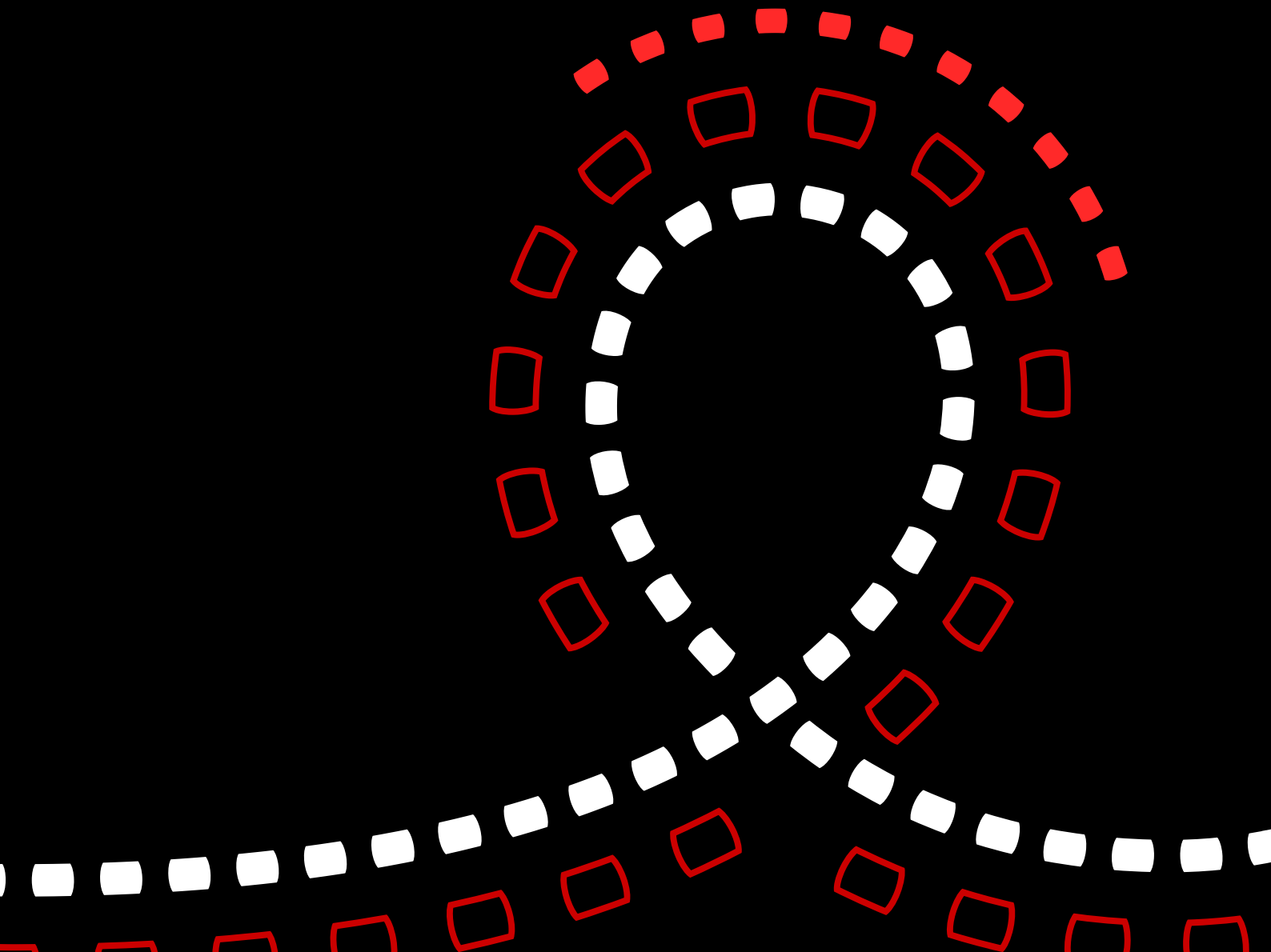
redgate

2025 State of the Database Landscape



Introduction

Welcome to the latest data industry report from Redgate. This is our seventh major report since 2017 and, in many ways, the most important yet. The last eight or so years have seen major changes for data professionals, transforming the way they work, and this report highlights how.

The amount – and diverse types – of data being created and stored has skyrocketed, for example, prompting organizations to introduce multiple database platforms. The cloud is now as important to organizations as on-premises environments, and sometimes more important. Data security has become a reputational risk as well as a regulatory one. AI has burst onto the scene and continues to disrupt the way businesses work. And the need to upgrade and extend skillsets for IT teams and individuals has never been more urgent.

We saw all of this in last year's State of the Database Landscape report. What's so fascinating about the 2025 data is that we're seeing a consolidation, a shakedown, as organizations move beyond the promised potential of multiple databases, the cloud, and AI, balancing the advantages to be gained with the added complexity they bring, and the ever-present need to safeguard data. They're taking stock, and we're seeing a more measured position emerge.

This latest report reveals insights into multiple database platform adoption, the cloud, AI, and data privacy, and the professional development challenges they bring, now the dust from these changes is beginning to settle.

Welcome to the real state of the database landscape in 2025.

Note: some chart data may not always amount to 100%
Numbers in the charts displayed are rounded up or down where necessary to ensure consistency between a figure appearing in a chart and the same figure being called out in the report text.

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Data security and testing quality is improving

The rise in the volume and variety of data that organizations are now collecting, storing and analyzing also increases the chances of sensitive data like personally identifiable information (PII) being compromised. This is a big concern for many businesses, with the ITRC's 2023 Annual Data Breach Report stating that data breaches in the US increased by 78% in 2023 compared with 2022, and nearly 11% of all publicly traded companies have been compromised.

It's clear why more and more organizations are prioritizing securing data in every environment where it's used, from development and testing through to production. At the same time, organizations can enjoy the best of both worlds, enhancing their security posture while also improving efficiencies, by automating difficult, laborious tasks, and streamlining workflows with practices that help to keep data safe while speeding up development.

THE FAST FACTS

Data security

Data security is improving, with the number of organizations with no approach for handling sensitive data during development and testing falling by over half since 2023. There are still issues around how frequently test data is refreshed, and how long developers wait for new test data to be provisioned, but an increasing number of teams are adopting a test data management approach to tackle these challenges. They are able to regularly refresh their test data and provision it faster – in turn, increasing developer efficiency while reducing failed deployments by nearly half.

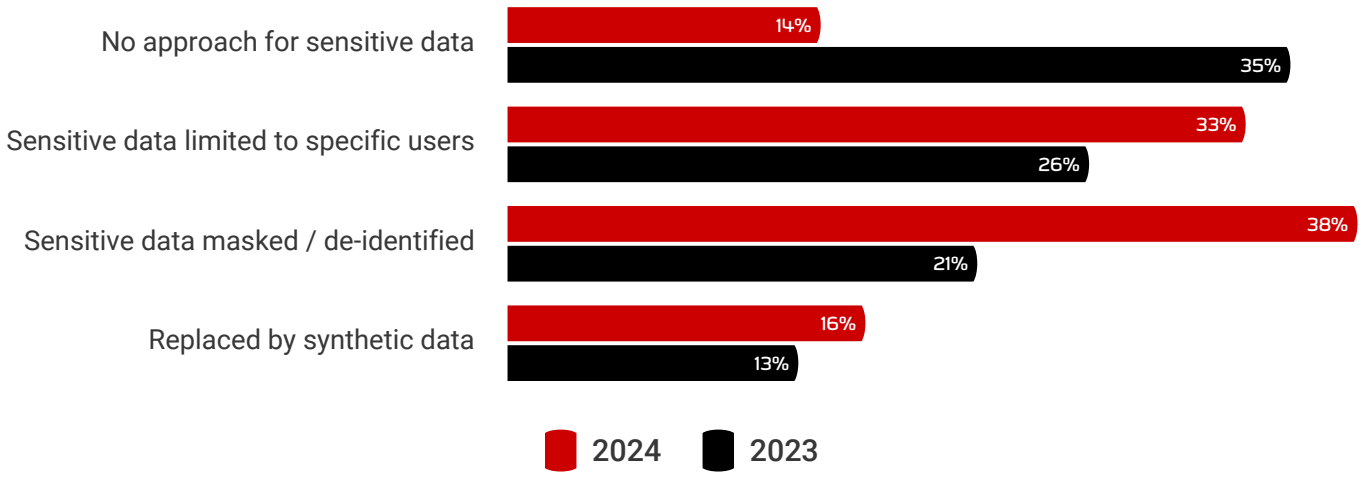
- Only 14% of organizations now have no approach for handling sensitive data, compared with 35% in 2023
- 38% of organizations mask or de-identify sensitive data, 33% use role-based access control (RBAC) and limit access to specific users, and 16% replace it with synthetic data
- Only 30% of organizations refresh development and testing teams with new test data on every new piece of work (or daily), with 51% taking a month or more
- The time it takes to provision the refreshed data also varies, with 21% of organizations doing so within one hour, 25% taking 2-4 hours, 20% taking 4-8 hours, and 35% waiting a day or longer
- Organizations which refresh test data on every new piece of work (or daily) are also able to provision it to developers faster, improving the speed of testing
- Organizations which refresh test data on every new piece of work (or daily) experience a reduction in failed deployments, with frequent failed deployments falling from 17% to 9%, and occasional failed deployments dropping from 18% to 10%
- The top three data privacy challenges are keeping development and testing environments up-to-date and synchronized, compliance, and the volume of data teams are responsible for handling
- While 87% of organizations in the EU follow GDPR, only 49% of those in the US follow HIPAA and 24% follow the CCPA, indicating a weaker data security posture and exposing them to risk

Development and test data is more secure

Copies of production databases are typically used in development and test environments so that developers can test their proposed changes and ensure they work as expected without risking an impact on production data. Those copies need to be realistic and truly representative of the original so that this testing is accurate. It's also critically important to protect the security of sensitive data like personally identifiable information (PII).

When asked about their approaches for handling sensitive data, an encouraging picture emerges:

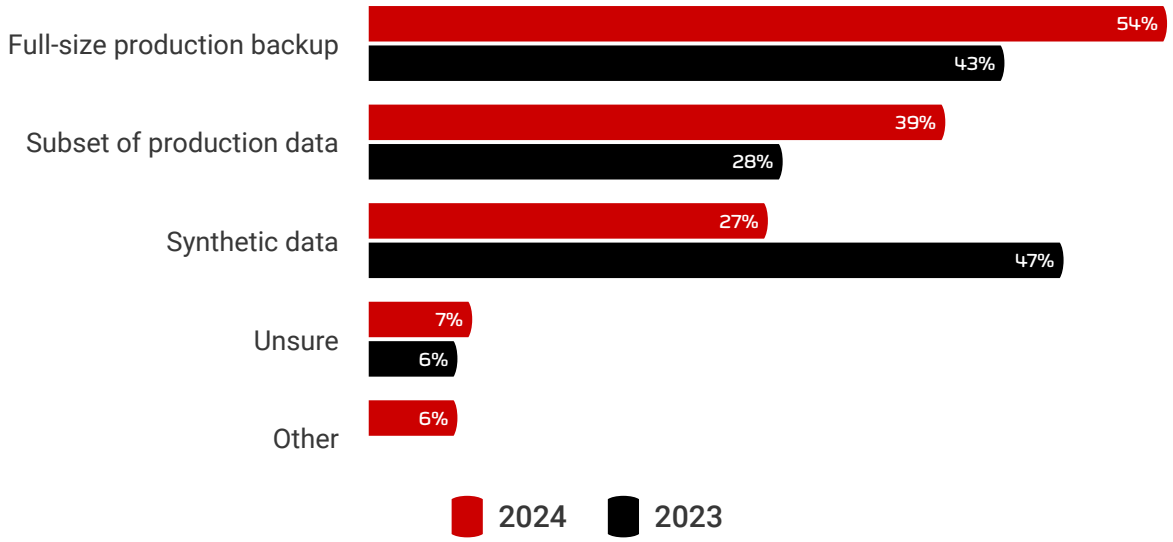
Approaches for handling sensitive data in development and testing



Most notably, the number of organizations with no approach for sensitive data has fallen by more than half, from 35% to 14%. Another positive sign is the increase in those masking their sensitive data, up from 21% to 38%.

We can correlate the approaches to protecting sensitive data with the types of data provided for development and test environments:

Types of data provided for development and test environments



We see a drop in the use of purely synthetic data since 2023 (-20%) coupled with sizable increases in the use of full production backups, and production subsets. Overall, the responses seem to indicate that more organizations are using test data management practices that enable production data to be used safely for testing and development, with any sensitive data in the full backups or subsets being subsequently de-identified or replaced with synthetic data.

Highlighting the need for test data management

Data from IDC[1] shows that 60% of developers still use production data, putting sensitive data at risk. That's where the capabilities of test data management (TDM) come in, helping teams to mask production data, generate synthetic data and much more. In particular, the trend towards data masking means more and more organizations are now seeking a TDM solution to assist them.

