thomas C. Redman and Donna L. Burbank, "How to Make Everyone Great at Data", Harvard Business Review, January 2025

The risks and cost when database change management goes wrong

For decades, many organizations have feared database changes. And understandably so. If database changes are unplanned and unpredictable, they risk far-reaching consequences:

- Poor performing software
- Security breaches
- Data loss and downtime
- Reduction in data quality with resulting impact on data reliability for decision making

"Companies are losing up to 12% of their potential revenue due to rogue data within their business processes."

IDC blog, Drowning in Data for Want of Information: Is Data Minimization Really Possible?[3]

Unmanaged and unpredictable database changes can of course arise for different reasons. Sometimes they come as a firefighting response to the unexpected or as a reaction to slow lead times, for example as 'hot fixes' or changes made directly to Production. At other times they can result from ad hoc database change management approaches. This can come down to a lack of understanding on how to manage database changes with greater rigor. It can also come from teams hitting technology barriers, such as having to force changes through a web of technical debt in difficult, legacy systems. Sometimes it can also be as a result of having to make difficult, manual database changes in an emergency, which in turn can mean teams circumvent processes and run the risk of deployment failure just to get the job done.

No matter the cause, unmanaged changes are hard. But actively excluding the database from application delivery pipelines is just as problematic. If the database is left out, whether unintentionally or not, it risks application performance, data security and integrity.

[3] Source: Drowing in Data for Want of Information: Is Data Minimization Really Possible? September 2024, IDC blog

The impact of poor performing software

Software that performs poorly in the market can have far-reaching consequences for organizations, denting customer satisfaction and in turn the organization's reputation in the market. Organizations that struggle to maintain high software quality risk falling behind their competitors who offer more reliable solutions.

> "The cost of poor software quality in the US has grown to at least $2.41 trillion."
>
> **A 2022 report: Cost of Poor Software Quality in the US, CISQ[4]**

The impact of security breaches

Every database change carries a risk of security breaches, fraud or non-compliance if meeting regulatory requirements is not considered. And with the explosion in quantities of data from AI integration in organizations, the risk increases still further with data breaches becoming more frequent, despite increased recognition in the importance of security and compliance. The ITRC's 2023 Annual Data Breach Report states that data breaches in the US, for example, increased by 78% in 2023 compared with 2022.[5]

> "For most organizations, security and compliance are no longer optional – they're essential for survival."
>
> **MRI Pandit, Senior Manager at Navy Federal Credit Union, 2025 State of the Database Landscape[6]**

[4] Source: Cost of Poor Software Quality in the US: A 2022 Report, CISQ
[5] Source: 2025 State of the Database Landscape Report, red-gate.com
[6] Source: 2025 State of the Database Landscape Report, red-gate.com

The impact of data loss and downtime

The cost of downtime and potential for resulting data loss is also not to be underestimated. Downtime can occur for several reasons, whether that's poorly managed database schema changes, human error, low quality code or insufficient testing.

> **"25% of downtime is caused by the database. The average cost of downtime from enterprises every year is $16.2M, giving a $4.05M cost for downtime from suboptimal database practices."**
>
> **The ROI of Database DevOps for Enterprise Organizations**[7]

The fundamentals of robust database change management

In a 2024 IDC survey[8], organizations rated their current software development and delivery priorities:

1. Speed: 46%
2. Quality: 43%
3. Efficiency: 43%
4. Productivity: 28%

Database change management is a required part of software delivery and needs to drive those same priorities. For optimal outcomes against these priorities, robust database change management requires organizations to adopt best practice and make incremental improvements. If this is done successfully, organizations will:

[7] Source: The ROI of Database DevOps for Enterprise Organizations, red-gate.com
[8] Source: IDC InfoBrief, sponsored by Redgate, Simplifying Complexity and Delivering Business Value: Making Database DevOps Work in the Real World, doc #EUR252966324, February 2025.

Gains for organizations	Return on investment
Increase software delivery velocity - and therefore time to market	Estimated $1.88M efficiency gains using Redgate for automation[9].
Raise quality - and de-risk database changes Catch errors earlier in the software lifecycle - bringing efficiency savings	Enterprises implementing effective Database DevOps have a 7 times lower change failure rate. Estimated $3.5M saving from the cost of downtime minus (reduced) change failure rates[10].
Give time back to development teams and re-invest savings in innovation and value-add work	Estimated 59% average time saving per deployment for a development team using Redgate Flyway to develop and deploy database changes[11].

