



Future of Federal Data

Key Findings on AI & Analytics Readiness

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Executive Summary

Key findings and high-level insights

The data leaders of the U.S. federal government share a mixed feeling about their readiness for AI and advanced analytics. While they acknowledge the adoption of **multi-source and multi-cloud** environments as a step toward being future-ready, their **confidence** in the current **data management foundations** remains limited. Notably, **80%** of the federal data leaders who participated in this survey recognize modernization of data infrastructure as their top priority in the next 12 months.

- Most participating U.S. federal agencies manage more than **26** data sources, with **38%** handling over **100**.
- **82%** of these agencies operate in multi-cloud environments to support various applications. While this approach offers significant flexibility, it also adds complexity to data management.
- **Only 20%** of data officers express confidence in their current data management foundations as being capable of supporting AI initiatives, including generative AI.

Traditional data management challenges must be resolved for data leaders to prepare for the evolving demands of AI.

Why the report matters to data leaders

It's no surprise that AI—especially Generative AI (GenAI)—is profoundly reshaping how government data leaders approach data management. GenAI is redefining what's possible, moving beyond assistants that augment or automate tasks. It's driving a major transformation in how agencies access, analyze, and leverage their data. With capabilities like identifying the best data sources, automating complex query creation, and grounding AI responses in contextually rich, semantically accurate information through Retrieval Augmented Generation (RAG), GenAI is revolutionizing the way agencies bridge the gap between their data and AI-driven insights.

This survey seeks to provide insights into various aspects of federal data management and data-related initiatives today. Do federal data leaders feel confidently ready and equipped with the capabilities they will need in the future? Are the decades worth of investments already enough, or is it time to rethink data management?

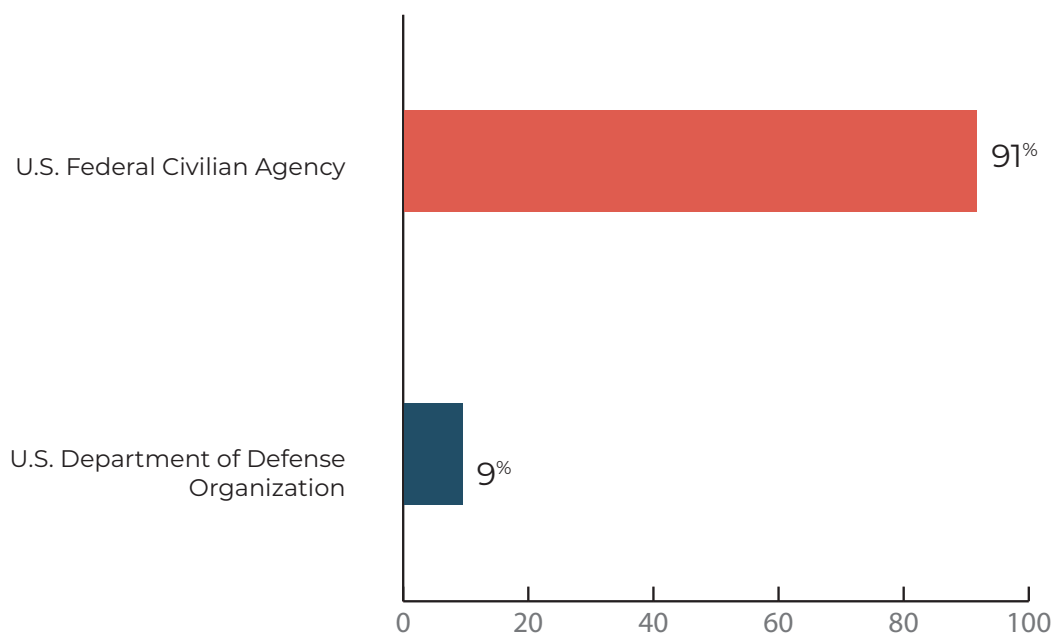
Methodology

Participating data leaders

This research conducted by CDO Magazine with Denodo evaluates the data management readiness of the U.S. federal government to operate in AI and advanced analytics environments. The report is based on survey responses from 45 data leaders across various federal civilian agencies as well as the U.S. Department of Defense.

Launched in October and completed in December 2024, the survey used a questionnaire to assess key aspects of data management. It also explored the agencies' willingness to transform their data infrastructure, gauging their interest in adopting emerging data management interventions to better leverage data for AI and advanced analytics. The report includes insights from a discussion of the survey's preliminary findings at CDO Magazine's December 3 Federal Data & AI Mixer in Washington, DC.