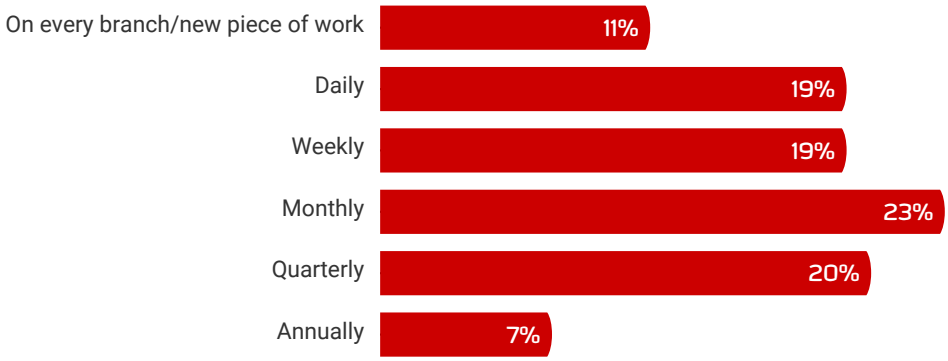
Learn more about test data management

[1]IDC InfoBrief, sponsored by Redgate, Simplifying Complexity and Delivering Business Value: Making Database DevOps Work in the Real World, doc #EUR252966324, January 2025

High-quality test data increases developer efficiency

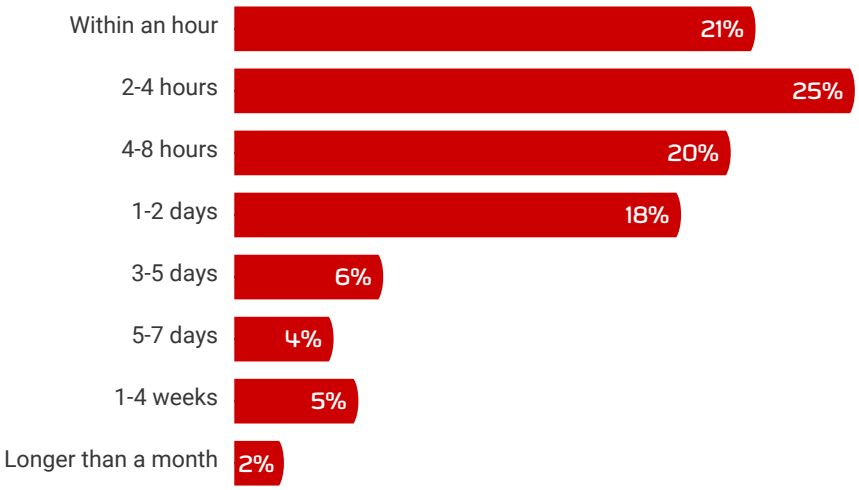
While the privacy and security of the data used in development and testing is of prime importance for DBAs, the frequency with which new test data is refreshed is most important for development teams. The data within databases is updated constantly, so the more up-to-date the data is, the more accurate the testing will be. This test data management approach is one area where many organizations fall behind:

How often software teams are refreshed with new test data



Half (51%) of organizations provision their development teams with new test data monthly, quarterly, or even annually. Only 30% do so on every new piece of work or daily, a sign that they're using test data management practices which enable them to provision secure data easily and quickly. We see a similar division regarding the time it takes to refresh those test data environments:

How long it takes to refresh test data

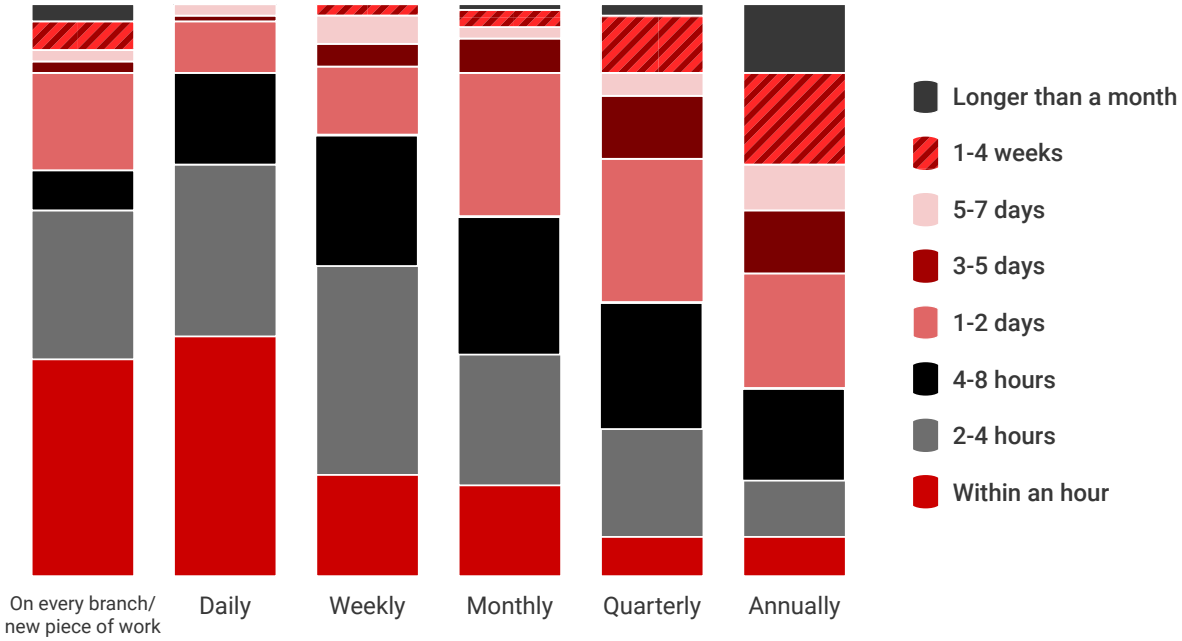


Just over a third (35%) of development teams have to wait anywhere between one day and longer than a month to refresh test data. Another 20% wait between half a day and one day. The remaining 46% wait between one and four hours. Shorter turnaround times on refreshing test data are another signal (particularly for the 21% who can refresh test data within an hour) that some organizations have developed established test data management practices.

This may seem a minor point, but it has a big effect on the efficiency of development and testing teams. If they have to wait for hours – sometimes a day or even longer – for the test data they need, they have to pause work, despite how important that work might be.

We can see the combined effect of these two practices when we examine how often teams are refreshed with new test data compared with how long it takes to provision data environments. A direct correlation can be seen:

Time taken to provision test data environments based on how often test data is refreshed

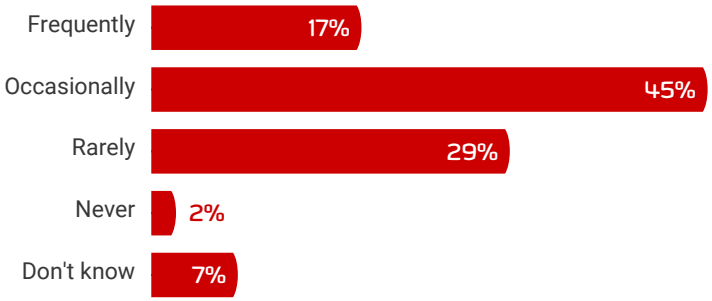


Organizations that regularly refresh their test data on every new piece of work, or daily, are also able to provide it to their developers faster. Developers can get back to work far more quickly compared with those in organizations that refresh their data weekly (or, indeed, the 51% of organizations which do so monthly, quarterly or annually). They're not waiting and waiting; they're working more efficiently.

High-quality test data reduces failed deployments

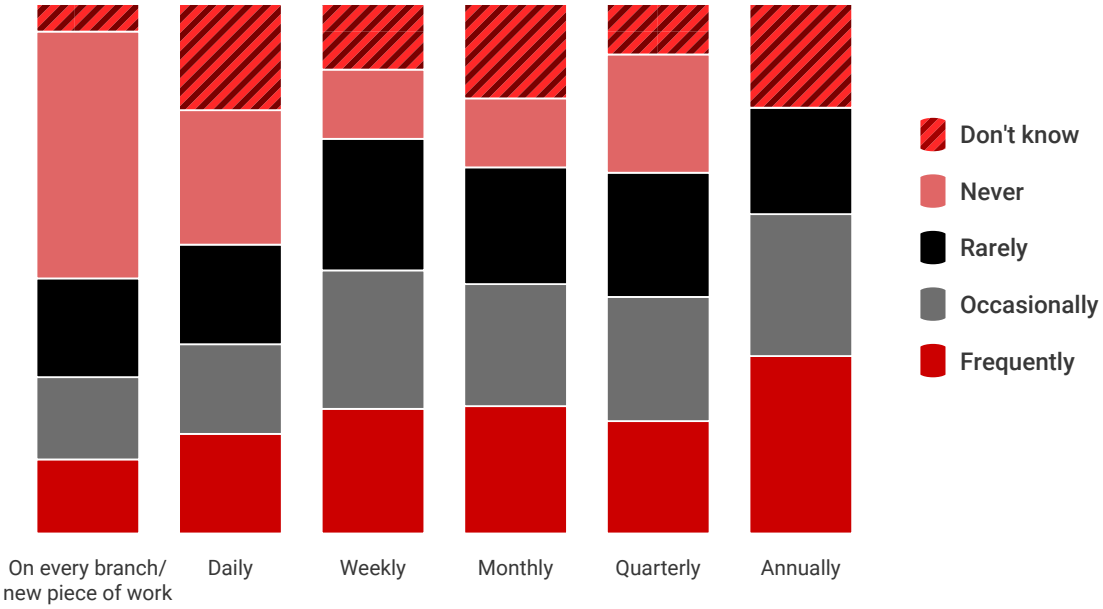
This focus on the quality of test data, and the speed at which it can be supplied and refreshed, also has a clear and demonstrable impact on the number of issues that are found in production which weren't caught in testing. These issues frequently result in failed deployments, and often involve hours of rework to resolve:

How often data-related issues are found in production that were not caught in test



Across all respondents, 31% rarely or never find issues, 45% occasionally find issues, and 17% find them frequently. When we compare how often issues are found with how often data is refreshed, a different picture emerges:

How often data issues are found in production based on how often test data is refreshed

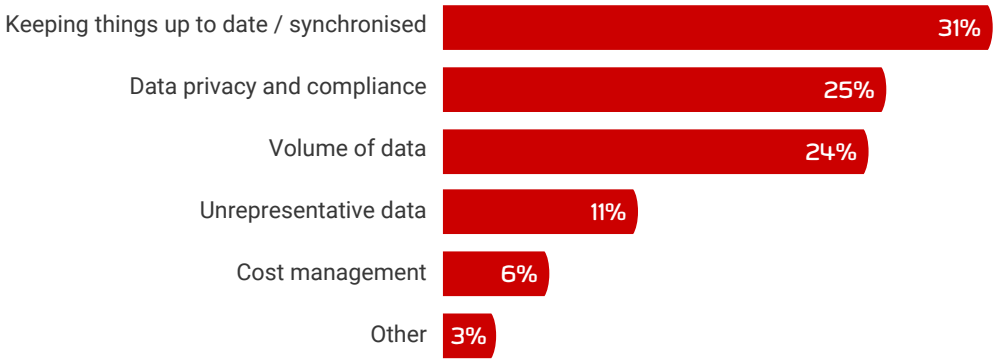


The number of failed deployments increases broadly in line with the days, weeks or even months it takes to refresh development teams with new test data. For those who do so on every new piece of work, the number of frequent failed deployments falls from 17% to 9%, the number of occasional failed deployments falls from 18% to 10%, and the number of deployments that never fail leaps from 2% to 30%.

Data privacy and compliance challenges persist

While development and test data is becoming more secure, challenges still remain for IT teams. A third of teams have problems keeping data environments up to date and synchronized, while a quarter have data privacy and compliance issues, and struggle to keep up with the volume of data:

The biggest challenge when managing test data

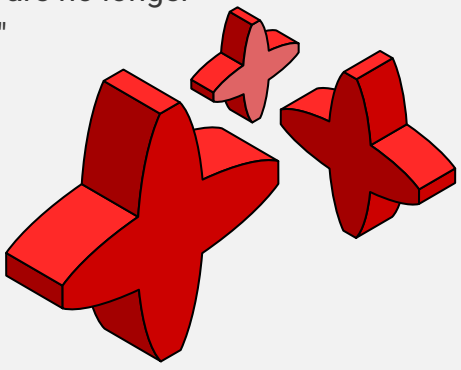


The growing importance of security and compliance

"Data is now the most critical asset for any organization, but as reliance on it grows, so do the risks associated with breaches, fraud, and non-compliance. For most organizations, security and compliance are no longer optional – they're essential for survival."

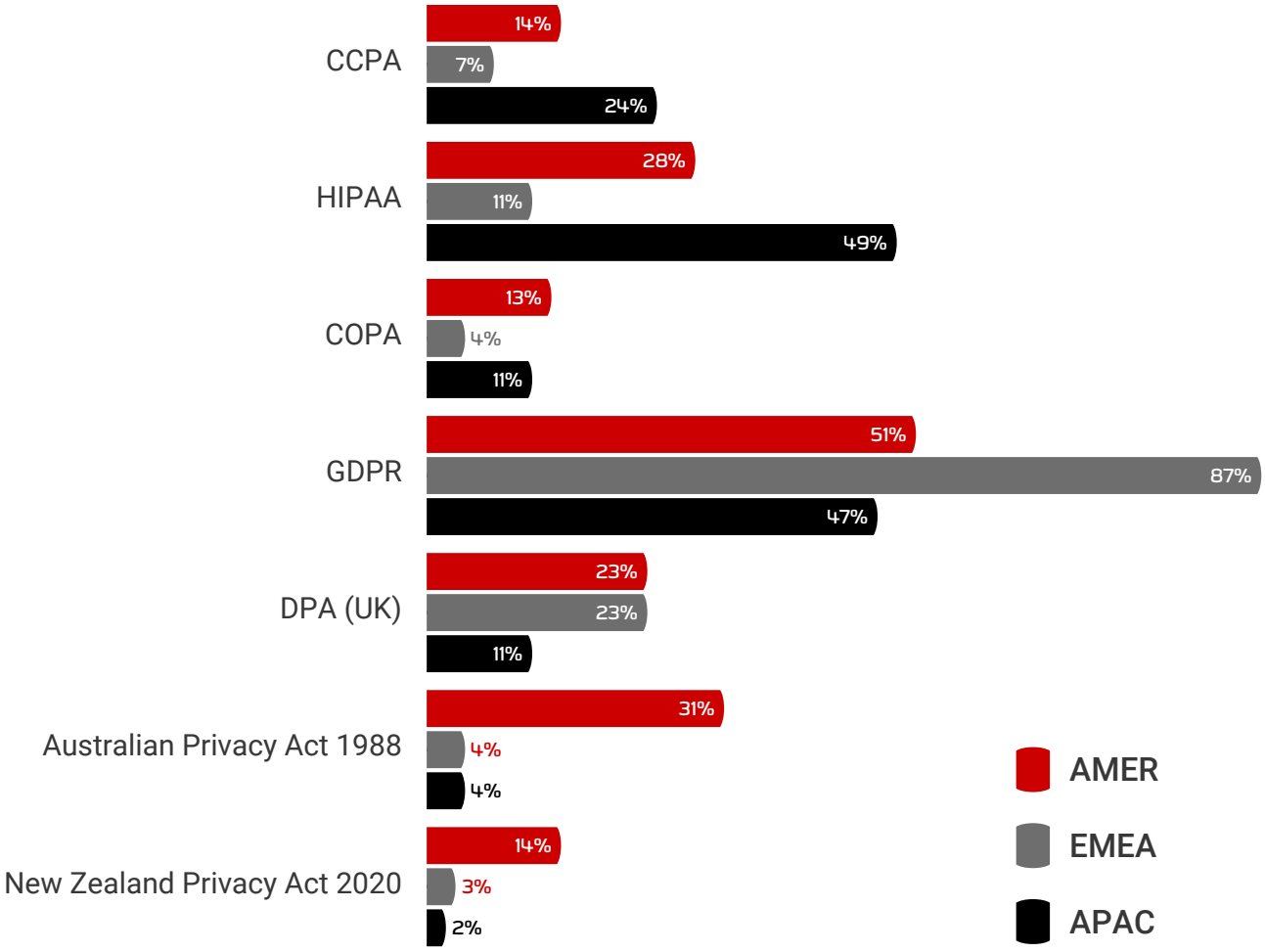
Mri Pandit
Senior Manager at Navy Federal Credit Union

Read the full article



There are regional variations as well. While 87% of organizations in the EU follow the GDPR, this falls to 49% for US organizations following HIPAA, and 24% following the CCPA, indicating a weaker regional data security posture:

Data protection measures followed to protect PII



While these regulations may not appear to be important or relevant for all organizations globally, compliance with regulations like GDPR helps organizations better prepare themselves against the risk of data breaches.

