SEEQUENT

UNDERSTAND THE UNDERGROUND

7TH EDITION

Geoprofessionals Data Management Report

Contents

Foreword

Data sits at the centre of every subsurface decision, and the expectations placed on that data have never been higher. As projects grow in complexity and organisations pursue faster, more confident decision-making, the ability to manage, trust, and act on geoscience data is an increasingly important organisational strength.

This seventh edition of the Geoprofessionals Data Management Report provides a clear view of where the industry stands today. The findings show encouraging momentum: three-quarters of respondents now consider data management a high or critical priority, and more organisations are planning to formalise their data practices through structured frameworks.

At the same time, the gap between intent and execution remains. Only 36% have an established framework in place, and almost a third of geoprofessionals still lack the information required for data-driven decisions. Historical data quality, fragmented systems, and the absence of a single source of truth continue to limit confidence.

The rapid acceleration of artificial intelligence is reshaping this landscape. More than half of respondents are already using or considering AI, a sharp increase from two years ago. These technologies offer significant potential to streamline workflows and improve data quality, but they also heighten the need for robust governance, reliable historical data, and trusted, well-managed datasets. In this context, data management foundations matter more than ever.

For more than a decade, this report has served as a benchmark for data management best practices for the subsurface community. This year's findings reinforce a consistent message: good data management is a strategic requirement. Organisations that strengthen their data foundations today will be the ones able to adapt to accelerating change. With trusted data at the core, teams can navigate complexity with confidence, make faster and more defensible decisions, and turn the challenges facing their industries into opportunities for progress.

Findings at a glance

75%

say data management is important to their organisation.
Importance rises sharply among teams using or considering AI, machine learning, data science scripting, and advanced analytics.

36%

Only 36% of organisations have a data management framework.
50%+ of those without one plan to implement it within 3 years.

57%

cite unmanaged historical data as a challenge.
Geoprofessionals say it remains the most significant challenge, and it's also the area where confidence in organisational capability is lowest.

51%

of organisations now use or are considering AI, up from 30% in 2023.
Applications include workflow automation, quality control, and predictive modelling.

25%

Geoprofessionals spend over 25% of their time on data management tasks.
Time is highest in mining but remains 20%+ across all industries.

1 in 3

Almost 1 in 3 geoprofessionals lack the information needed for data-driven decisions.
This is primarily due to poor-quality or incomplete historical data and the absence of a single source of truth.

32%

list perceived cost as the biggest barrier to implementing data management solutions.
An increase from 19% in 2020.

01 Introduction

The Geoprofessionals Data Management Report provides a recurring benchmark for how subsurface industries manage and value their data. This edition builds on more than a decade of trend data, capturing how organisations are adapting to rising data volumes, increasing technological complexity, and the rapid emergence of AI-driven practices.

The survey questionnaire included 26 questions exploring the state of data management across several core themes:

- Importance of geoscience data management and data types
- People and solutions interacting with the data
- Key challenges in geoscience data management
- How geoscience organisations prefer to implement solutions to their challenges
- Challenges faced when implementing a data management solution
- Readiness for and adoption of cloud technologies for data management and access
- Prevalence of data management frameworks
- Ease of data access
- Data practices (e.g., scripting, advanced analytics, machine learning, AI)
- Current and emerging use of artificial intelligence

Together, the responses offer a detailed view of how different industries are evolving their data practices and where significant gaps remain.

02 Research methodology

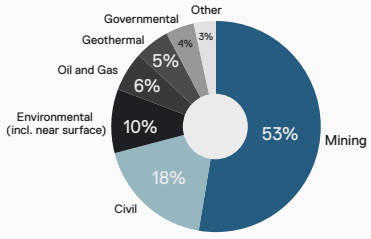
The survey ran from September to November 2025 and received 1,022 responses from geoscience professionals worldwide. As in previous years, participants were drawn from Seequent's global network, LinkedIn, and broader geoprofessional communities.

The 2025 sample reflects a broad mix of industries, regions, and professional roles.

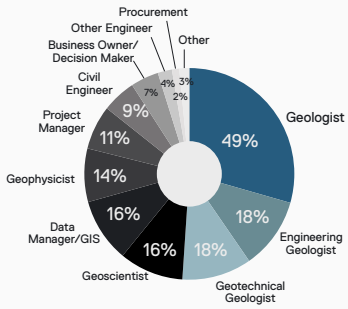
No single continent accounted for more than a quarter of total responses, underscoring the global distribution of participants. Mining accounted for the largest share of respondents (53%), followed by civil (18%) and environmental (10%). The remaining responses came from government, geothermal, oil and gas, and other subsurface sectors.

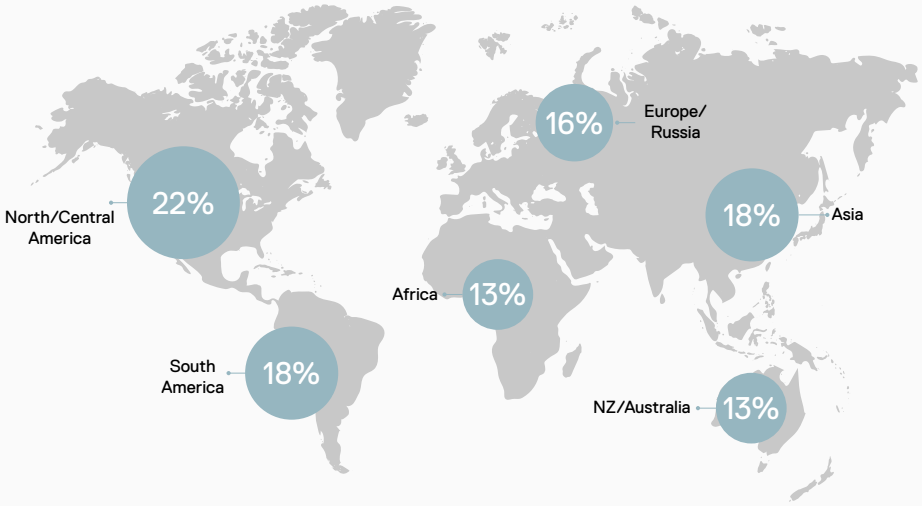
Reflecting the industry mix, Geologists were the most common job role (49%), followed by Engineering Geologists (18%) and Geotechnical Engineers (18%). The sample size provides sufficient depth across all major industries to compare trends with previous survey years.