Organizations they work for

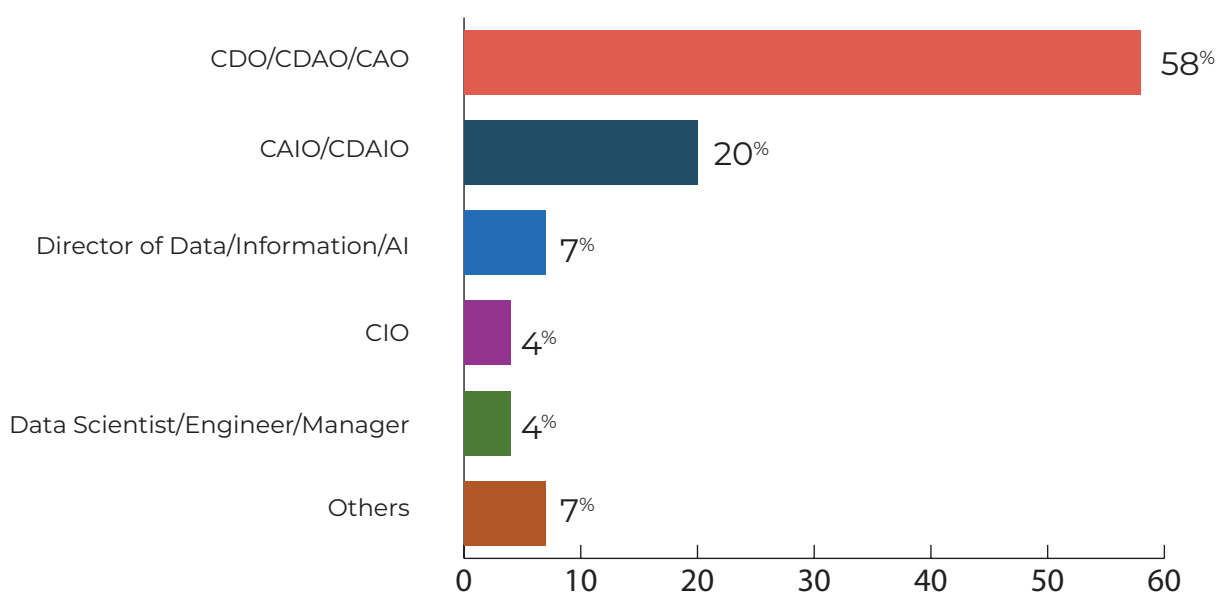


Methodology (cont.)

Participating data leaders

The data leaders who participated in this survey represented the data & analytics officers working in the U.S. federal government. Among them, **91%** represented federal civilian agencies, while the remaining were from the U.S. Department of Defense.

Job titles of the respondents



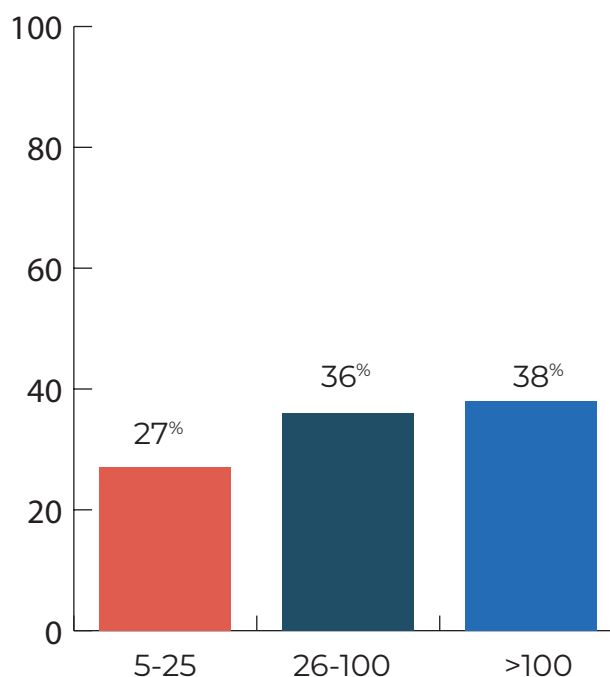
CDO - Chief Data Officer | CDAO - Chief Data & Analytics Officers
CAO - Chief Analytics Officer | CAIO - Chief AI Officer |
CDAIO - Chief Data & AI Officer | CIO - Chief Information Officer

Key Findings

Managing multiple data sources is an inevitable reality

Data is the foundation to any AI or analytics service. U.S. federal agencies need to manage multiple data sources effectively to be ready for the future.