Compliance drives behaviors like data anonymization (with measures like masking) or limiting data access. Procedures are in place to limit the likelihood and impact of breaches and mitigate their impact the moment a problem is found. This helps to manage reputational risk, as well as making data safer.

The adoption of multiple database platforms is consolidating

The sheer amount and complexity of data that data professionals have to contend with has been growing rapidly over the last decade, and it shows no sign of stopping. At the same time, the variety of data has expanded far beyond the structured data typically seen in familiar relational databases.

While structured data like financial records and customer information still needs to be collected and stored, hence the continuing dominance of 'traditional' platforms like Oracle, MySQL, SQL Server and PostgreSQL, organizations are now also expected to collect, store and analyze semi-structured, unstructured, time-series, geospatial and graph data from a range of sources: the kinds of data relational databases are not best suited for.

As a consequence, organizations have been introducing different types of database platforms alongside relational platforms. But what's the position today? Which new database platforms are the most popular? What are the drivers – and the challenges – of introducing them? Why are a quarter of organizations still sticking with just one database platform?

THE FAST FACTS

Multiple database platforms

The relentless increase in the volume and variety of data that organizations now need to collect, store and analyze continues. This is exacerbated by semi-structured, unstructured and other data types entering the picture, bringing with it the requirement to introduce different database platforms that are built to handle them.

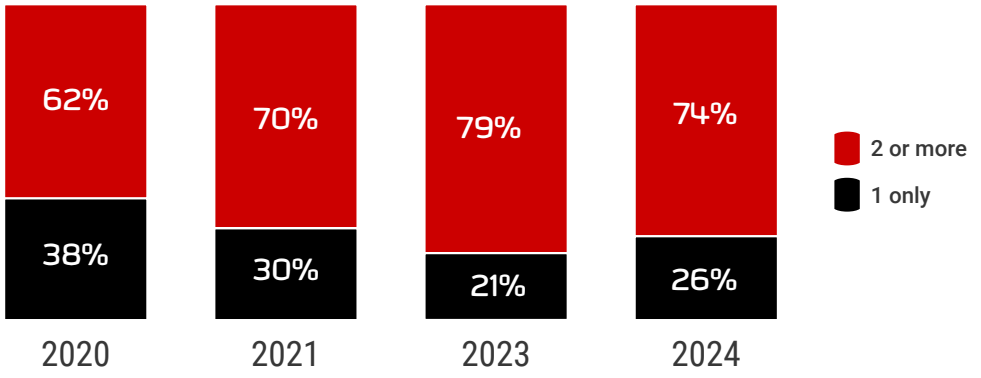
Organizations have now recognized that this explosion of data brings with it major challenges, with the need to improve skillsets and training the biggest among them. Consequently, they're now consolidating their use of multiple databases, with nearly 75% pulling back to three platforms or less. Meanwhile, a quarter of organizations are sticking with one database platform, driven by increasing concerns around cost, licensing issues, and security and compliance.

- 74% of organizations now use more than one database platform, down from 76% in 2023, with the number using four or more platforms also dropping from 42% to 26%
- The majority of organizations (74%) have consolidated their adoption of multiple database platforms, using between one and three database platforms (up from 57% in 2023)
- For the 26% of organizations sticking with one platform, the top three drivers are that the need for additional platforms has not arisen, concerns around costs have more than doubled since 2023, and worries about licensing have more than trebled since 2023
- For 57% of organizations, their biggest challenge when managing different database technologies is skillset requirements and individual/team training, up sharply from 38% in 2023
- Differing needs and use cases remains the biggest factor influencing the decision to introduce new database platforms, up to 62% from 44% in 2023
- While the top four relational databases (Oracle, MySQL, SQL Server and PostgreSQL) remain the most popular, NoSQL databases like MongoDB and Redis now comprise five of the top 12 databases
- The top four most popular databases that organizations have introduced over the past two years are the open-source platforms PostgreSQL and MySQL, and the NoSQL platforms MongoDB and Snowflake
- Sharing common practices across different database management systems is limited to 32% of organizations
- 56% of organizations want multi-platform support for database monitoring tools, and 48% want the same support for database migration tools

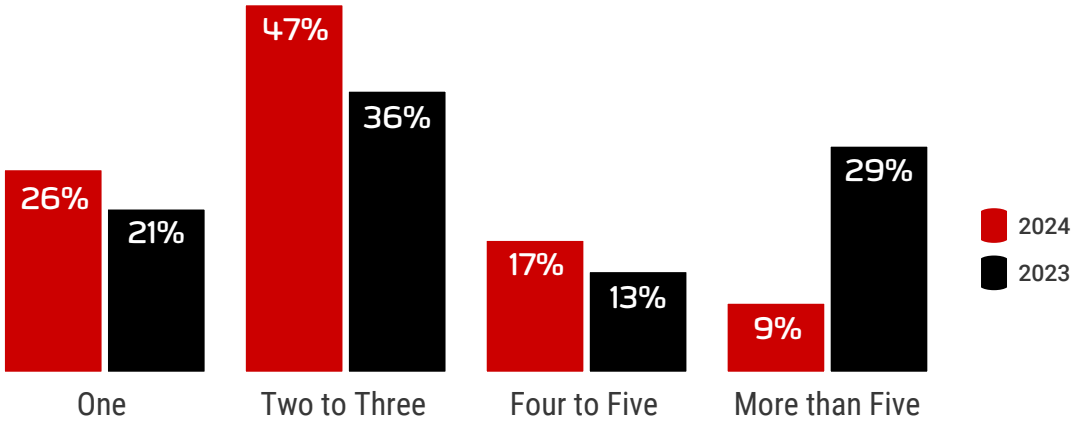
The makeup of database estates is changing – again

Since 2020, Redgate's major data industry surveys have highlighted a notable upward trend in the adoption of different database platforms, with organizations using only one platform falling by nearly half from 38% in 2020 to 21% in 2023. This year we see a reversal in that trend, with organizations using just one platform rising to 26%:

The number of different database platforms in use



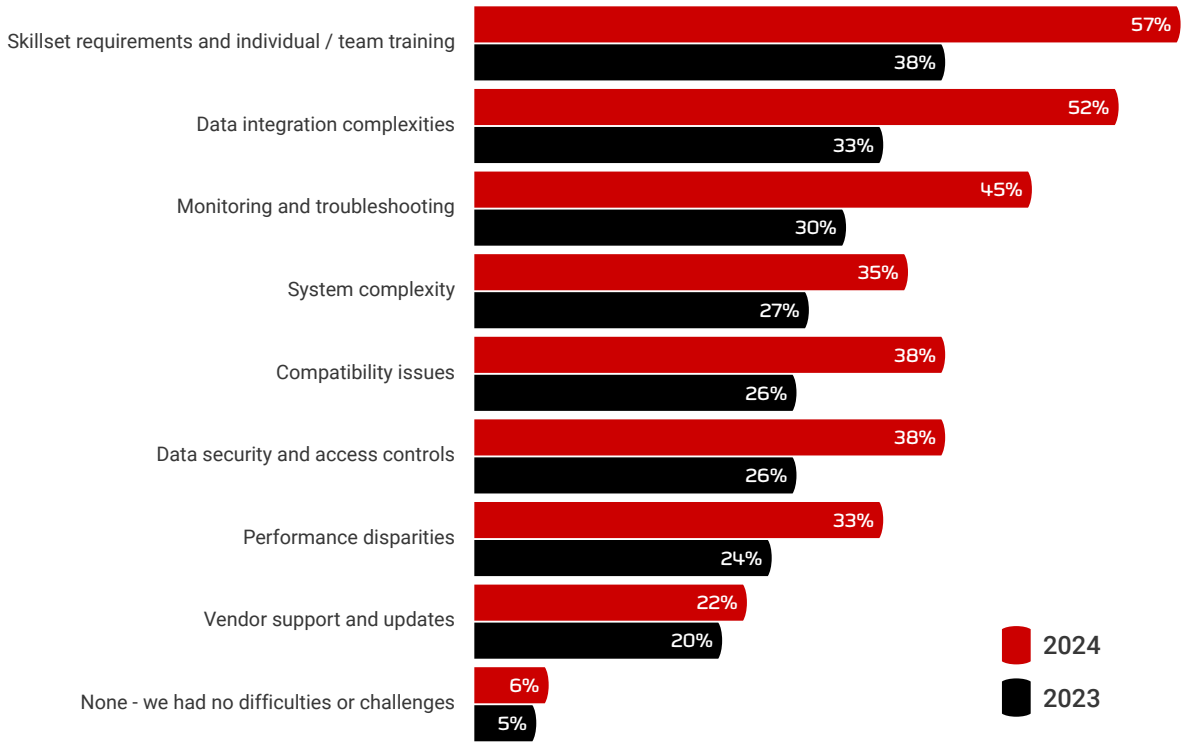
Beneath the surface, there has also been a significant shift. The proportion of organizations using three or fewer database platforms has risen to 74%, compared with 57% in 2023 – and those using more than five has dropped from 29% in 2023 to 9% in 2024:



The implications here are important. This shift indicates that organizations have explored the opportunities afforded by multiple database platforms to meet changing business requirements and are now rationalizing their choices. They're moving from introducing any platform that meets a business use case, to considering which platforms they can support with the resources they have.

This trend is highlighted by the challenges organizations now face when managing different database technologies compared with 2023:

The challenges faced when managing different technologies



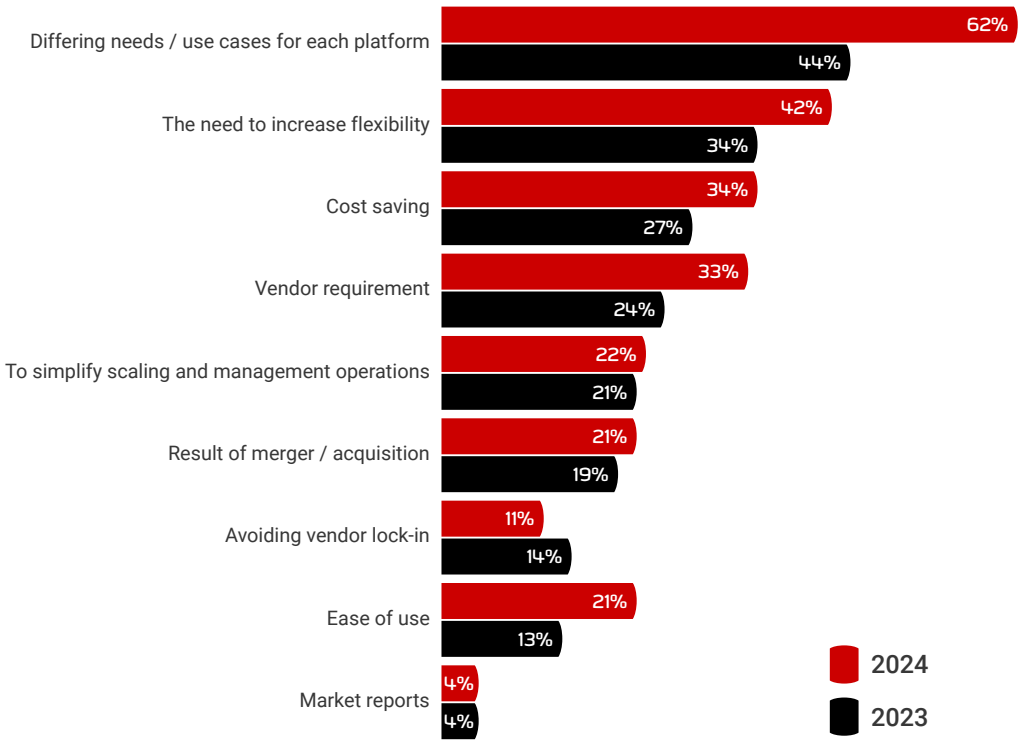
Skillset requirements, data integration complexities, and monitoring and troubleshooting continue to be the top three challenges. However, there is a marked increase in the magnitude of those challenges across nearly every factor, with experiences of the top three reported challenges rising by around half. These increasing challenges are driving recognition that one way to mitigate them is to scale back the number of database platforms in use.

> “For enterprise companies, the future of data means embracing a multi-database strategy where non-relational databases coexist with relational databases to meet diverse business requirements.”
>
> **Tom Treivish**
> Head of Content & Brand, Studio 3T

Differing needs and increased flexibility continue to prompt change

While the challenges of managing different technologies are on the up, so too are the drivers for introducing them, with differing use cases, flexibility, and cost saving continuing to make up the top three:

The factors influencing the decision to implement a multiplatform environment



The need to cater for different use cases rising by nearly half is a standout finding here, but another factor is also worth noting. Vendor requirements have now increased to the point where they almost match the desire for cost saving, indicating that the option of introducing a new database platform is sometimes driven by external pressures rather than business imperatives or the bottom line. Examples of this effect include WordPress, which requires a MySQL or MariaDB database, and Salesforce, which typically runs on Oracle databases.

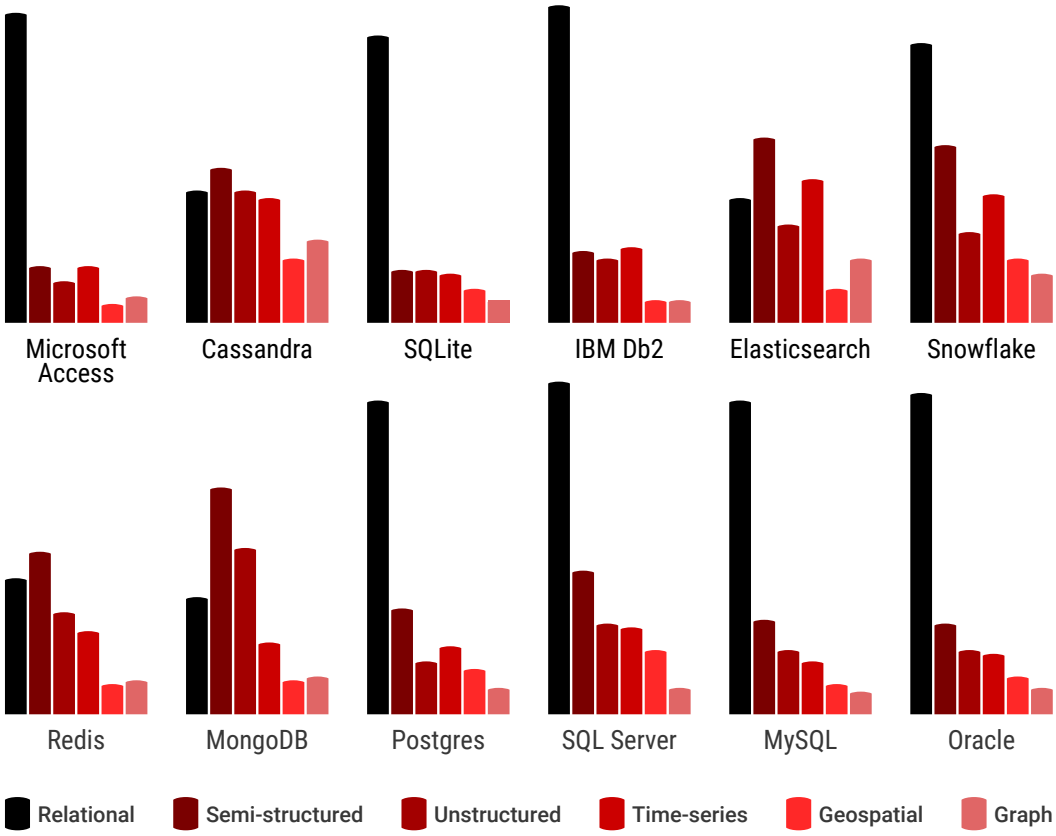
Organizations need more than traditional relational databases can offer

Whatever the challenges organizations face when introducing new database platforms, the reason why they need them is clear: the expansion in data, new and different types of data, and the rising complexity of that data.