Industry



Job roles





03 The role of data management

The 2025 survey asked geoprofessionals how data management is valued and implemented across their organisations. While its importance continues to climb, many teams still lack the foundational systems needed to support growing complexity.

Data management importance is rising sharply, driven by AI and advanced analytics

This year, 75% of respondents ranked data management as of high or critical importance. The shift is significant: the proportion of respondents calling it critical rose from 43% in 2023 to 53% in 2025.

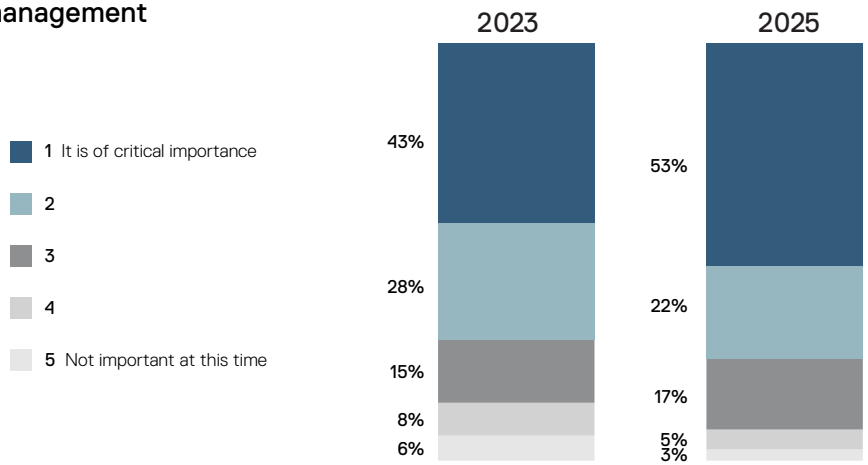
Importance rises even further among those using or considering the use of emerging technologies:

- AI (79%)
- Data science scripting (80%)
- Machine learning (80%)
- Advanced analytics (81%)

Teams adopting these technologies depend heavily on well-structured, high-quality data, reinforcing the role of effective data management.

FIGURE 1

The importance of data management



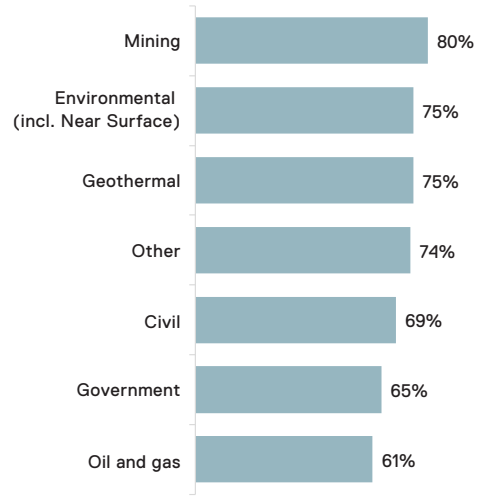
Importance is universal across industries, with notable shifts

Data management is considered important across all industries surveyed, with at least 60% of geoprofessionals in each sector rating it as of high or critical importance.

Those placing the highest importance were mining (80%), environmental (75%), and geothermal (75%). The civil sector has shown notable growth, rising from 55% in 2023 to 69% in 2025, a shift that aligns with the sector's digital transformation.

FIGURE 2

The importance of data management by industry



Data types are becoming increasingly important, but systems aren't keeping up

When asked about the importance of different data types, reports and documents were ranked highest (88%), continuing a steady rise since 2015. These were consistently among the top three data types across almost all industries.

Other highly valued data types include geological data (88%) and drillhole or well data (87%). In contrast, the perceived importance of geophysical data has declined, dropping 11% over the past decade.

On average, respondents rated seven data types as of high importance (4 or 5 out of 5), reflecting the expanding breadth of information required for modern projects and the increasing pressure on systems that were never designed for this diversity.

Data storage practices haven't evolved despite rising complexity

Data storage methods remain largely unchanged from earlier surveys.

- Just under half of respondents still store data in folders or files on a centralised server
- Just under a quarter continue to manage their own data

Use of commercial and internally developed solutions has grown, with commonly cited platforms including Microsoft tools (OneDrive, SharePoint), Seequent tools (MX Deposit, OpenGround), and acQuire.

FIGURE 3

The importance (4-5/5) of different data types

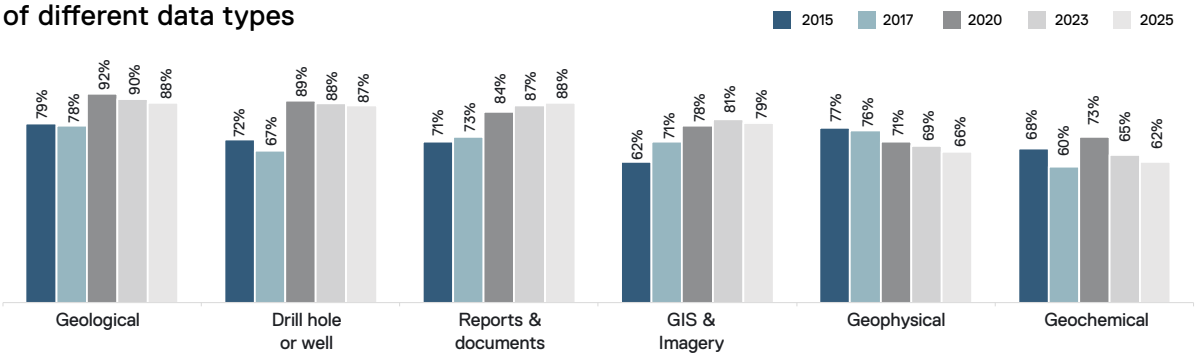
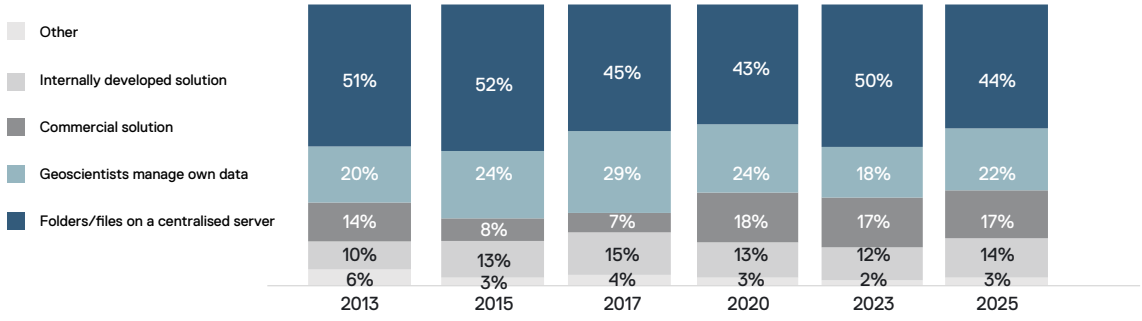


FIGURE 4

Current method of data storage/management



Time burden on geoprofessionals remains high

Geoprofessionals spend 27% of their time on data management tasks, an increase from 2023, even with more automation tools available. Time varies by industry: Mining and oil and gas spend the most, while civil spends the least (still over 20%). Notably, oil and gas reports comparatively lower importance for data management (61%) despite the high time burden.