The pains of failing to implement impacts technology and teams

Failing to implement robust database change management has a fallout for technology and teams. On the team side, there's a hit to morale and productivity. On the technology side, avoidable events such as downtime cut capacity to scale and optimize data strategies. Whether it's teams or technology affected, the consequences nearly always migrate to the bottom line.

> "91% of large organizations calculate the cost of unplanned downtime as at least $300,000 per hour."
>
> **Kate Duggan, "Why Database Discussions Have Moved from the Backroom to the Boardroom, Bloomberg[12]**

[9] Source: The ROI of Database DevOps for Enterprise Organizations, red-gate.com
[10] Source: The ROI of Database DevOps for Enterprise Organizations, red-gate.com
[11] Source: Based on Redgate case studies and customer feedback.
[12] Source: Kate Duggan, "Why Database Discussions Have Moved From the Backroom to the Boardroom", Bloomberg.

It's not just the status quo that's impacted either. If an organization is held back by unstable database change management, time is spent fixing problems rather than investing in innovation and its competitive advantages.

Top 5 pains experienced without robust database change management in place

1. Inability to scale - due to heightened risks and difficulty in rolling out every database change
2. Increased costs resulting from related problems, including: downtime, inefficiencies, security breaches
3. Opportunity cost of missed innovation time due to too much time spent fixing software delivery
4. Reputational damage from poor quality software
5. Demotivated workforce from poor experience with software delivery – can impact retention

Factors that intensify pains

The pains are intensified when teams responsible for managing database changes are dealing with:

- Increasing volumes of data
- Use of two or more database platforms
- Complexity of data architecture
- Technical debt due to monolithic databases or legacy architecture
- Pressure to lift and shift large databases to the cloud without optimizing the data architecture
- Compliance and regulatory requirements
- Lack of standardization between database estates, pipelines and processes

Small changes, big gains

In all these scenarios, robust database change management practices can alleviate those pains. Importantly, organizations can also take a pragmatic and incremental approach to

applying the practices. Small changes can yield big gains as organizations introduce rigor, reliability and automation where they need it most.

> **"We're talking about introducing more stringent processes, a tighter methodology, and automation as opposed to manual changes."**
>
> **Grant Fritchey, DevOps 101: Introducing Database DevOps**[13]

[13] Source: Grant Fritchey, "DevOps 101: Introducing Database DevOps", Redgate Blog.

The fundamentals for robust database change management

1. Understand the scale of the problem

Measure your mean time to recovery (MTTR) and change failure rate (CFR). Practice hitting your recovery point and recovery time objectives. These metrics are part of the four key metrics for modernizing database change management. This will help your organization understand where to invest time and budget. Adding automation, source controlling database code and other fundamentals are all important for robust database change management. But to see true impact, you need to know where to focus your efforts for change.

2. Reduce the risk of human error

The first building block is to remove the risk of human error wherever possible. Development and operations teams can spend hours hand-writing database scripts, but all too easily make a syntax error, confuse environments or introduce incorrect logic. By introducing a script generation tool into the database change management process, human error is side-stepped. Automation also reduces human error – see below.

3. Source control database code

Teams need to treat the database in the same way they do their applications and ensure that all code changes are in source control. This acts as a backup for data code and ensures that teams are all working from a single source of truth, without risking overwriting each other's code.

4. Automate testing

One of the most important elements to introduce is automated testing. For consistency and stability, teams can use the same continuous integration processes for their database as they do for their application code. This represents a dress rehearsal for deployments to

production. Teams can catch errors earlier and re-deploy that time elsewhere. It also reduces the risk of downtime and data loss.

5. Automate deployments

This is the end goal. The scale of automation will vary, depending on the project, and typically teams work their way up to automated deployments in small steps to grow confidence and put guardrails in place. This is the key to accelerating value to market once you have stable, repeatable processes in place to support automation.