Make no mistake – organizations still need to collect and store structured data like financial records and customer information, hence the continuing dominance of traditional relational databases like Oracle, MySQL, SQL Server and PostgreSQL. These four have consistently taken the top spots in the DB-Engines ranking of database management systems since DB-Engines was launched in late 2012.

Over the last decade, however, those four platforms have been joined in the ranking by hundreds of other databases designed to store and analyze all of the different kinds of data organizations now use. We can see why when we examine the top 12 databases in the current DB-Engines ranking and review the variety of data they store:

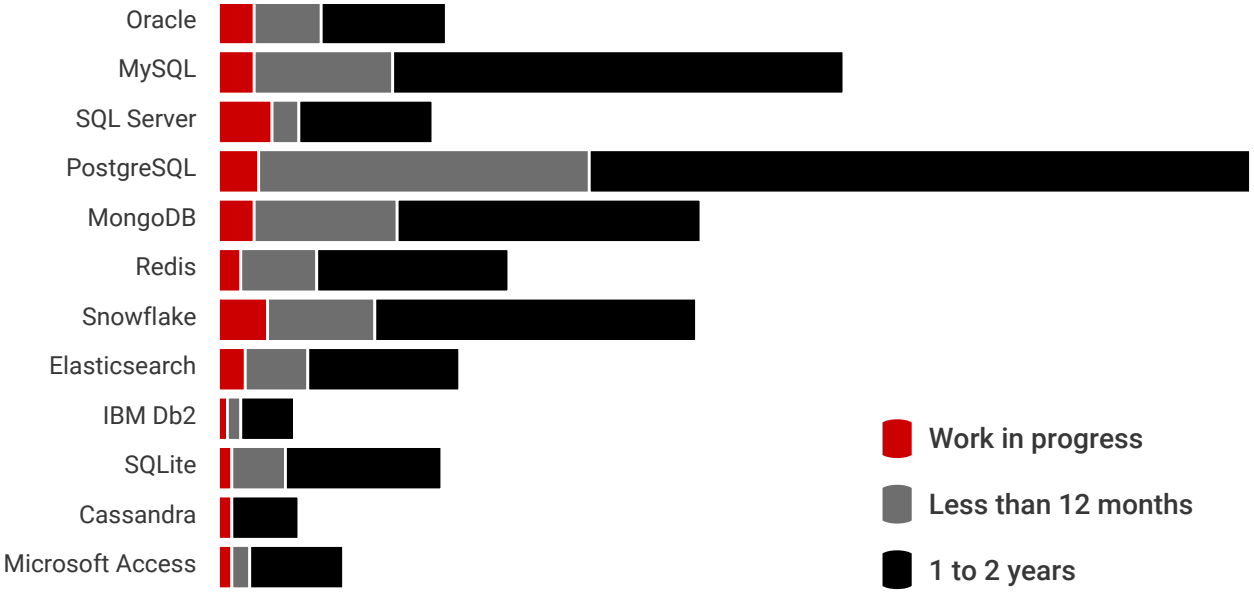
The kinds of data stored in different database platforms



Structured relational data has now been joined by semi-structured data in the form of emails and HTML code, unstructured data like images and video files, time-series data from edge devices such as smart meters, geospatial data for mapping, and graph data from social media.

As a consequence, organizations are introducing additional database platforms which are better suited to handling this data. So, while the top four (along with IBM Db2 and Microsoft Access) remain popular for relational data, others, like MongoDB and Snowflake, are being introduced alongside them when additional forms of data enter the picture. This effect is particularly notable when we look at the database platforms organizations have introduced within the past two years:

The database platforms introduced within the past two years



Snowflake, the cloud-native database platform, supports most basic SQL data types, but its real focus is on semi-structured, unstructured, time-series, numerical, string and logical data. Similarly, MongoDB is particularly good at handling large volumes of semi-structured and unstructured data. Other NoSQL databases like Redis and Elasticsearch are also being introduced in greater numbers than Oracle and SQL Server.

It's worth noting that the most popular databases being introduced within the last two years, PostgreSQL and MySQL, are still relational. Organizations are typically moving to open-source platforms to reduce licensing costs and support customization. And in terms of overall numbers of instances, the top four from the DB-Engines ranking remain far ahead of other database platforms. These new database platforms aren't replacing legacy platforms: they're supplementing them.

The challenges of working with different database platforms are becoming more complex

This need to handle more data, and more types of data, naturally brings obstacles when it comes to introducing new database management systems. We've already seen that skillset requirements, data integration complexities, monitoring and troubleshooting are the biggest challenges. These challenges aren't just limited to development teams. Since 2023 they've spread across the business, and IT/Ops, data science, infrastructure, BI and security teams are now also far more likely to work across multiple database platforms.

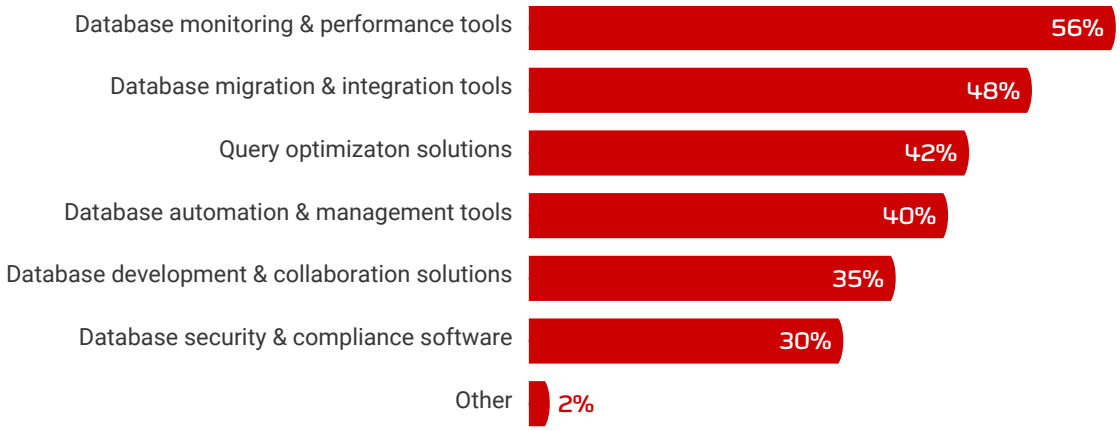
One common approach to resolve this complexity is to use common, shared and standardized practices that simplify workflows across teams. Unfortunately, only 32% of respondents are working in organizations that promote cross-functional collaboration, formal sharing, a continuous improvement culture, and communities of practice:

The sharing of practices across teams working with different database management systems

This particular challenge calls for teams to share more practices, more widely, and seek out processes to streamline workflows across different database platforms in order to reduce the skillset requirements and the impact across multiple business functions.

Another widespread approach to addressing the gap in skillsets involves equipping teams with tools to remove, reduce or automate laborious processes, and standardize working practices across multiple platforms. When asked which tools would benefit from support across multiple platforms, the top two mentioned by around half of respondents are database monitoring and performance tools, and database migration and integration tools:

Tools currently used that would benefit from multiple platform support



Redgate's multi-platform solutions

With 56% of respondents saying they currently use database monitoring & performance tools that would benefit from multi-platform support, Redgate Monitor could be the answer, with full compatibility with both SQL Server and PostgreSQL.

Try Redgate Monitor for free

Meanwhile, 40% and 35% want cross-database automation, management & development tools, which is where Redgate Flyway comes in.

Try Redgate Flyway for free

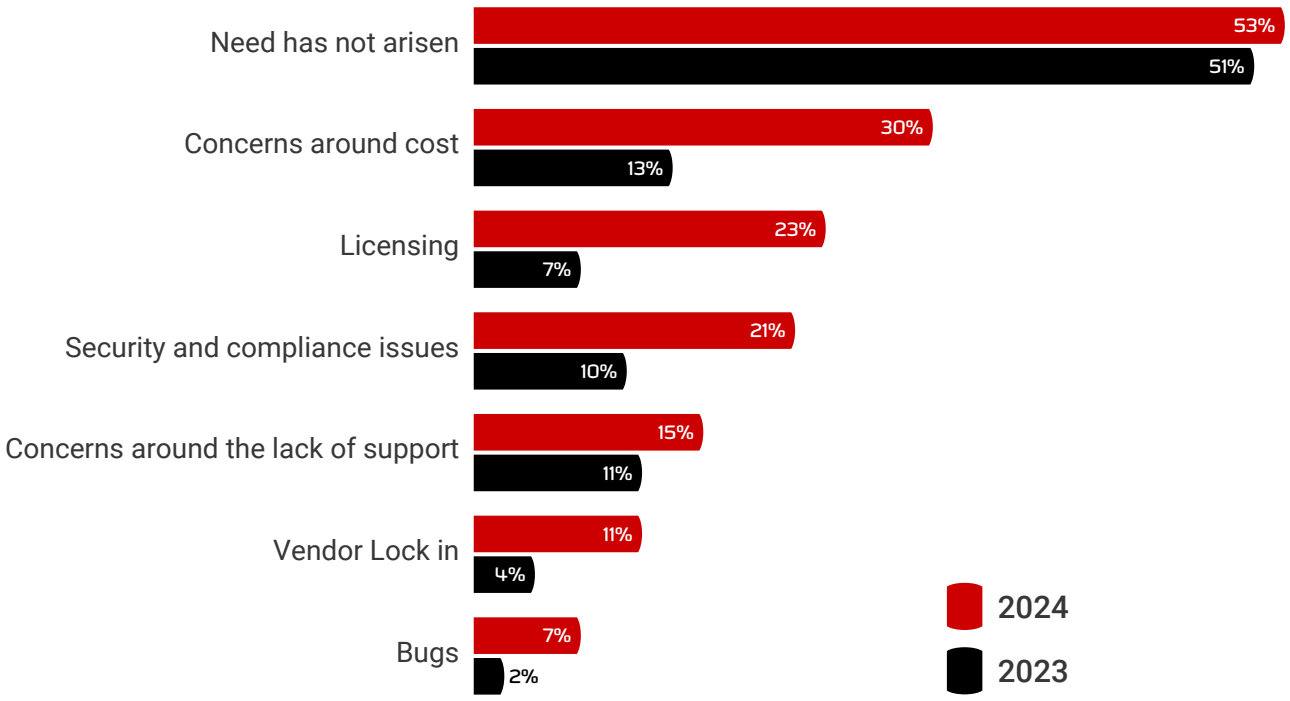
Using our tools for tasks such as database change management (Flyway) and monitoring (Monitor) helps to improve workflows, reduce operational costs and lower skills gaps.

A sizeable minority of organizations are sticking with one database platform

Finally, we want to highlight the 26% of organizations who are sticking with one database platform. They form a sizeable minority, up from the 21% we saw in last year's survey. And for good reason. Half have deliberated on introducing another platform, but the need has not yet arisen. They're happy with the database platform they have.

There are also big – and rising – concerns about the challenges of adopting multiple platforms. Concerns about the costs have more than doubled over the last year, security and compliance issues have also doubled, and worries about licensing have more than trebled. It's clear that organizations are balancing the potential advantages with the challenges…and in some cases deciding not to move forward.

The challenges influencing the decision not to adopt multiple platforms



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Addressing the skills gap has never been more important

Professional development has now become a major priority for the IT industry, with the IT skills gap widely understood to be a challenge.

Rapid changes in technology over the last decade, and the use of more and more different systems, have seen organizations in every sector struggling to narrow the gap.

Multiple database platforms are now the norm, along with hybrid cloud and on-premises database estates. AI has changed the game, bringing opportunities as well as pitfalls. Data privacy and security makes complying with regulations challenging, while also presenting reputational risk.

So how can we better equip data professionals to understand and work more effectively in today's complex IT environments? What professional development opportunities are offered, and are most beneficial? How can we better understand the 'gap' in 'IT skills gap', and how can we overcome it?

THE FAST FACTS

Skills gap

Throughout this report, the need to improve skillsets and training and bring in more advanced development practices has been a recurring theme. The last decade has seen the introduction of multiple database platforms, the widespread adoption of the cloud and the emergence of AI, but professional development has remained in stasis. The opportunities on offer no longer match what developers and data professionals need and want, and only half of organizations proactively provide these opportunities, despite the fact that there is a recognized IT skills gap.

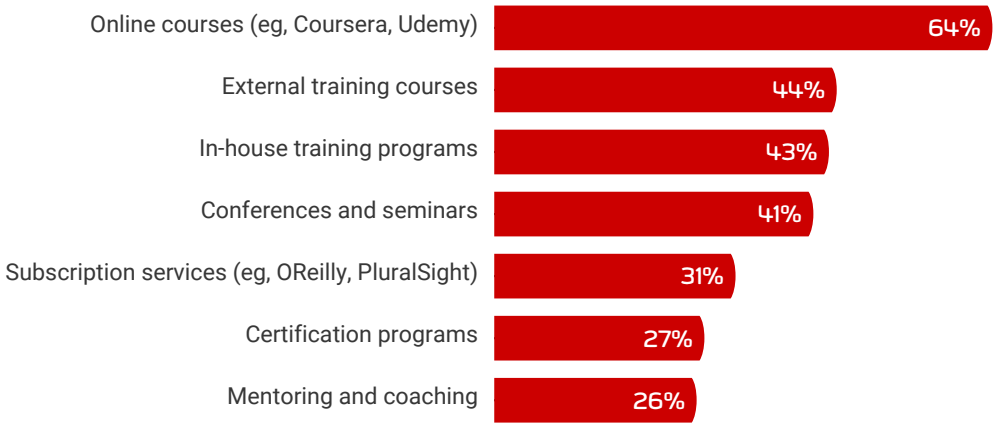
The skills gap will be different across organizations and sectors, depending on the makeup of their IT infrastructure, so it would be prudent for them to understand where their own gaps are and seek ways to remedy them. The IT Skills Gap Report from Forbes is a good place to start, covering the latest methods and approaches.