FIGURE 5

Time spent on data management

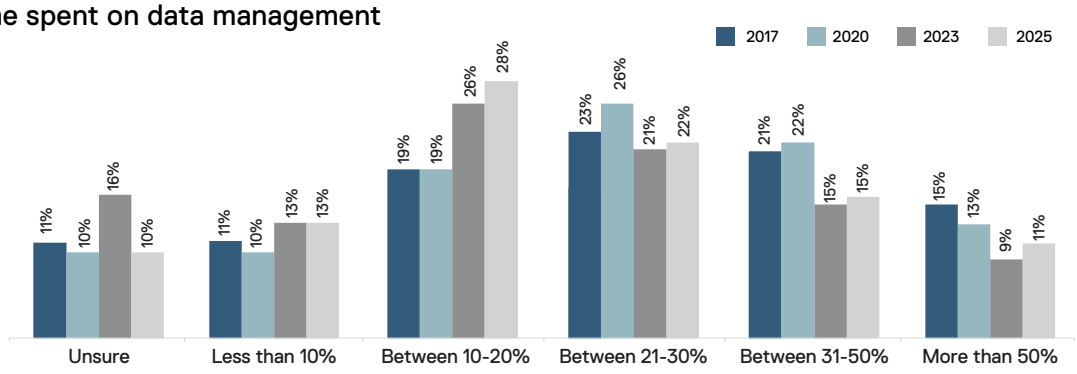
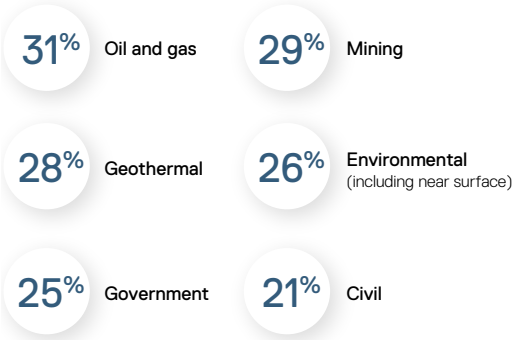


FIGURE 6

Average % of time spent on data management by industry



Complexity increases as more tools and people interact

The complexity of managing subsurface data continues to grow:

- An average of four solutions is used on each dataset
- Around a quarter of respondents are unsure how many solutions are involved
- Roughly a quarter of organisations have more than 20 people interacting with the data

This creates challenges around real-time updates, visibility, access control, and unwanted changes.

FIGURE 7

Number of software solutions used on the data

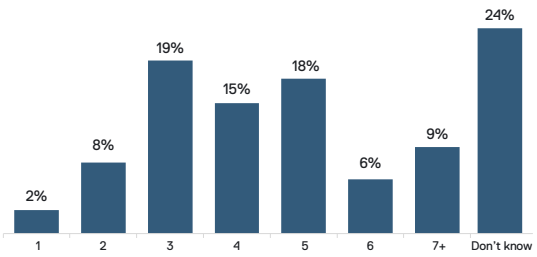
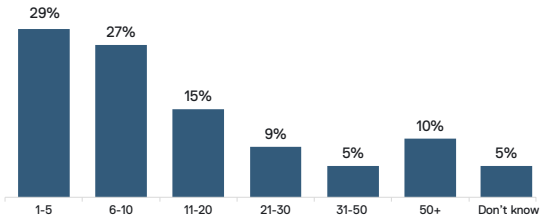


FIGURE 8

Number of people interacting with the data



Despite high levels of data interaction, formal governance structures lag behind

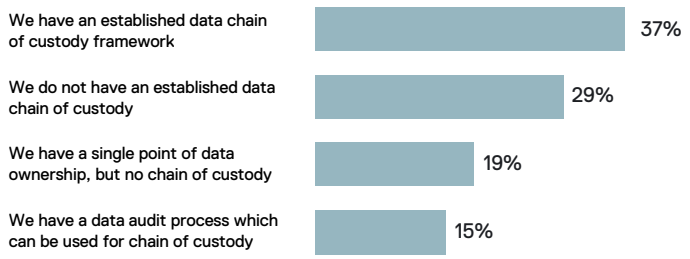
Only 37% of organisations have a data chain of custody. Among the rest:

- 19% rely on a single point of data ownership
- 15% use a data audit process
- 29% have neither

Within the 29% of organisations with limited data governance, an average of 13 people still interact with the data, highlighting the risks associated with unclear ownership.

FIGURE 9

Presence of data chain of custody



Although over three-quarters of respondents say data management is important, only 36% of organisations have an established data management framework.

- 41% organise data across various systems
- Almost 25% have no defined framework at all

Industries most likely to have data management frameworks include civil, mining, and oil and gas. Geothermal and government respondents were equally or more likely to lack a framework than to have one.