6. Standardize across teams and technology

74% of IT teams now use two or more database platforms, which adds further complexity to software delivery[14]. This is further compounded if teams are using diverse processes to manage changes across those platforms. Varying skillset requirements across the database platforms can worsen the problem. Standardization across the database change management process is the answer - it should look to fill the gaps in skillset requirements and provide scalability across all platforms.

7. Reduce cognitive load for teams

Navigating diverse systems and tech stacks to complete tasks can quickly result in cognitive load for today's development teams. That load reduces productivity, quality of work and in excess it can lead to burnout. Robust database change management should also reduce cognitive load by: a) breaking complex tasks into smaller, manageable parts; b) integrating with existing software delivery workflows as much as possible, and c) automating away onerous, repetitive tasks.

[14] Source: 2025 State of the Database Landscape Report, red-gate.com

How Redgate Flyway drives robust database change management

Redgate Flyway is an enterprise-grade change management solution that enables teams to take advantage of the most flexible and robust database deployment approaches in the market. With support for 50+ DBMS and advanced capabilities for the most popular DBMS, SQL Server, Postgres, Oracle and MySQL, teams have all they need to deploy with confidence.

De-risks database change management

To drive up quality and stability, Redgate Flyway Enterprise enables teams to release database changes through a CI/CD pipeline and catch errors before they get close to Production. Industry-proven database comparison technology also means teams can source control changes right down to the object level, troubleshoot problems, detect database drift and auto-generate accurate database deployment scripts for every change.

"We can now do releases much smoother, quicker, in a more controlled way. Freeing up developer's time to do real development, rather than actual deployment."

Head of Data, UK based charity case study

Standardizes database changes across database platforms

Redgate Flyway Enterprise equips teams with the advanced capabilities they need to develop database changes with confidence, whether those changes are for SQL Server, PostgreSQL, Oracle or MySQL. Script auto-generation and code analysis rules also help teams deliver database changes consistently, reducing error and freeing up time for value-added work. It also offers foundational capabilities for 50+ DBMS.

"The data is always going to get bigger, but now with Redgate Flyway as part of our core engine room it's so easy."

Director of the Data Team, Global Pharmaceutical case study

Offers market-leading flexibility for smooth adoption

Redgate Flyway Enterprise integrates with all common CI and release tools, including GitHub, Azure DevOps, Octopus Deploy, Jenkins, GitLab and many more, making it easy to work with existing platforms and processes for delivering application changes. Unlike other database change management solutions, Flyway Enterprise is the market-leading solution for flexibility, giving teams the choice of state- and migrations-based deployment approaches with a number of workflow integrations. This means organizations can ensure the best-fit implementation for their data needs, with a faster time to value.

"Flyway brings databases into the 21st century with source control management and version schemas."

Desjardins case study

Supports compliance requirements

Redgate Flyway Enterprise maintains a full audit log of database changes deployed via Flyway down to the object level. This ensures consistency and facilitates rollbacks and audit trails, bringing support for regulatory requirements that mandate traceability and accountability in database change management.

"A nice by-product of this is that it's so auditable. It's nice to say, here's the model we deployed in Production, and here are all the downstream changes."

US Credit Union case study

Pay down technical debt and grow scalability

By freeing up teams from manual processes, such as hand-writing database change scripts, testing or verifying differences between database environments, Redgate Flyway Enterprise helps teams pay down some of the data management debt experienced when working with complex and often legacy data architectures. In addition, the act of automating database change management processes in a standardized, reliable and repeatable way means that organizations can more easily work with monolithic databases or tackle transformational strategies, such as migrating to the cloud.

"In the time we've saved on fixing errors, I can be working on higher quality jobs, not just remedial tasks. So it's a lot more than just time savings."

Agnete Nørskov Nielsen, Data Analyst, Sydbank case study

Ready to take the next step towards achieving robust database change management?

Contact us for a free consultation with our Sales and Solution Engineers to uncover how Redgate Flyway can meet your goals.

You're in good hands

Using Redgate Flyway Enterprise means benefiting from Redgate's industry-proven database comparison technology, continually developed since 2000. Today, more than 200,000 people globally, including 92% of the Fortune 100, trust Redgate to deliver ingeniously simple software.

Find out more