- Online courses are the most popular professional development opportunity offered by 64% of organizations, followed by external training courses (44%), in-house training programs (43%), and conferences and seminars (41%)
- The most beneficial opportunities are online courses (71%), external training courses (70%), conferences and seminars (67%), and in-house training programs (63%)
- There's a mismatch between the provision of professional development opportunities and how often data professionals would prefer to access them, with 44% of individuals preferring these opportunities to happen weekly or monthly, compared with the 27% of organizations offering them at this frequency, while 54% are only offered opportunities annually or rarely
- The top three barriers preventing individuals from participating in professional development are lack of time, lack of financial support, and limited availability of relevant training
- 32% of individuals have a professional development budget representing 3% or more of their salary, but 46% are limited to ad hoc or low-cost requests
- The top additional professional development opportunities individuals would value are advanced technical training, industry certifications, and soft skills like leadership, teamwork and networking
- The top three resources necessary to further IT skills are software tools (55%), online forums and communities (44%), and a budget for external courses (42%)

The pace of learning is lagging behind the pace of change

That's not to say organizations have dropped the ball – they haven't. Many do offer professional development opportunities in lots of different ways:

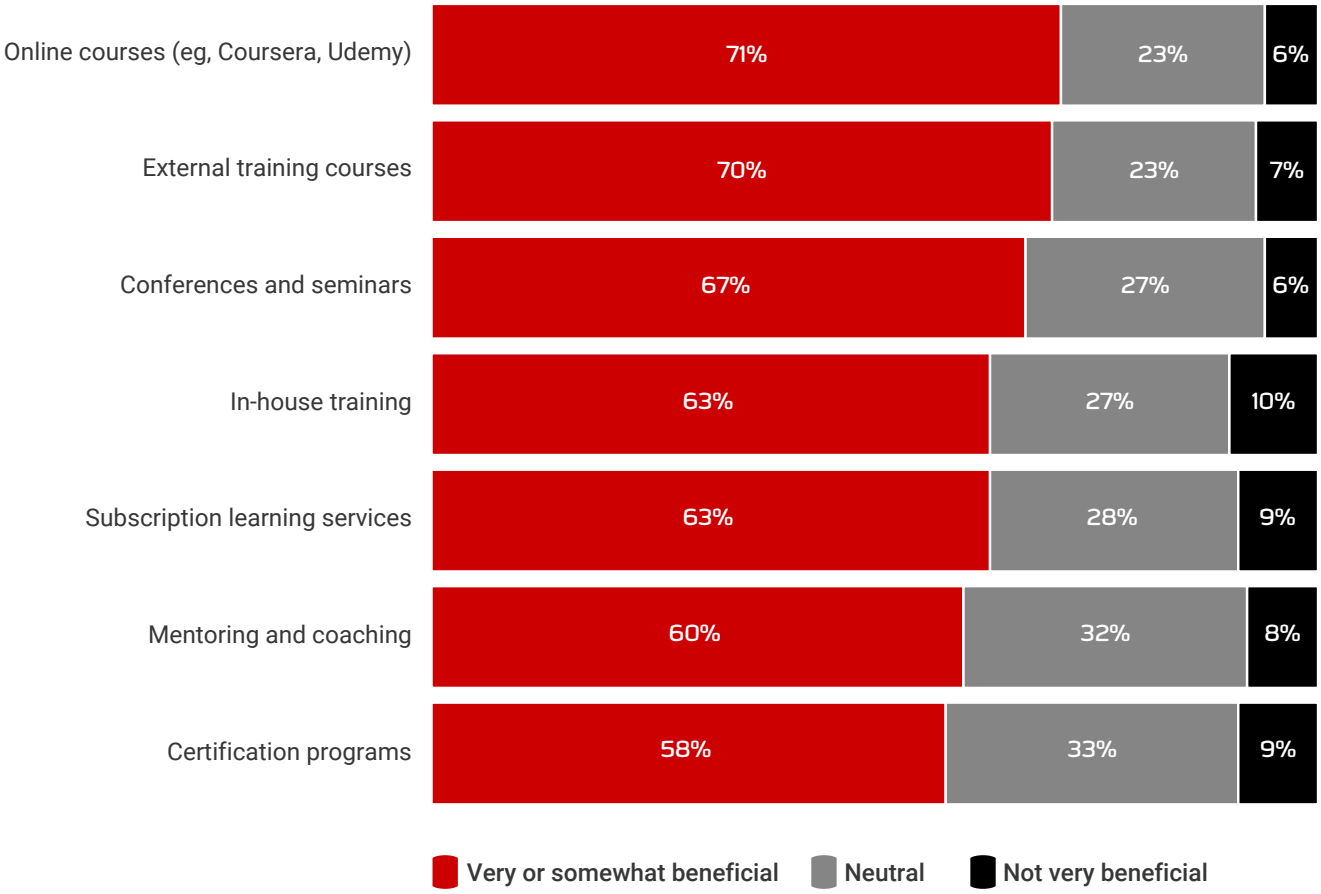
Professional development opportunities offerered



> "I knew I wanted to switch careers, so I prioritized learning and making connections in the industry. I took advantage of free and inexpensive resources like books, articles and forums – YouTube and TikTok didn't exist in the mid-1990s, but today an unbelievable amount of free resources are available online."
>
> **Kathi Kellenberger**
> Former Customer Success Engineer, Redgate

Clearly there are a lot of opportunities across varied learning mechanisms, with two thirds of organizations offering online courses, and around four in ten providing external training courses, in-house training programs, and access to conferences and seminars, alongside subscription services, certification programs, mentoring and coaching. Satisfaction rates are also fairly high:

The most beneficial professional development opportunities over the last 12 months

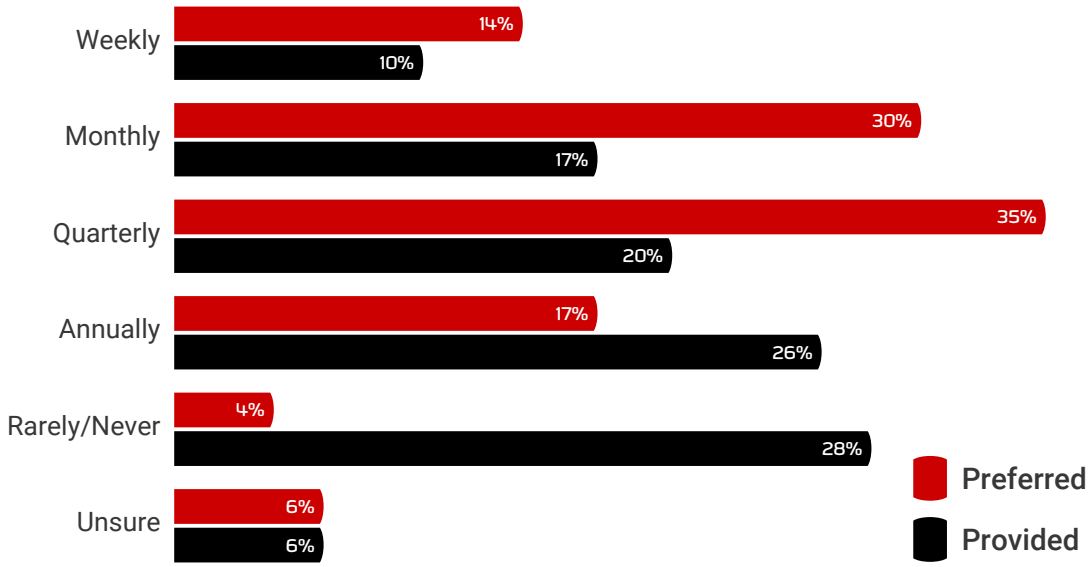


Again, this paints a good (if not perfect) picture. Professional development opportunities are available, and the majority of participants find them beneficial. But arguably it's not enough, given that the much-discussed skills gap still exists.

What's holding your people back?

While many organizations do offer professional development opportunities, they often fall short when it comes to the frequency at which these opportunities are provided, the barriers their people face when trying to participate, and the budgets available to take advantage of opportunities. Reviewing the frequency of opportunities, for example, we can see that there's a mismatch between what's on offer and what people prefer:

How often opportunities for professional development are provided



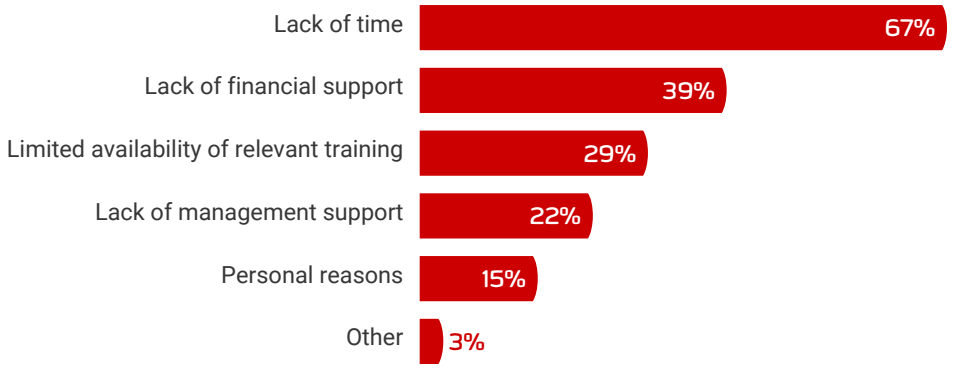
44% would like weekly or monthly professional development opportunities, for example, but only 27% of organizations are providing such opportunities this frequently. Over a third (35%) would appreciate quarterly opportunities, compared with the 20% of organizations providing professional development once a quarter. Perhaps most importantly, 54% of organizations provide opportunities only annually or rarely/never, while only 21% of data professionals prefer such infrequent opportunities for learning and development.

For 77% of organizations, data-driven transformation is a strategic goal – but 45% report lack of data skills/data literacy being a barrier.

IDC InfoBrief, sponsored by Redgate, Simplifying Complexity and Delivering Business Value: Making Database DevOps Work in the Real World, doc #EUR252966324, January 2025

When we explore the barriers to participating, the biggest challenge by far is lack of time at 67%, followed by lack of financial support at 39%:

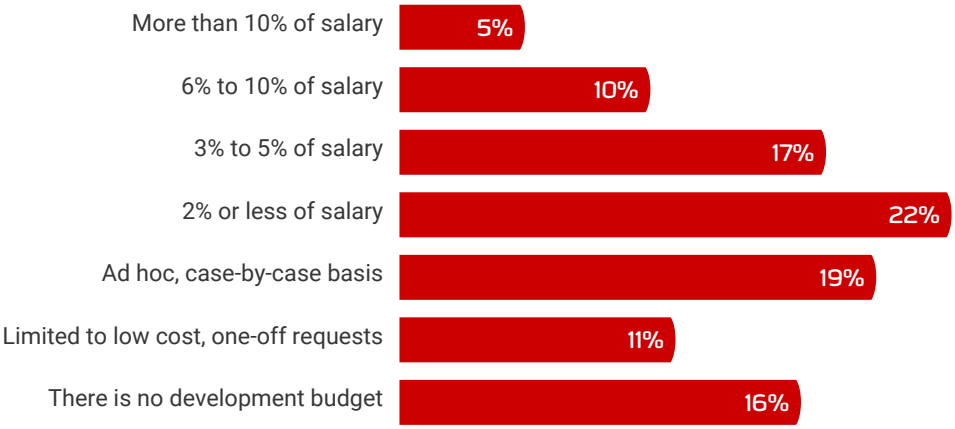
The barriers faced when participating in professional development activities



Given that 44% of people would like professional development opportunities to be provided weekly or monthly, this is a relevant – and telling – finding. People don't just need opportunities; they also need dedicated time away from their day jobs to take advantage of them.

Lack of financial support can be seen when we look at the budgets organizations provide for professional development opportunities. For a lucky third (32%), that budget ranges between 3% to more than 10% of their salary. For 22%, it's 2% or less of their salary. The remaining 46% are limited to ad hoc or low-cost requests, or no budget at all.

Average annual professional development budget for each team member



What can push your people forward?

The professional development opportunities offered today haven't changed significantly over the past decade. A range of courses are available online, in-house or externally, with some opportunities to attend conferences or seminars, for those who firstly have a training budget and secondly are given the opportunity. However, organizations haven't kept pace with the kinds of opportunities their people would like to see:

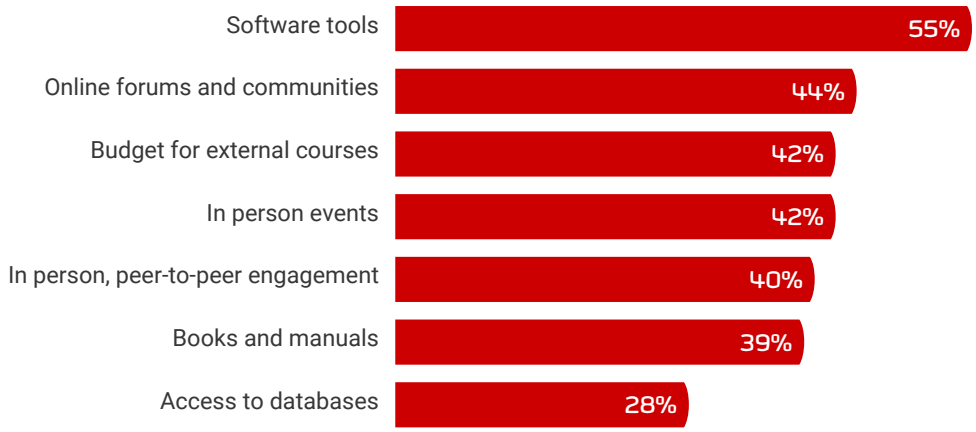
The additional professional development opportunities employees would like to participate in

Top of the list by a wide margin is advanced technical training – people want to upskill faster and further with more complex and in-depth training. Perhaps most importantly, they also want leadership and management training, soft skills and networking opportunities, as well as industry certifications. Interestingly, where tight budgets are concerned, some of these opportunities (like networking opportunities with peers) can be achieved without significant cost.

> "We continue to invest in education and content, and events like PASS Data Community Summit, where we welcome a range of diverse and experienced voices to share their skills and describe how they've overcome common database challenges."
>
> **Cassi Roper,**
> Chief Revenue Officer, Redgate

When asked about the resources they need to further their skills, people are looking beyond the usual suspects:

The resources or tools necessary to further skills



Over half (55%) want software tools that can help them do their jobs more efficiently by removing laborious, manual tasks. They also want access to online forums and communities, and in-person events to improve their networking skills. And, naturally, they want a budget for external courses.