FIGURE 10

Presence of data management framework

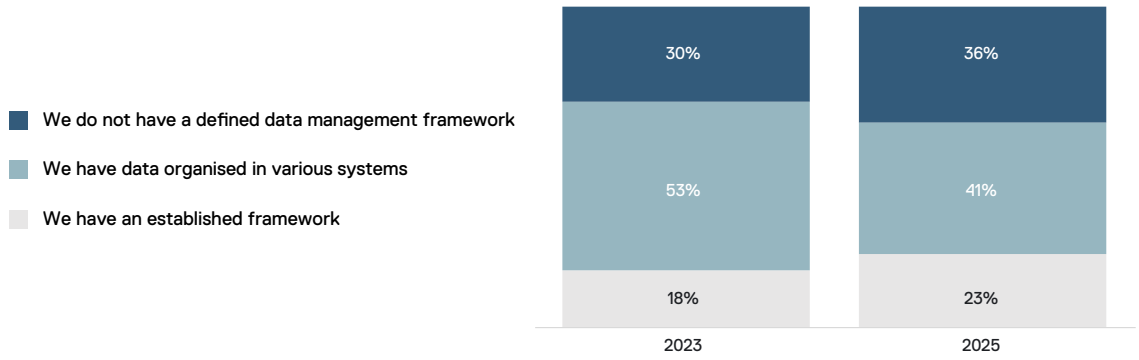
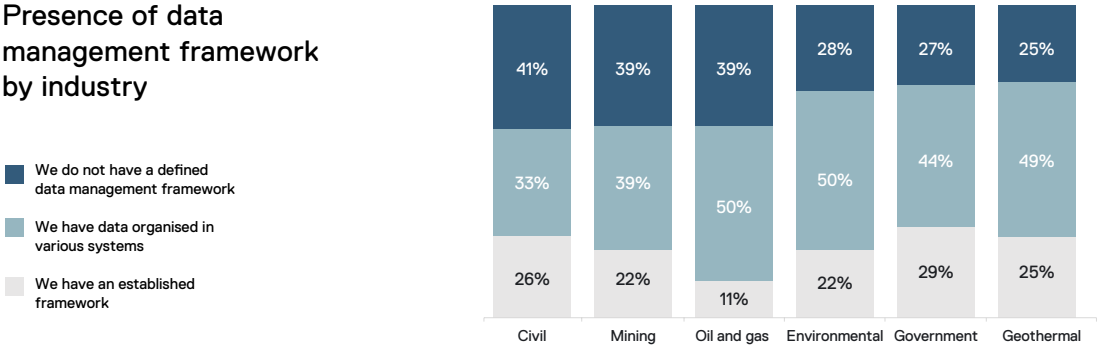


FIGURE 11

Presence of data management framework by industry



Many expect data management to improve, but uncertainty remains high

Among those without a framework, almost half plan to implement one within the next three years. However, uncertainty remains high:

- Over one-third do not know whether their organisation plans to adopt a framework
- 63% of those who do not plan to implement one and 75% of those who are unsure still believe data management is important

By industry, implementation intentions are strongest in oil and gas, geothermal, and environmental, where over half of respondents anticipate adopting a framework within three years. Uncertainty is most pronounced in mining, civil, and government, where at least one-third are unsure of their organisation's plans.

FIGURE 12

Intention to get a data management framework among those who don't have one

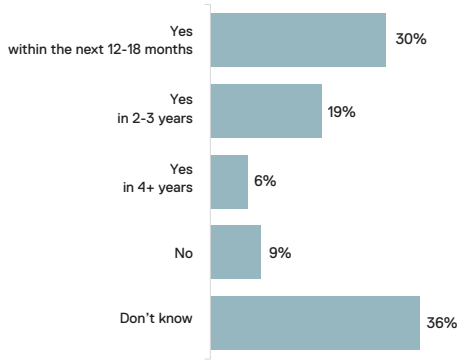
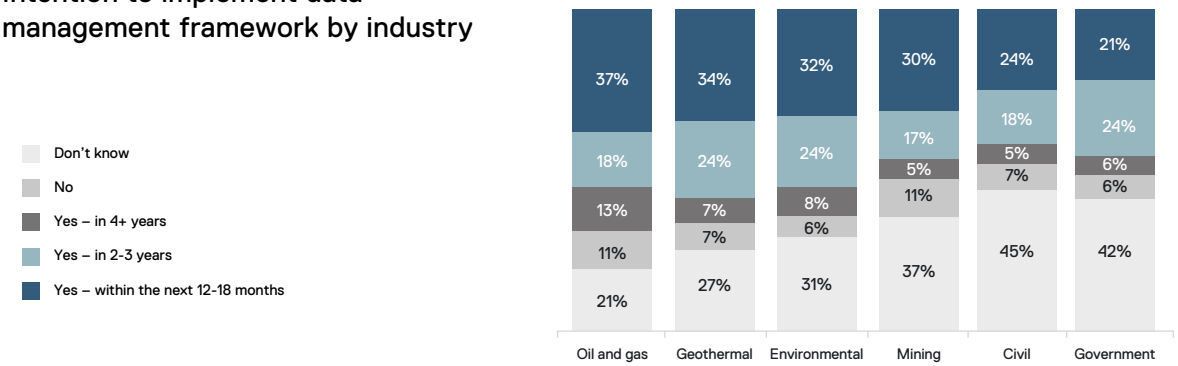


FIGURE 13

Intention to implement data management framework by industry



04 Data management challenges

The 2025 survey asked geoprofessionals how they manage, value, and interact with their data, and where their systems and practices are falling short. The findings show that while the importance of data management continues to rise across industries, many organisations still lack the foundations needed to support the growing complexity. As more people, tools, and technologies interact with subsurface data, issues around storage, governance, time burden, and framework maturity become increasingly visible. This section also examines preferred approaches to solving these challenges and the outcomes organisations value most.

Many geoprofessionals lack the information needed for data-driven decisions

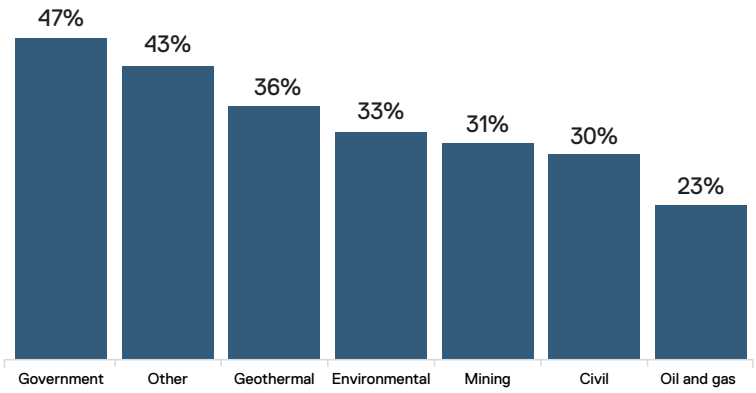
32% of respondents say they lack the necessary information to make data-driven decisions, up from 26% in 2023. This issue is especially pronounced in government (47%) and far lower in oil and gas (23%).