Data sources managed by U.S. federal agencies

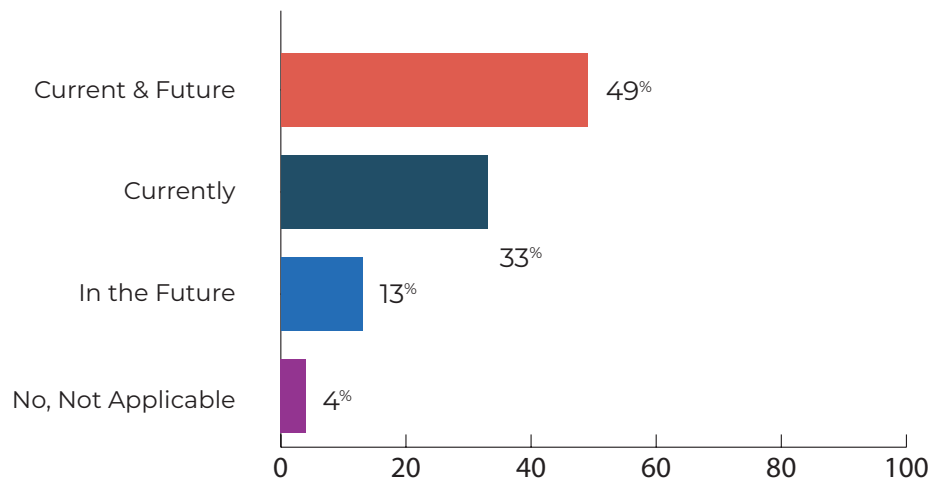


U.S. federal agencies rely on a variety of data sources to meet their information needs. These sources include data warehouses, data lakes, databases, enterprise resource planning (ERP) systems, and other similar data repositories.

Agencies surveyed typically manage more than **26** data sources. A significant portion (**38%**) of these agencies handle an even larger number, exceeding **100** data sources. This proliferation of data sources is increasingly posing significant challenges for federal government data leaders.

Embracing multi-cloud: A necessity

Multi-cloud environment support



U.S. federal agencies are increasingly working in multi-cloud environments, adding complexity to managing and delivering AI-ready data.

Data leaders in U.S. federal agencies agree that multi-cloud environments are essential to effectively support their mission objectives. **82%** of the survey respondents have already adopted a multi-cloud environment.

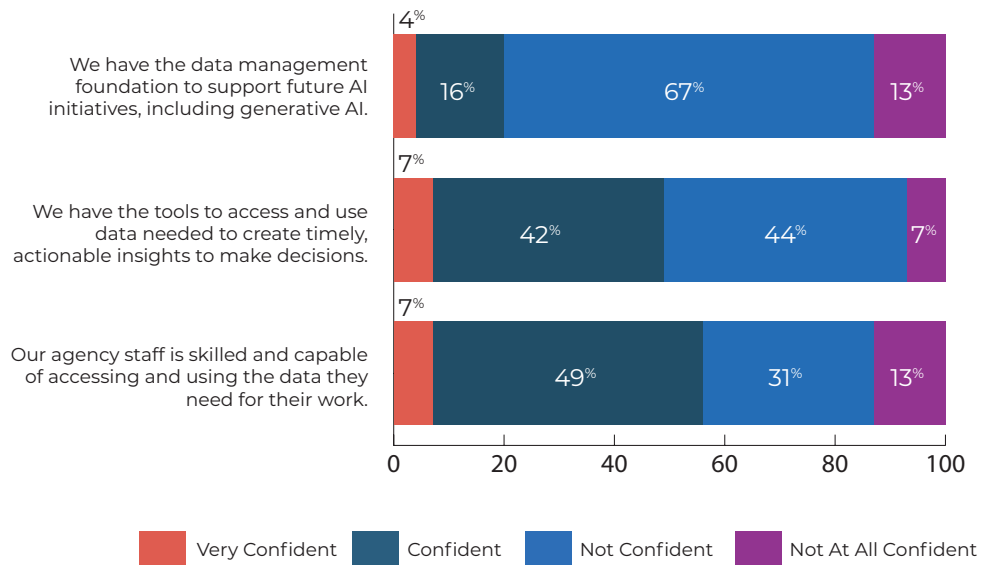
Besides these, another **13%** of the participating agencies recognize the need to move towards a multi-cloud environment in the future.