This ties in with The IT Skills Gap Report from Forbes, which found that training methods have moved on. A third (34%) of businesses are investing in internal training programs that help to create a culture of continuous learning. Over a quarter (28%) are collaborating with educational institutions like universities to bridge the gap between the IT skills their current workforce have and what they need, now and for the future. Soft skills are also now firmly on the agenda; the leading three requests in this space are problem solving and analytical thinking, adaptability and the willingness to learn, and teamwork in the form of collaboration, cooperation and conflict resolution.

Forward-thinking organizations are now looking beyond the traditional methods to upskill their employees, using a variety of strategies and experiential learning approaches like hands-on labs, games and hackathons to enhance their professional development efforts.

Artificial intelligence: a cautious welcome

Artificial intelligence has been the biggest business disruptor since the launch of the internet, and the fastest too. It was only in June 2022 that GitHub released its AI 'pair programmer', Copilot, built on OpenAI's Codex API. OpenAI followed this up with the launch of ChatGPT in November 2022, adding the ability to generate text and images as well as code. Since then, it's been open season for AI, with numerous businesses launching tools, services, features and capabilities to take advantage of this disruption, all promising to do things faster, better, smarter.

In many ways, the shift has been welcome, replacing minor and laborious tasks with a few clicks or a short prompt. In other ways, it's been less welcome, with concerns around copyright and data privacy, unintentional bias, a lack of transparency about the algorithms used, and AI's ability to generate 'hallucinated' and fake content.

But what about data professionals? When it comes to streamlining processes in database management, how welcome is AI? What tasks is it being used for, and what are the benefits gained? What concerns do data professionals have? What does the future hold?

THE FAST FACTS

Artificial intelligence

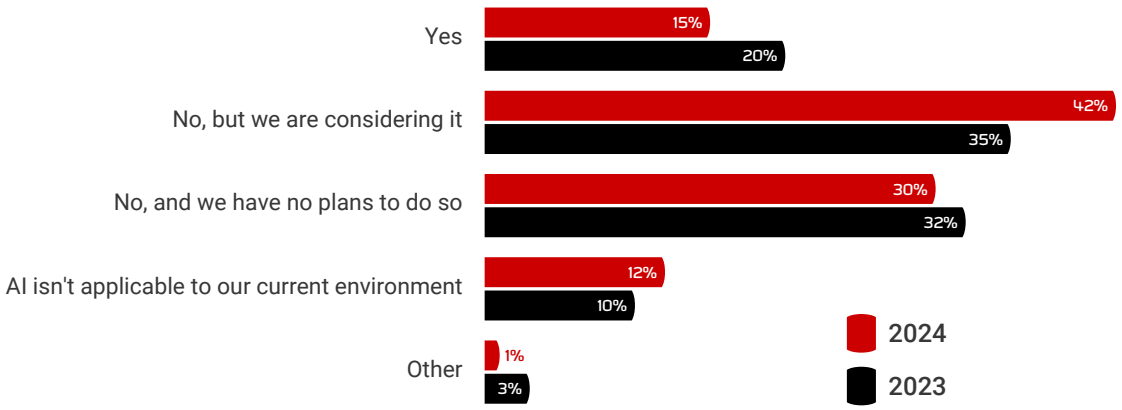
While AI presents a lot of promise, with its ability to streamline tasks, automate processes and standardize workflows, there are also understandable concerns around its use. Data security and accuracy are the most important concerns, followed by ethical considerations, regulatory compliance, and training and expertise. Hence only 15% of organizations are using AI to help with database management. Among that 15%, however, the majority have relied on it to some degree – and 84% say that it's improved their productivity. In the next two years, the majority of organizations predict AI will have a positive impact across their business.

- Only 15% of organizations are using AI in the context of database management, down from 20% in 2023
- The top three tasks AI is being used for are code reviews, query optimization, and data modeling & schema design
- The top three benefits experienced by organizations using AI are automation (47%), the streamlining of tasks (45%), and standardization (42%)
- While enhanced security was cited by 40% of organizations as a main benefit of using AI in 2023, this has dropped sharply to 25% in 2024
- Concerns about using AI have risen, with 61% of organizations citing data security and privacy, up from 41% in 2023, and 57% citing accuracy, up from 37% in 2023
- Users are far more positive about AI than their organizations, with 60% extensively or moderately relying on it – and 84% say it has significantly or somewhat improved their productivity
- 70% of those using AI state that they're likely or very likely to adopt more AI tools in the next one to two years
- Across all organizations, more than half think AI will have a positive impact on internal processes, DevOps performance, saleable products, and careers in the next two years

Organizational adoption of AI is slow

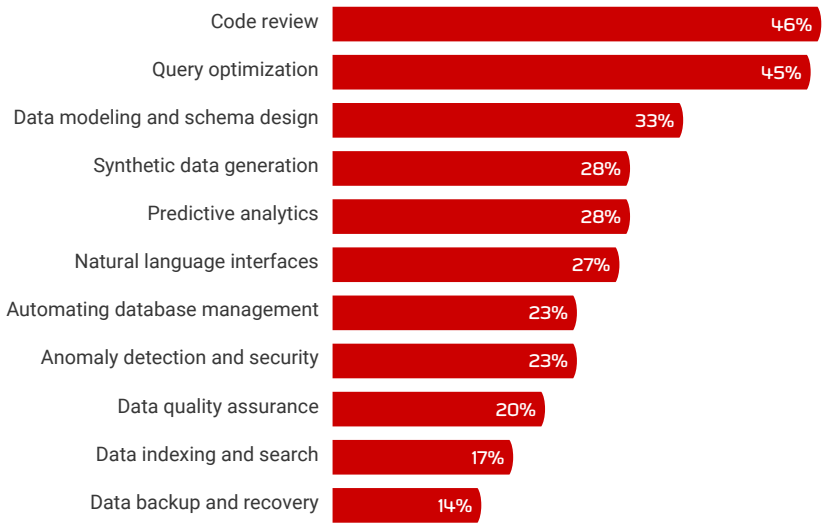
Across many sectors, AI has been widely embraced and often boasted about. It's seen by some as a badge of honor to have adopted it. At the moment, however, database management professionals are telling a different story:

Have you used AI in the context of database management?



The already low percentage of 20% we saw using AI in 2023 dropped to 15% in 2024, although the percentage of those considering using it rose. Those who did adopt it, however, used it widely:

The tasks AI is being used for

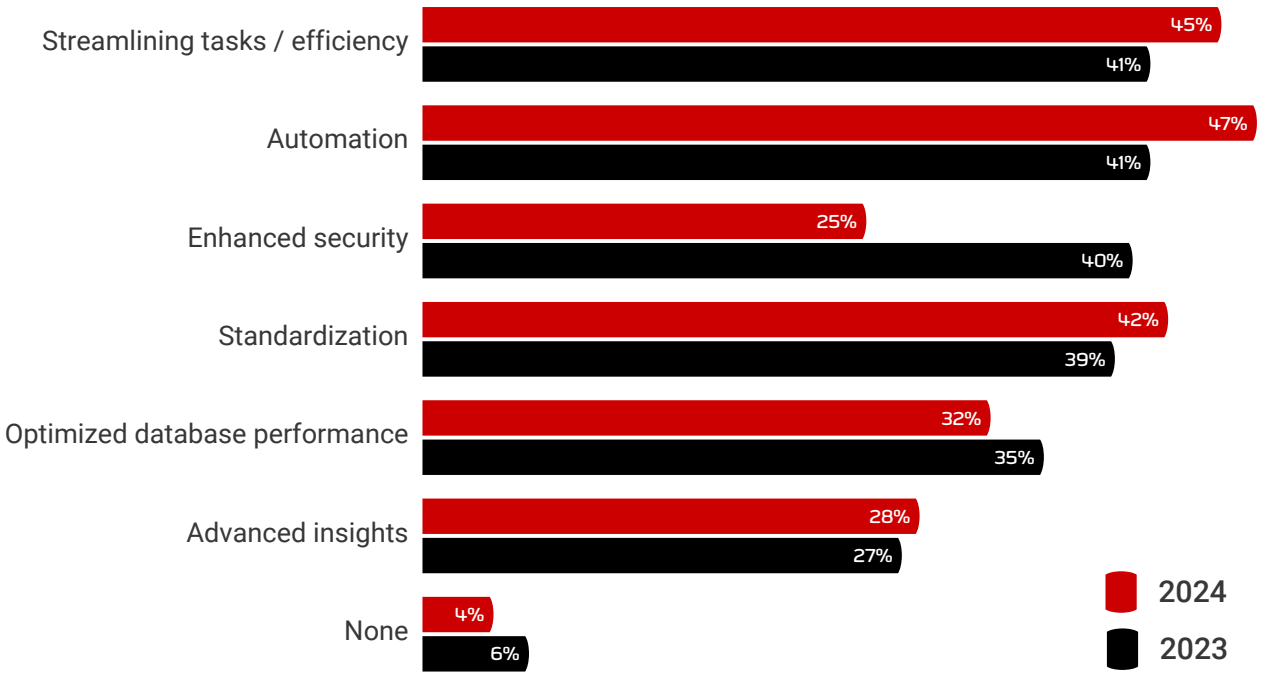


There's clearly significant interest in using AI across every database management task, from code reviews and query optimization, through synthetic data generation and predictive analytics, to data quality and assurance, and data backups. This trend is broadly repeated among the 42% who are considering using it, demonstrating that AI does indeed have a wide appeal.

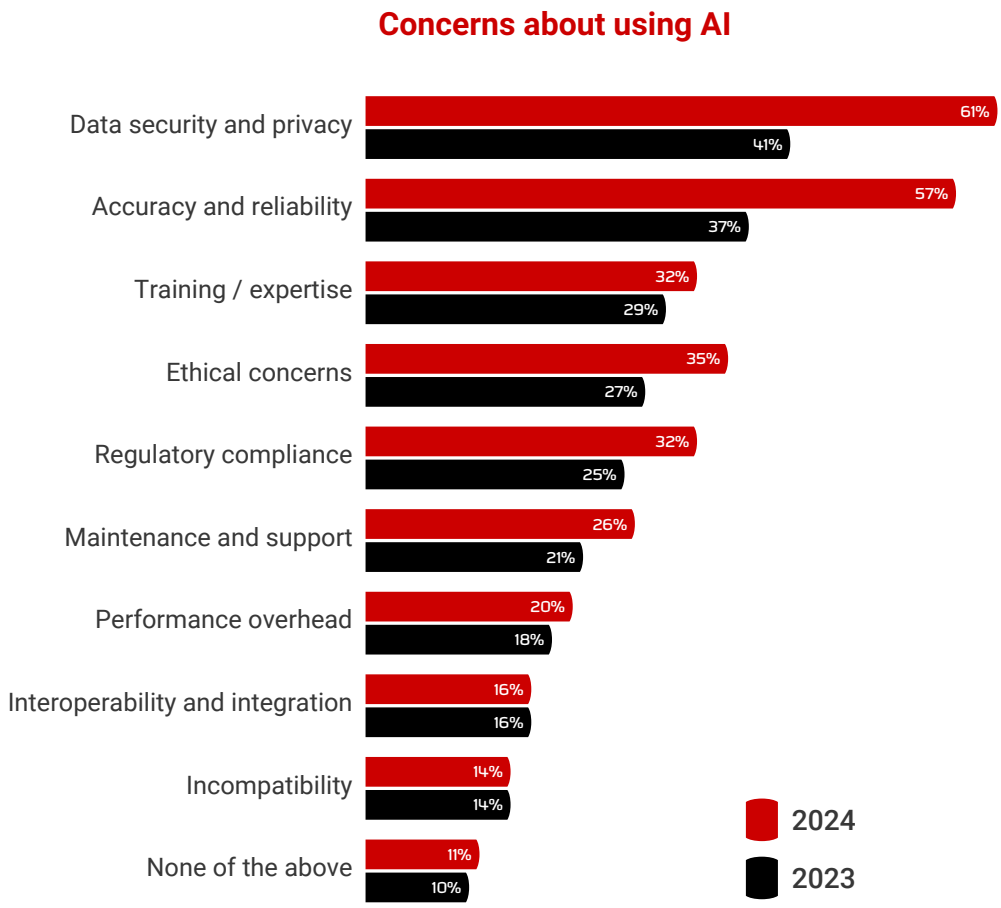
Balancing the benefits and concerns surrounding AI

Those who have used AI in database management have seen major benefits in every area although, notably, its effectiveness at enhancing security has fallen since 2023.

The main benefits you and your organizations experience using AI



AI can help streamline and automate tasks, standardize working practices, optimize database performance and provide advanced insights. All of this sounds like good news until we look at the concerns data professionals shared about using AI:



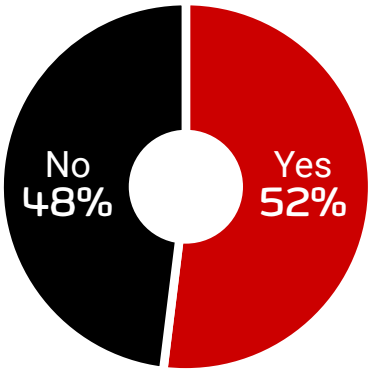
The top two concerns around data security and accuracy are the most important, and both have increased by around half since 2023. Ethical concerns have also risen to the third spot, and regulatory compliance is now in fourth spot, tying with training and expertise.

Quite simply, organizations are worried. Databases contain data, and the security and privacy of that data is vital to their businesses, as is the accuracy and reliability of any measures taken to store, analyze and manage it.

Users are more positive about AI than organizations

Among the 15% who have used AI for database management, in many cases its adoption appears to have been informal, rather than formal. When asked about training or guidance, for example, just under half had not received any:

Have you received any formal training or guidance from your organization on using AI?



Similarly, access to AI tools is sporadic, with 43% limited to an approved list of tools that offer enterprise licenses, and the remaining 57% having a number of different choices:

What access does your organization provide to AI tools?

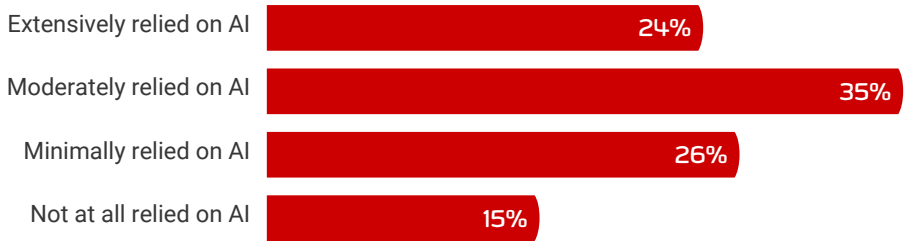
Security top of mind as Redgate rolls out new AI capability

Data security was top priority for the Redgate Test Data Manager team while developing the product's AI-enhanced data generation capability, which is currently in beta. Unlike open GPTs, your data stays yours, at all times.