When asked what information is missing, two themes dominated:

- Historical data is incomplete, of poor quality, or missing entirely
- Lack of a single source of truth, i.e., information exists, but is not centralised or integrated enough to support confident decisions

FIGURE 14

Percentage that don't have the necessary information for data driven decisions by industry



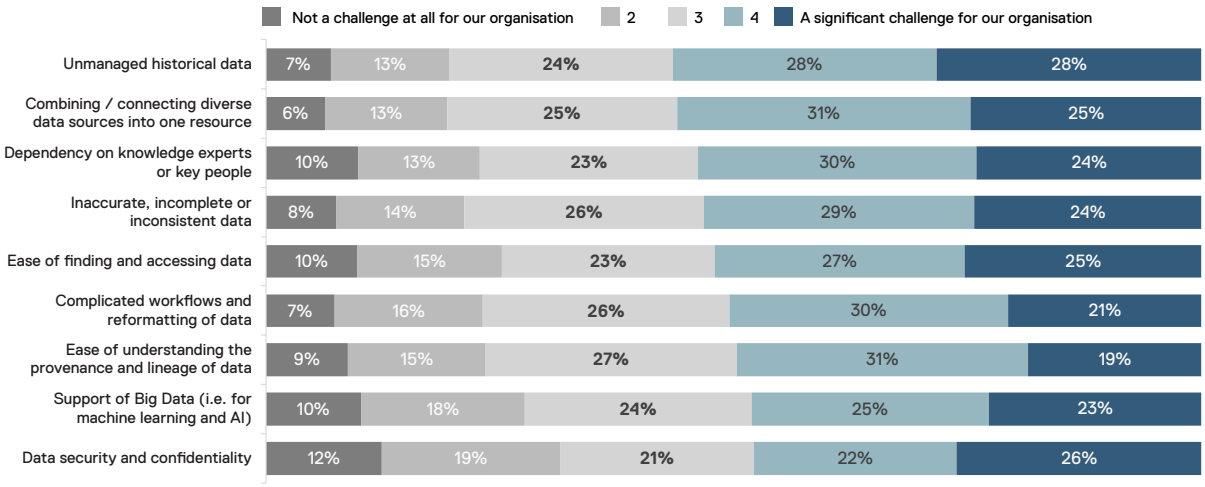
Unmanaged historical data remains the most significant challenge

57% rate unmanaged historical data as a significant organisational challenge (4 or 5 where 5 = a significant organisational challenge). The same percentage highlights difficulty combining or connecting diverse data sources.

Across all listed challenges, at least 48% rated each as significant, indicating a broad set of pain points. Even the lowest-ranked issues, data security/ confidentiality and support for big data, still affect almost half of the respondents.

FIGURE 15

Significance of data management challenges



Confidence in data management varies widely

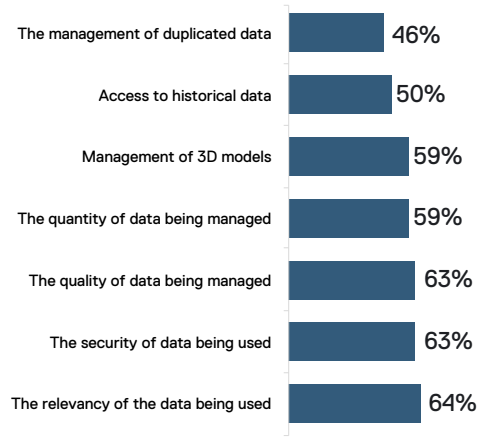
Only one in two respondents is confident in their organisation's ability to manage historical data effectively, a persistent issue since 2020. Confidence is even lower for the management of duplicated data (46%).

In contrast, respondents report higher confidence (over 60%) in their organisation's handling of data relevancy, quality, security, and quantity.

Confidence also differs significantly by seniority. C-suite and board members are more confident across all areas, particularly relevancy, security, and duplicated data management, than managers, mid-level staff, or entry-level professionals.

FIGURE 16

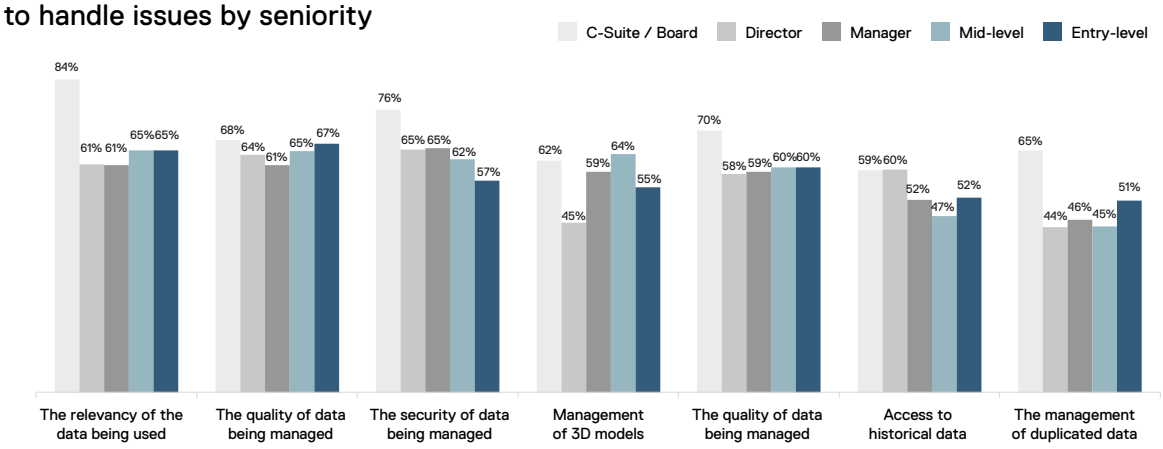
Confidence (4-5/5)* in organisation handling issues



*4 or 5 where 5 = a significant organisational challenge

FIGURE 17

Confidence (4-5/5)* in organisation to handle issues by seniority



*4 or 5 where 5 = a significant organisational challenge

Collaboration challenges have remained consistent over the past decade

The top collaboration concerns have changed little since 2015:

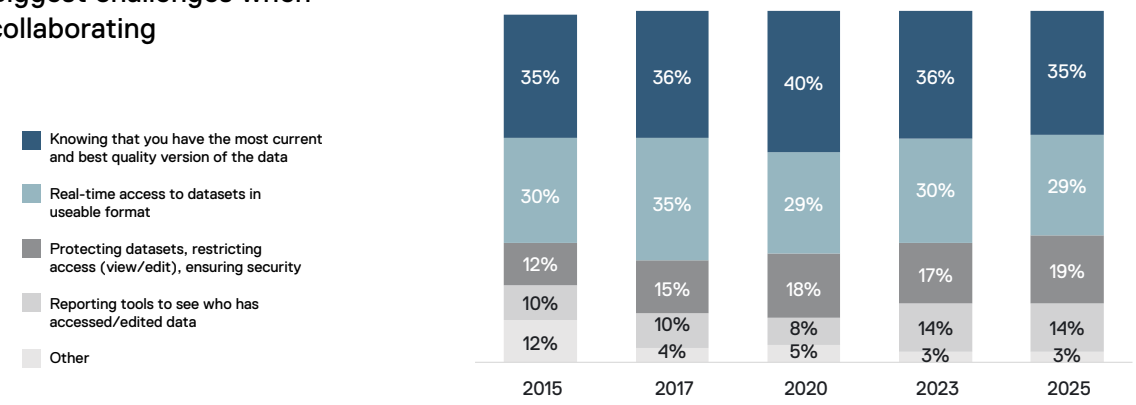
- Knowing whether they are working with the most current, highest-quality version of the data (36%)
- Real-time access to datasets in a usable format (30%)

Two challenges have increased modestly over time:

- Protecting datasets and restricting access: 12% → 19%
- Reporting tools that show who has accessed or edited data: 10% → 14%

FIGURE 18

Biggest challenges when collaborating



Approaches to implementing solutions vary by industry

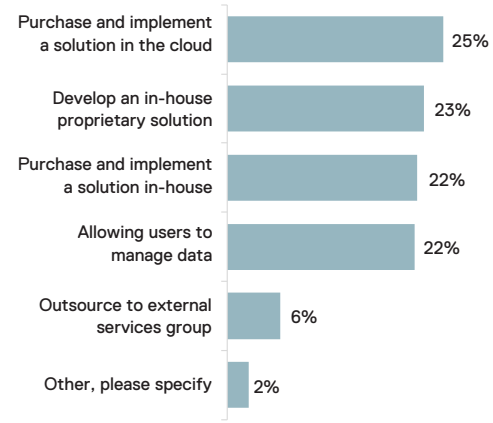
While 22% of respondents let users manage their own data independently, the majority prefer to have some solution in place, with one quarter preferring purchasing and implementing cloud solutions, 23% preferring developing solutions in-house, and 22% preferring purchasing solutions for in-house implementation.

Industry preferences differ notably with:

- Oil and gas and government: Over 30% prefer developing proprietary in-house solutions more than any other approach
- Civil, environmental, and oil and gas lean more toward cloud-based solutions

FIGURE 19

Preferred approach to addressing challenges



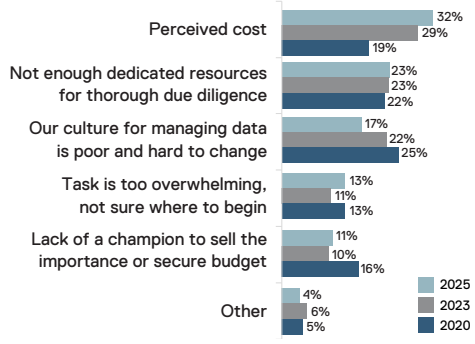
Cost pressures are now the biggest barrier to implementing solutions

Perceived cost has become the leading obstacle to adopting data management solutions, rising from 19% in 2020 (ranked 3rd) to 32% in 2025 (ranked 1st). Meanwhile, cultural resistance to data management, once the top barrier, has dropped from 25% in 2020 to 17% in 2025.

Cost is an even greater challenge for senior leaders, with over 50% of C-suite and board respondents citing it as the primary barrier.

FIGURE 20

Main challenge implementing a solution



Even after implementation, cost and resource demands remain concerns

When maintaining and populating a solution, the most important factor is the time and resources required, selected by nearly one-third of respondents.

Other maintenance considerations include:

- Cost, which continues to grow as a barrier (14% → 20% since 2020)
- Adherence to standards, policies, and best practices (now 20%)
- Complexity of integrating data silos (21%, down from 30% in 2020)

Once again, cost ranks highest for senior respondents, with over a third citing it as their primary concern.

FIGURE 21

Most important factor in maintaining and populating solution

The outcomes organisations value most: full data value and a single source of truth

Two solution outcomes stand out:

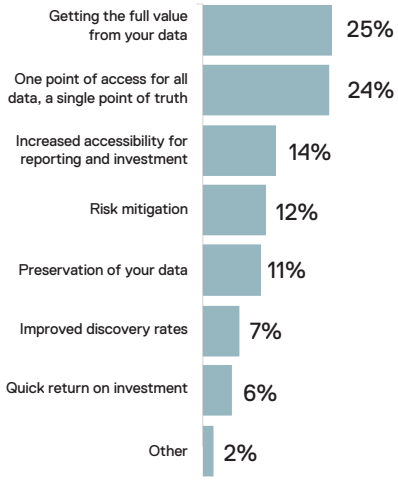
- Getting full value from existing data (25%)
- Achieving a single point of truth (14%)

Both reinforce themes from earlier in the report: rising cost pressures, the need to maximise the utility of current data assets, and the importance of centralisation to support confident, data-driven decisions.

For oil and gas, however, the top outcome is risk mitigation (23%), reflecting sector-specific priorities.

FIGURE 22

Most important outcome of a solution



05 The future of data management

The 2025 survey explored how future-focused geoprofessionals perceive their organisation's approach to new technologies, their readiness to leverage the cloud, and their expectations and concerns around AI. The findings show growing enthusiasm for innovation but also persistent barriers that slow transformation.