Current data management resources do not infuse confidence

Current data management capabilities are insufficient to support future AI initiatives, including generative AI. However, data leaders feel more confident in meeting today's analytics needs.

Only 20% of data leaders are confident that their data management systems are equipped to support AI initiatives, including GenAI.

Data management confidence level



Meeting future GenAI requirements demands a new approach to data management. Unlike traditional data lakes or warehouses, GenAI relies on rich semantics, real-time updates, and seamless integration with AI workflows like Retrieval-Augmented Generation (RAG). These advanced needs challenge current data management practices, leaving agencies feeling unprepared to support AI-driven decision-making.

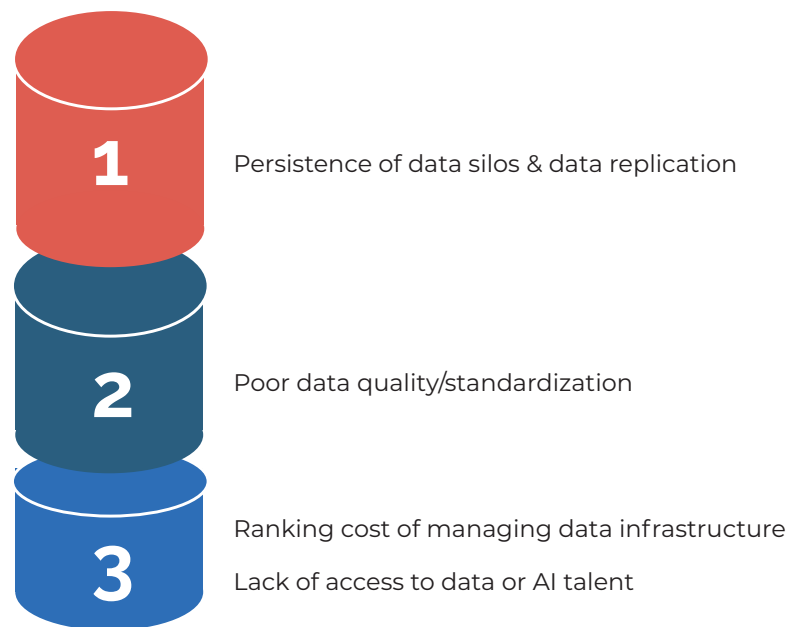
However, **49%** express confidence in their ability to handle data analytics with the availability of the right tools and **56%** believe they have the skilled staff to extract actionable insights and drive decision-making.

U.S. federal agencies need to manage multiple data sources effectively to be ready for the future.

One of the top challenges federal data leaders foresee is data silos and data replication. Data needs to be decentralized but also controlled.

According to survey respondents, **persistence of data silos & data replication is the most common challenge (29%)**, followed closely by **poor data quality/standardization (22%)**.

Top 3 current data management challenges



Ranking is determined by the maximum number of respondents choosing a specific rank for every identified challenge.