Read the full article

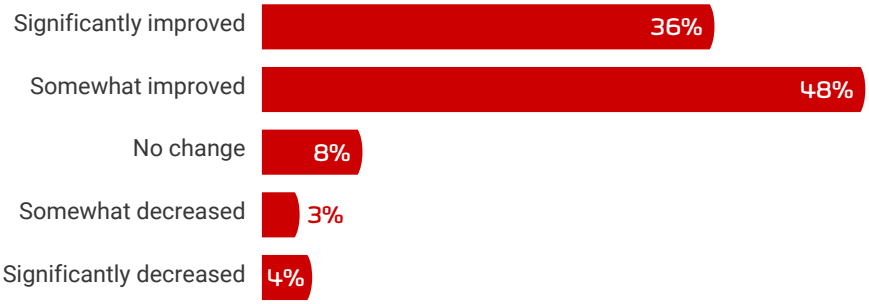
The overall mood about the use of AI, however, is positive in terms of the ways respondents have relied on it, and its effects on productivity. 60%, for example, have extensively or moderately relied on AI, while 26% have minimally relied on it:

In your current role, how much have you relied on AI over the last 3-6 months?



84% of those who have used AI found that it has significantly or somewhat improved their productivity. That's a significant outcome for any organization:

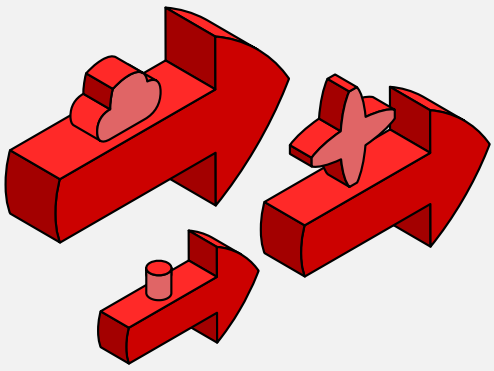
How has the use of AI impacted your productivity?



"AI-driven optimizations in Oracle, SQL Server, PostgreSQL, and MySQL help automate tasks like query optimization, coding and indexing."

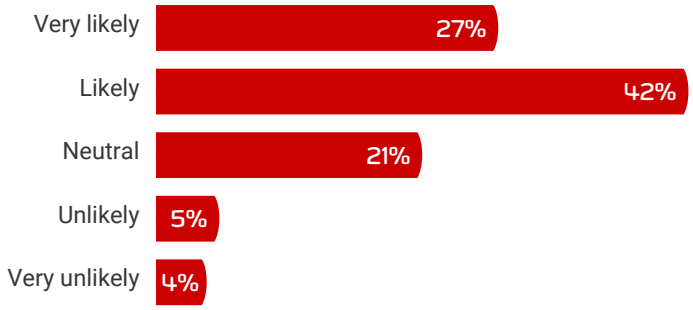
Kellyn Gorman
Advocate & Engineer at Redgate

Read the full article



The attraction of AI tools also looks set to continue, with over two thirds (70%) stating they're likely or very likely to adopt more tools in the near future:

How likely are you to adopt more AI tools in your role in the next 1-2 years?

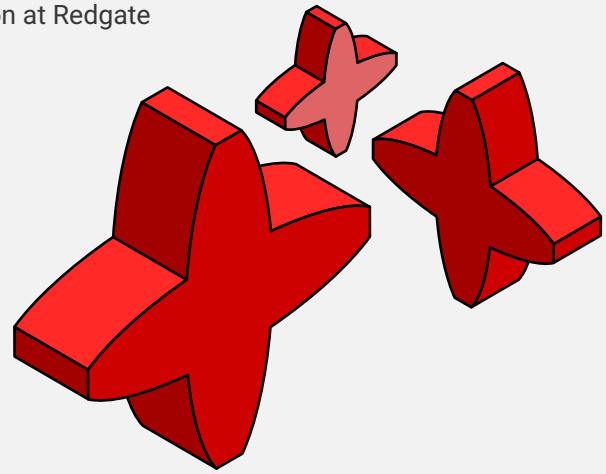


What does AI mean for Redgate?

"Time-forecasting predictions, synthetic data generation, utilizing ChatGPT to help write SQL queries…that's just a sample of what Redgate is doing with AI right now, in the knowledge that any AI solutions we create support human workflows rather than replacing them."

Jeff Foster
Director of Technology & Innovation at Redgate

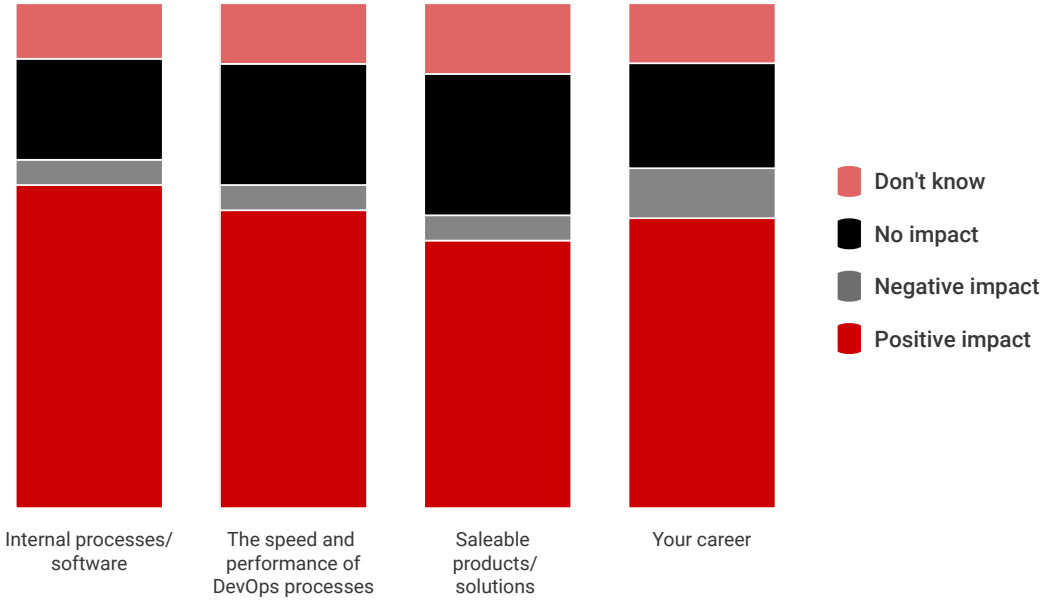
Read the full article



Organizations are positive about the impact of AI in the next two years

There's a clear mismatch between organizations (who are cautious about introducing AI to database management) and users (the vast majority of whom have found that AI improves productivity). However, there's a strong signal that both sides will meet somewhere in the middle. When asked about the impact of AI on internal processes, DevOps performance, saleable products, and careers in the next two years, the majority opinion is positive:

The impact of AI in the next 1-2 years



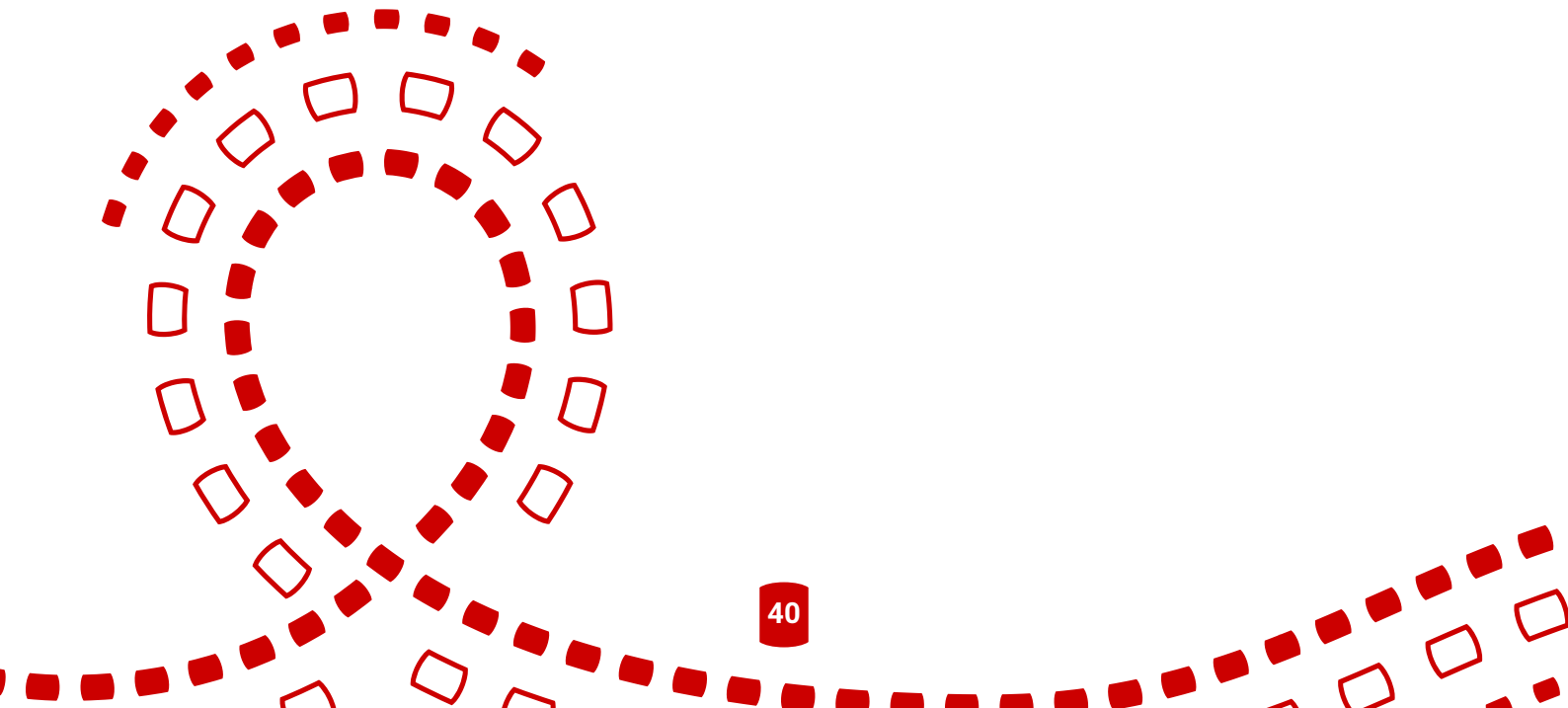
It appears that while organizations are playing catch up to address their concerns about data privacy and reliability, over half will be adopting AI for database management use cases in the next two years.

The cloud outlook is clearing

Ever since Amazon first launched AWS with its Elastic Compute (EC2) service in 2006, the cloud has been a popular topic. The potential for business is huge, with the promise of instant scalability, high availability, and cost efficiencies compared with on-premises hosting environments.

However, there are also downsides to the cloud, including performance issues, resource optimization and data privacy. And, perhaps surprisingly, the biggest downside: cost management. While the cloud can introduce cost efficiencies, it can also be difficult to control and manage ongoing cloud costs.

So, while the cloud remains an attractive option, it's not the panacea it was once seen as. With that in mind, how has cloud adoption changed over the last five or so years? What are organizations' future plans when it comes to cloud migration? How are they balancing the potential of the cloud with the concerns and challenges once they reach it? And why are a sizeable minority of organizations keeping their data on-premises?



THE FAST FACTS

The cloud

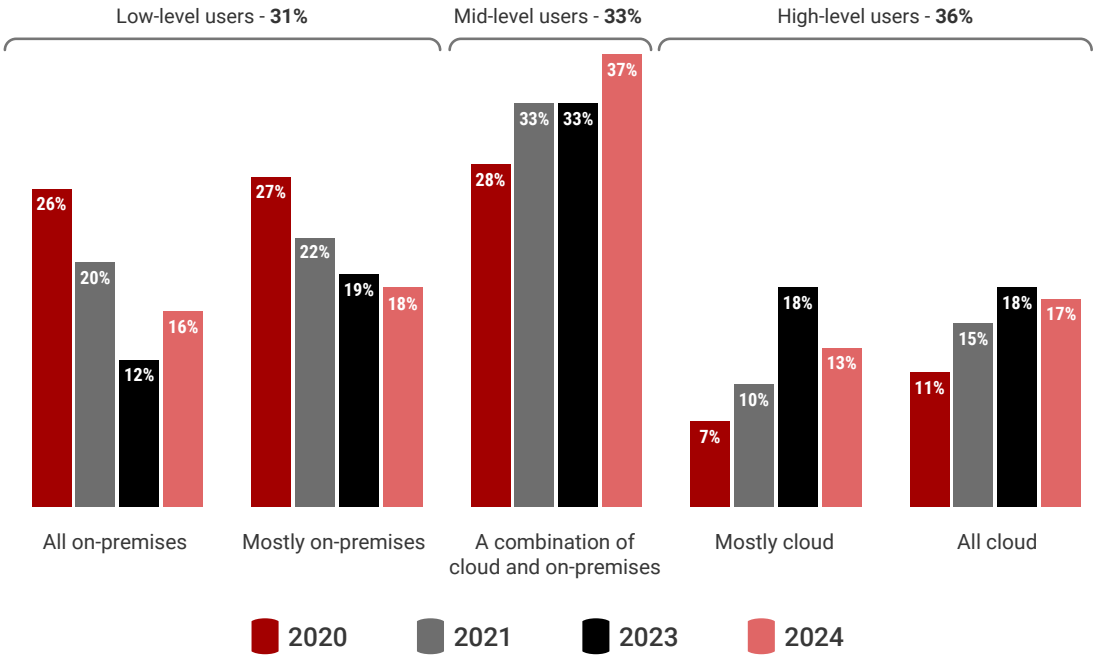
After a meteoric rise in popularity, the cloud is beginning to lose its shine, with respondents whose data is entirely or mostly in the cloud falling from 36% in 2023 to 30%. While scalability, high availability and cost efficiency are still big drivers for migrating to the cloud, these promises are balanced by concerns once the cloud is reached. Chief among these concerns is, perhaps surprisingly, cost management, followed by performance issues and resource optimization. As a result, the rush to the cloud has slowed, and high-level, mid-level and low-level groupings of cloud users have emerged, with each group having their own valid business reasons for their position.