Early adoption of new technologies varies by role and industry

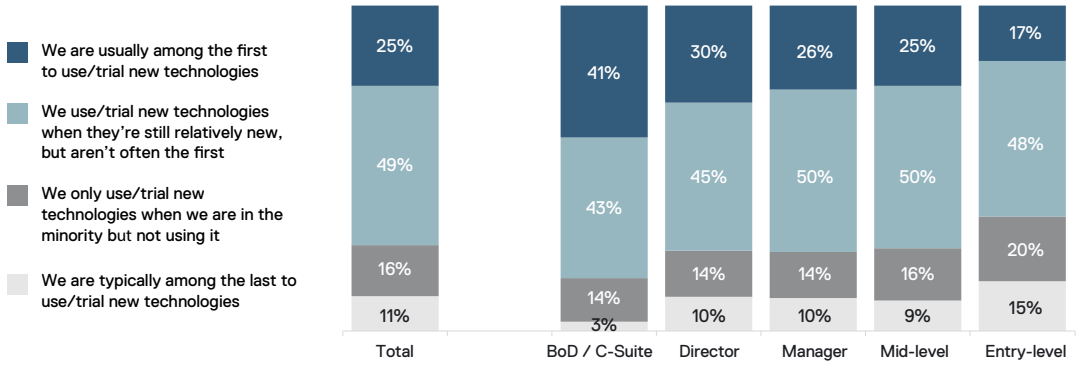
A quarter of respondents consider themselves among the first to use or trial new technologies, while nearly half adopt tools when they are still relatively new but not at the forefront.

Adoption attitudes differ significantly by seniority:

- 41% of C-suite and board-level leaders describe themselves as early adopters
- Only 17% of entry-level respondents say the same
- Those who personally manage organisational data are notably more likely to identify as late adopters (14%)

FIGURE 23

Level of future focus



Industry differences also stand out:

- Geothermal (31%) and civil (28%) are most likely to be early users of new technologies
- The environmental sector is least likely (16%) to trial new tools early

These variations highlight not only differing levels of appetite for innovation, but also differing abilities to trial and operationalise new technologies effectively.

AI adoption is rising faster than any other technology

AI has seen the sharpest growth of all emerging technologies tracked. Over half of respondents now use or are considering AI, up from under 20% in 2020. AI was the third-most adopted technology in 2023, but is now the most used or considered in 2025.

Adoption of all emerging technologies continues to rise, with more than three-quarters of geoprofessionals using at least one, compared with just over half in 2020.

FIGURE 24

Level of future focus by industry

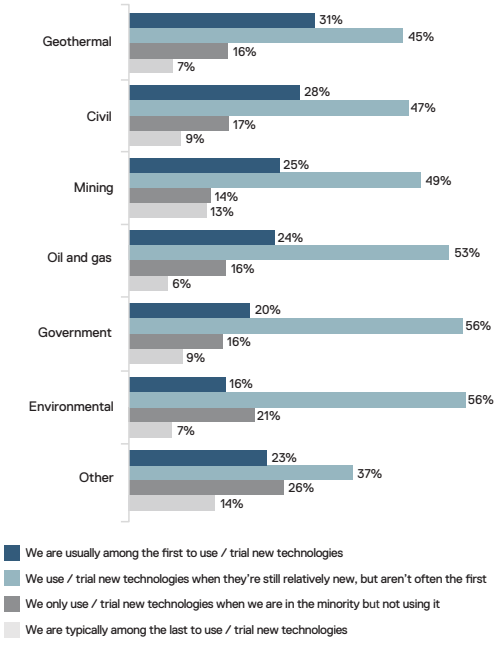
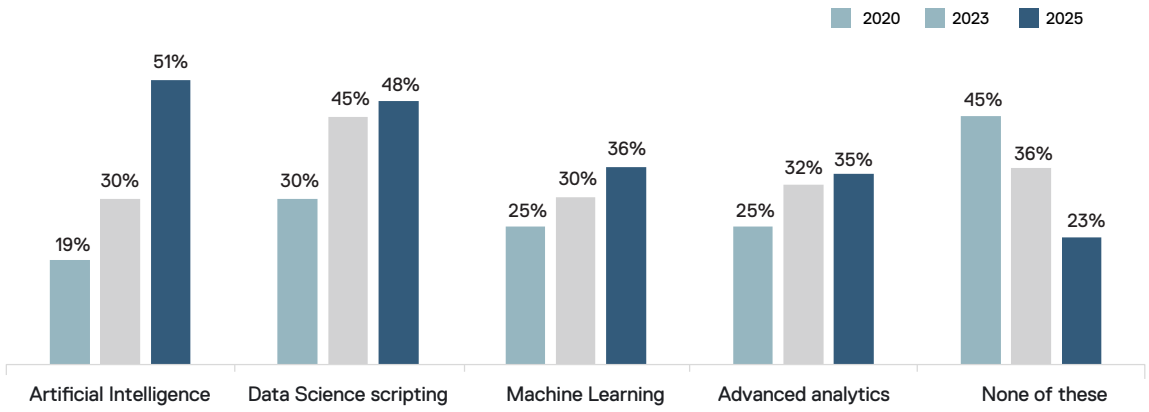


FIGURE 25

The use/consideration of current technologies



How geoprofessionals are using AI today

Current applications focus on practical efficiency gains:

- Automating workflows and repetitive tasks
- Supporting quality control processes
- Analysing large datasets
- Generating scripts to assist with data cleaning
- Developing predictive models or estimations

Concerns about AI reflect issues seen throughout the report

Two themes dominate:

- Data reliability and accuracy with concerns about hallucinations, transparency, and the need for human oversight
- Security and privacy, given the sensitive nature of many datasets, respondents emphasise the need for AI systems to prevent leaks, resist attacks, and comply with regulations such as GDPR and CCPA

These concerns reinforce the importance of strong data governance, well-managed historical data, and robust internal frameworks.

Cloud readiness is improving, but progress is slow and uneven

Readiness to leverage the cloud has increased gradually over time, with 17% “very ready” in 2017 and 25% “very ready” in 2025. Meanwhile, those who say they are not ready have dropped from 33% to 16%.

As expected, adoption aligns closely with broader attitudes toward technology. Respondents who identify as early adopters are the most cloud-ready, with over 40% saying they are very ready. More than half of late adopters are either not ready or uncertain.

Cloud readiness also varies by industry, with the highest readiness in oil and gas, mining, and environmental. Lowest readiness is seen in geothermal, civil, and government, where more than a third are not ready or unsure.