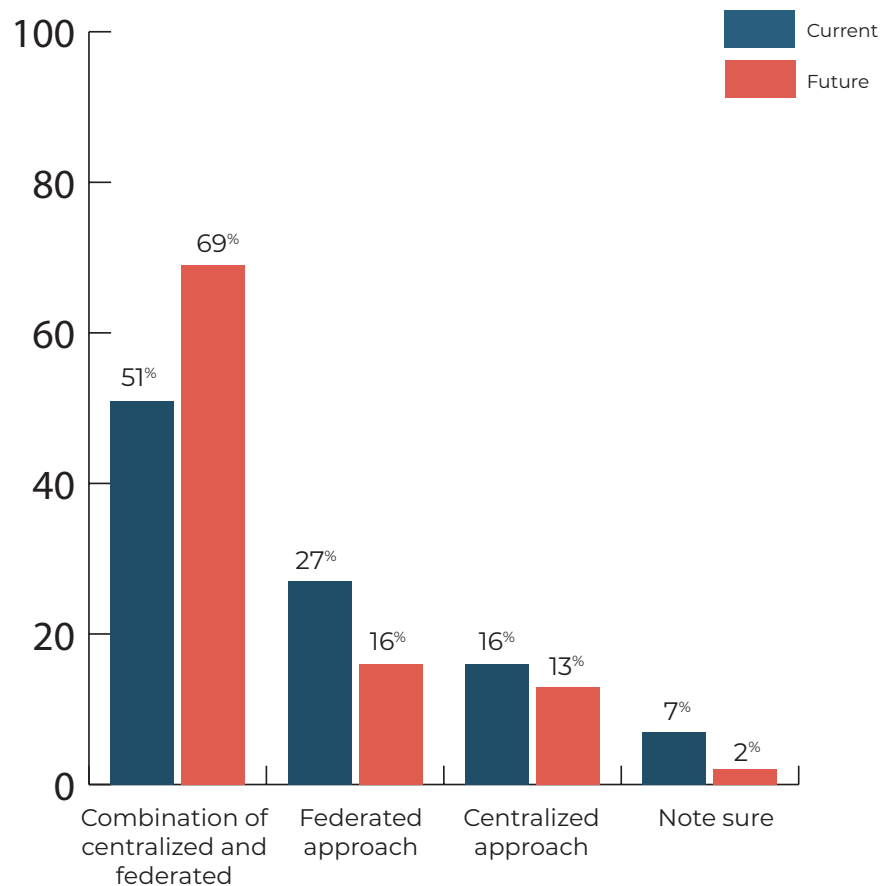
According to survey respondents, persistence of data silos & data replication is the most common challenge **(29%)**, followed closely by poor data quality/standardization **(22%)**.

Rising cost of managing data infrastructure **(18%)**, as well as lack of access to data or AI talent **(18%)**, are also significant issues. These challenges must be addressed to establish the foundation needed to support future AI initiatives.

Combination of centralized and federated approaches support future AI and analytics

AI and future analytics will need both centralized and federated approaches to managing data.

Data management approach to supporting current vs. future AI/analytics



Federal data leaders believe that a combination of centralized and federated data management approaches will be most suited for the future AI and analytics needs. From the present **51%**, the survey findings predict that it will go to **69%**.

On the contrary, data leaders believe that relying solely on a centralized or decentralized approach makes it less likely they will meet future needs.

Challenges affect both mission and ability to replicate the data

The data management challenges are not only about data, but also certainly to impact the missions.

Mission impact from lack of distributed data source access

Mission Impact	Severity
Lower quality of public service or mission outcomes	36%
Delayed decision-making & response times	33%
Increased operational costs due to inefficiencies	22%
Reduced effectiveness of AI & analytics initiatives	4%
Inability to meet new compliance & reporting requirements	2%
Quality of decision making	2%

36% of respondents believe these challenges could result in lower quality of public services or mission outcomes.

33% of federal data officers indicated delayed decision-making and response times as potential consequences.

Challenge of replicating existing data

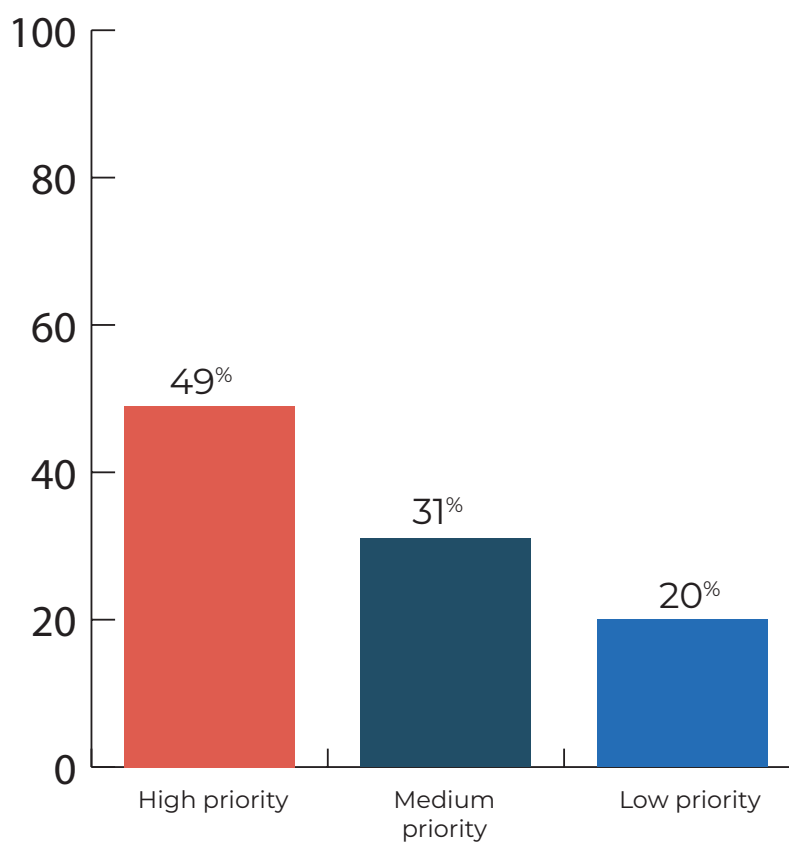
Replicating Existing Data Challenges	Severity
Enforcing data governance policies	31%
Determining the authority data source	27%
Increased cost & complexity	22%
Security & compliance risks	16%
Latency & performance issues	2%
Data culture	2%