- 30% of organizations now host their databases all or mostly in the cloud, down from 36% in 2023, while 34% host their databases all or mostly on-premises, up from 31% in 2023
- 46% of organizations plan a hybrid future for cloud adoption, up from 36% in 2023, while 30% have already fully migrated to the cloud or plan to migrate
- The top three reasons for hosting databases in the cloud persist: scalability and flexibility (up to 70% from 48% in 2023); high availability and reliability (up to 62% from 45% in 2023); and cost efficiency (up to 42% from 34% in 2023)
- The top three reasons to reduce cloud usage are cost management (39%), data privacy and security (26%), and performance issues (22%)
- For organizations using the cloud, 63% see cost management as their biggest challenge, followed by performance issues (40%) and resource optimization (37%)
- While 59% of individuals feel they have the necessary skills to manage databases in the cloud, 19% do not, and a further 23% are unsure, highlighting a further gap in appropriate skills to manage the shifting database landscape
- The top three areas where organizations are planning to invest in their cloud strategy are security (61%), automation (59%), and monitoring (49%)

Three distinct cloud users emerge

The move to the cloud has been well documented by many sources. The decision to host databases in the cloud or on-premises, however, has been in flux for years. While some organizations have fully embraced the cloud, others have been less certain, year on year:

Where production databases are hosted



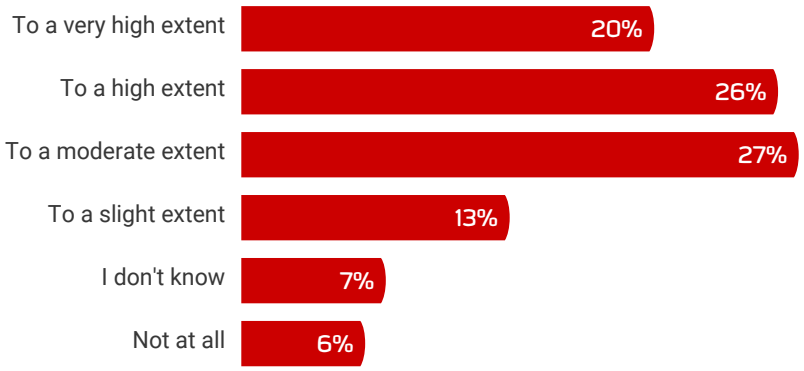
Back in 2020, 18% of organizations were all cloud or mostly cloud, and this rose to 36% by 2023. At the same time, all or mainly on-premises usage fell from 53% in 2020 to 31% in 2023. We also see around a third keeping feet in both camps, using a combination of cloud and on-premises. In 2024, this picture has become a lot more balanced, with what looks like a correction taking place. All or mainly cloud usage has fallen to 30%, while on-premises usage has increased to 34%, and those taking the middle position have risen to 37%. Three kinds of cloud users have emerged: high-level, mid-level, and low-level. Each takes up around a third of the market, and all have their own reasons behind their hosting choices.

High-level users want the scalability and high availability of the cloud to easily handle fluctuations in traffic and load, or the ability to scale up their business very quickly without high capital expenditure. Low-level users are likely to have predictable workloads and demands, and stable platforms. Around half of these users have stayed mostly on-premises while exploring the cloud for greenfield projects, with the other half preferring to stay on-premises. And that third of mid-level users with one foot in each option? They want the best of both worlds.

The future is in the cloud...and on-premises

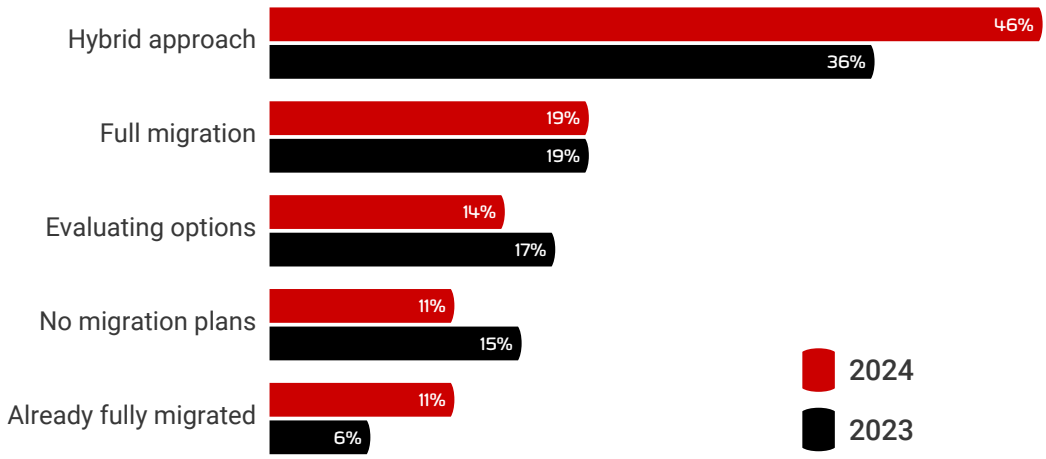
This picture, where hosting choices are split between high-level, mid-level and low-level cloud users, looks set to continue in the future. In terms of the priorities organizations place in cloud transformation, there's a lot of interest, with 46% stating this as a high or very high priority, 27% considering it a moderate priority, and 13% treating it as a slight priority:

The priority your organization places in cloud transformation



When it comes to future plans, however, they're more measured, with around half (46%) planning to continue with a hybrid approach, up from 36% in 2023. Meanwhile, 30% have already fully migrated to the cloud or plan to migrate, and 25% have no migration plans or are still evaluating their options:

Future plans regarding cloud adoption



When asked about the factors prompting organizations to reduce cloud usage or move towards on-premises, 41% of respondents had no plans to reduce usage, leaving 59% who are unsure. The leading reason among more than a third (at 39%) is cost management, with data privacy and security cited by just over a quarter (26%):

The factors driving the decision to reduce cloud usage or move towards on-premises

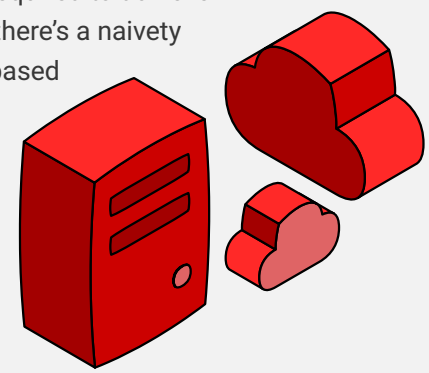
The conclusion from this data is that the cloud still offers lots of promise, but it's not the single destination every organization wants to head for. Instead, they're recognizing that high-level, mid-level or low-level cloud user personas exist, offering them the flexibility to choose their usage based on their specific business needs and the unique challenges they face.

The big lie - cost saving in the cloud

"Don't get me wrong; it is possible to save on infrastructure spending by making use of cloud computing. But effort is required to achieve this, and many organizations don't bother. Either there's a naivety about what's involved, or someone makes a call based on numbers and sets an arbitrary deadline."

John Q Martin
Technical Training Manager, Redgate

Read the full article



The cloud remains appealing – and challenging

We've seen that two thirds of organizations are fairly evenly split between high-level and mid-level cloud usage, though factors like cost management and data security remain major concerns. They like the cloud, they want to host databases in the cloud, and when asked why, their reasons are immediately apparent:

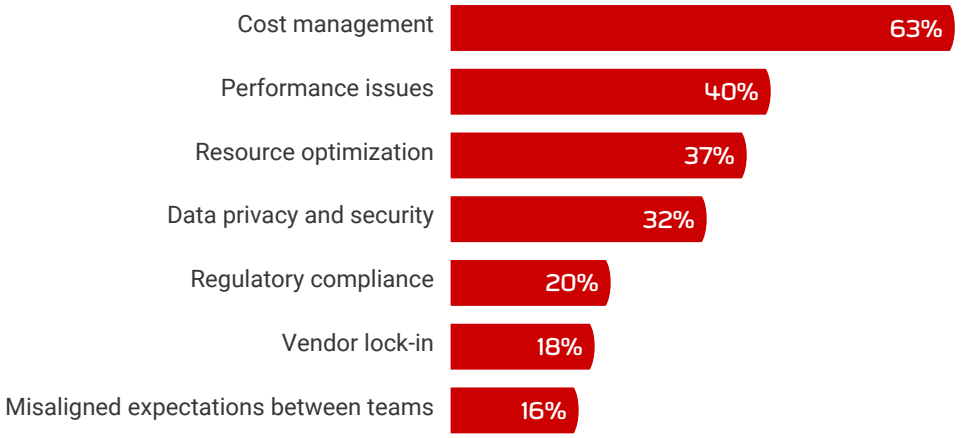
Primary reasons for hosting databases in the cloud

Scalability, high availability and cost efficiency remain in the top three spots, and notably there has been an increase across every measure since last year. The cloud is seen as the route to resolving many database issues, from ease of management, through backups and data security, to global accessibility.

> "What the cloud excels at in 2024, which wasn't even possible in 1999, is its level of automation, scalability, and integration."
>
> **Hamish Watson**
> DevOps Alchemist, Morph It ltd

That's not to say, however, that everything is easy in cloudland. While the promise of the cloud remains as appealing as ever, the challenges organizations face when managing the journey persist:

Challenges organizations face managing databases in the cloud



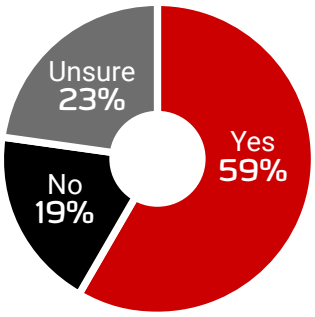
Cost management is the number one challenge, experienced by two thirds of organizations. We saw earlier that cost efficiency is the third biggest reason for migrating to the cloud. However, it can be hard to effectively manage costs once the cloud migration journey is complete, and this is the leading factor prompting a reduction in cloud usage.

Organizations also cite performance issues (40%) and resource optimization (37%) as major challenges. Data privacy and regulatory compliance also come into the picture as a major concern for organizations subject to data regulations.

There's still work to be done in terms of managing the cloud

Managing databases in the cloud is hard, particularly for DBAs and data teams who are accustomed to managing on-premises databases. The cloud requires a different skillset, as illustrated by our survey respondents' views when they were asked if they had those skills:

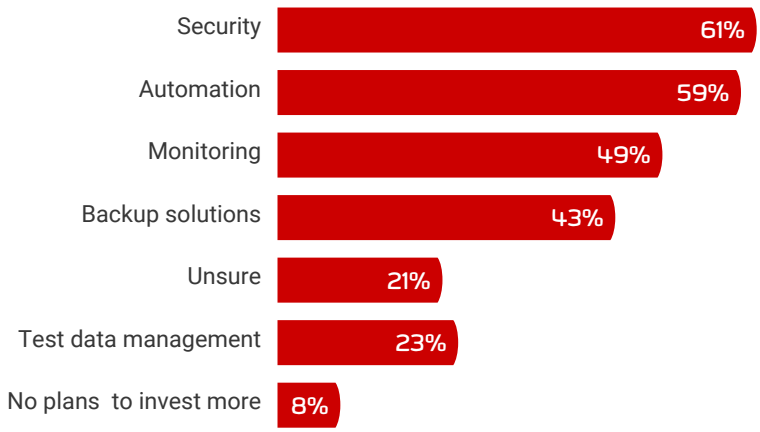
Do you feel you have the necessary skills to manage databases in the cloud?



59% do, which is good. 19% state they don't, which is a concern but it's an identified gap which can be rectified. What's more worrying is the 23% who aren't sure. We saw earlier that skillset requirements and individual/team training are the biggest challenge for 57% of organizations when managing different technologies. The same challenge exists for the cloud, with 41% of organizations working with team members who either don't have the skills or simply don't know if they're up to the challenge.

Fortunately, many organizations already have plans in place for more investment in their cloud database strategies across a number of different areas. Top of the list are security, automation and monitoring, with backup solutions and test data management also cited as important:

Areas your organization plans to invest more in a cloud database strategy



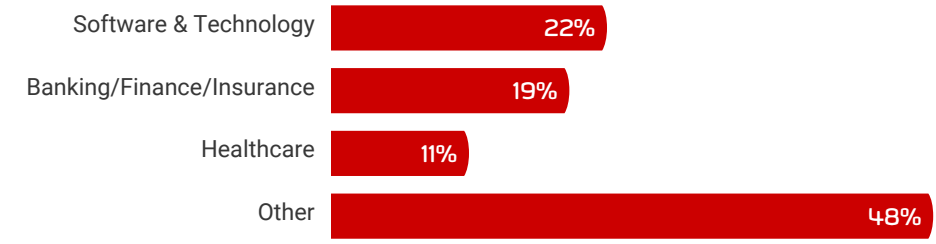
Methodology

Conducted in late 2024, Redgate's State of the Database Landscape survey was launched to discover how enterprises and businesses everywhere are using data and addressing cross-database development, where DevOps comes into the picture, how far and wide cloud adoption has become, and what impact AI has had on development practices.

From the C-level to Architects and Analysts, DBAs to Developers, just under 2,500 IT professionals from businesses of every size and sector around the world responded. The results offer a unique and informed insight into the challenges they face. Importantly, they also reveal just how complex and varied the database landscape now is, and what IT leaders need to address to stay ahead in the coming years.

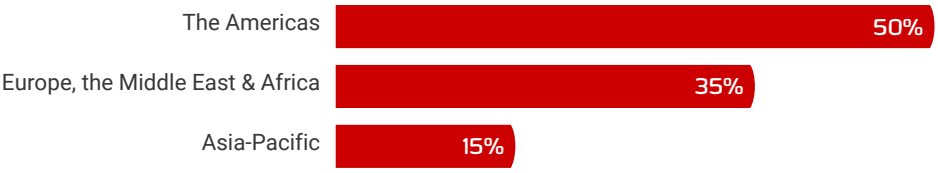
Demographics

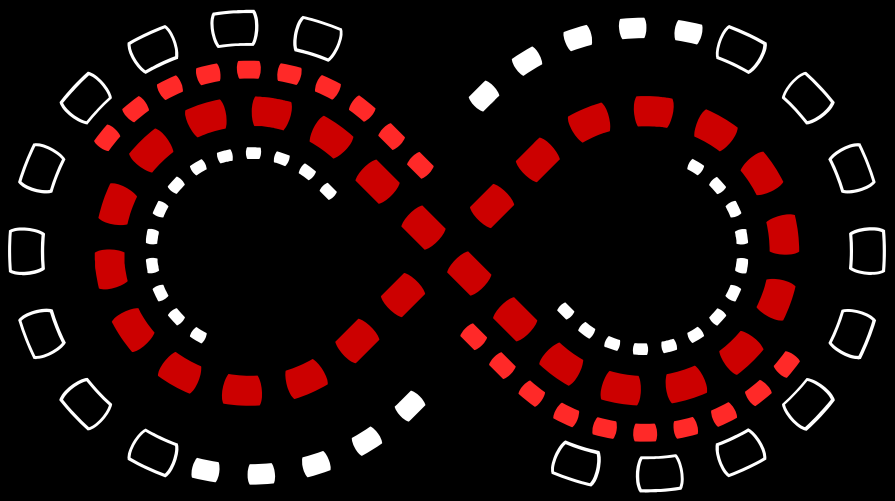
Sector



Company size

Region





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