FIGURE 26

Readiness to leverage the cloud

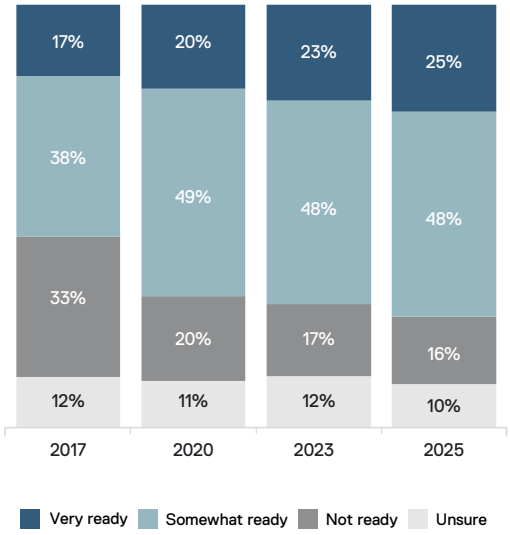


FIGURE 27

Readiness to leverage the cloud by future focus

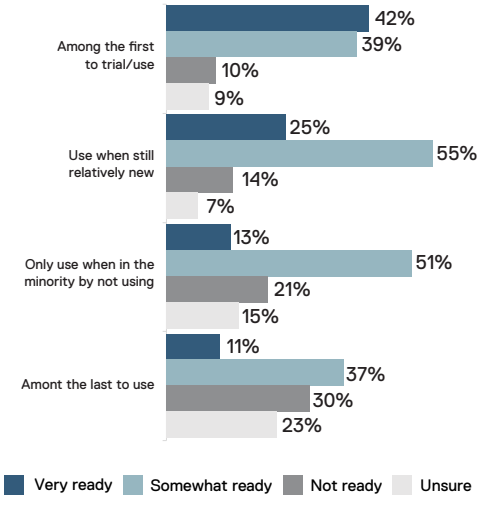
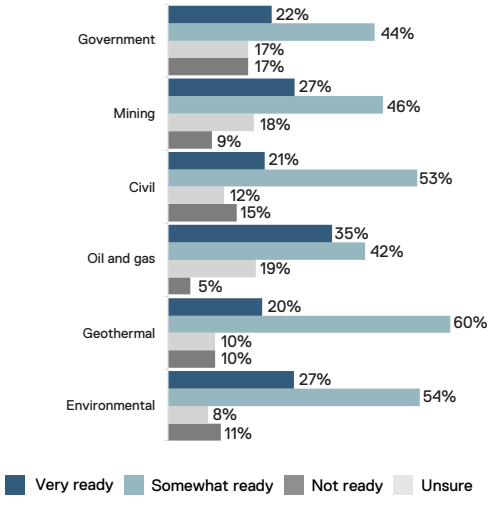


FIGURE 28

Readiness to leverage the cloud by industry



Cost is now the primary barrier to cloud adoption

Cost has become the dominant obstacle to leveraging the cloud, up from 19% in 2023 to 29% in 2025.

This trend mirrors broader findings across the report, where rising costs increasingly hinder solution adoption, framework implementation, and long-term maintenance.

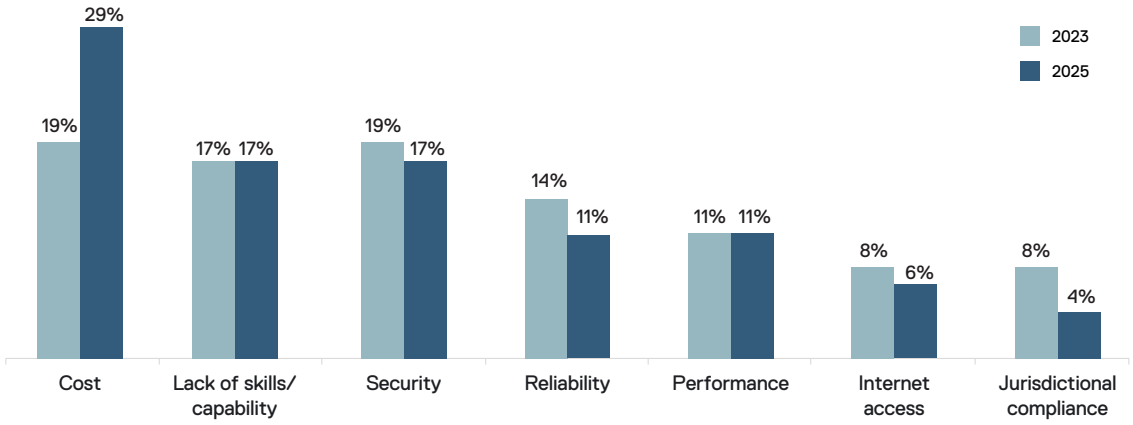
Other barriers include:

- Security: the top concern for geothermal respondents
- Security and performance: the biggest barriers for oil and gas
- Lack of skills or technical capability: disproportionately cited by civil (22%)

These findings suggest that enthusiasm for emerging technologies is strong, but operationalising them depends heavily on budgets, security requirements, and workforce capabilities.

FIGURE 29

Barriers to leveraging the cloud



Conclusion

The 2025 Geoprofessionals Data Management Report shows a sector moving in the right direction, but not yet at the pace the work now demands.

The importance of data management continues to rise across industries, fuelled by growing project complexity and the potential efficiencies presented by AI. Yet the fundamentals are not where they need to be: historical data is often unreliable, single sources of truth are still the exception, and many teams lack the structures needed to make confident, data-driven decisions.

Despite these gaps, momentum is building. AI adoption is accelerating, cloud readiness is improving, and more organisations intend to introduce formal data frameworks. The opportunity is clear. But so is the challenge. Without strong foundations, emerging technologies cannot deliver their full value.

Cost pressures, security concerns, and skills shortages remain significant barriers. But the findings also point to a quieter truth: the return on investment in effective data management is already visible.

Organisations that improve consistency, streamline workflows, and reduce time spent wrangling data see efficiencies compound across projects. In a cost-constrained environment, these gains matter.

Ultimately, the findings of this survey point to a simple conclusion: effective data management is no longer a background task. It is a core enabler of operational performance and technological advancement. Organisations that strengthen their data foundations now will be better positioned to adapt, innovate, and meet the evolving demands of the subsurface industries.

We extend our thanks to all participants in the 2025 Geoprofessionals Data Management Report. Your feedback and experience are instrumental in shaping the insights presented in this report.

Since 2011, Seequent has undertaken this research to help the subsurface community better understand data management trends and challenges. We hope this year's findings provide meaningful guidance as organisations work to improve the quality, accessibility, and impact of their geoscience data.

Seequent is evolving the way mining, civil engineering, energy and environmental organisations work with a better understanding of the underground.

Seequent, The Bentley Subsurface Company

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