The current practice of replicating data to meet various needs is not without challenges. In fact, **31%** of respondents indicated that it adds complexity to enforcing data governance policies, while **27%** reported difficulties in determining the authoritative source of data.

Data infrastructure modernization is top priority for most

While a lot of the requirements are met, data modernization is high on priority to meet future needs.

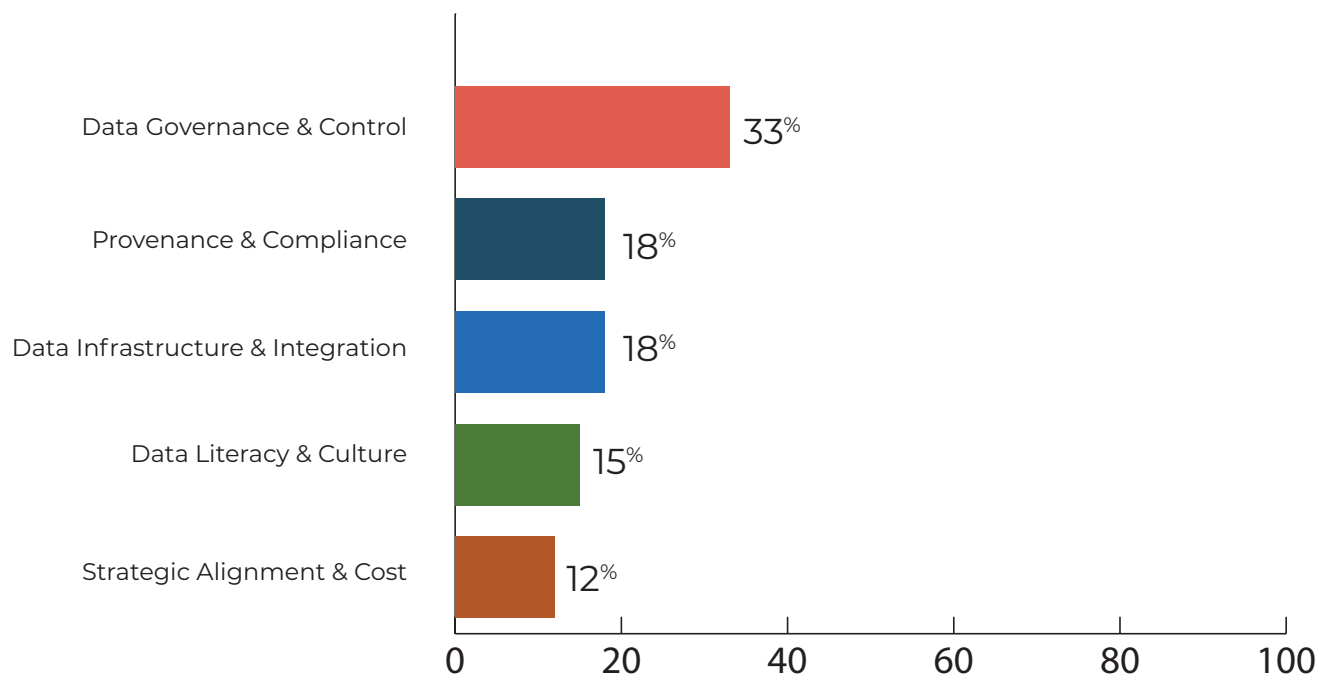
Priority level of modernizing data infrastructure



According to the survey, **80%** of data leaders consider modernizing their data infrastructure a priority within the **next 12 months**.

Execution challenges weigh on data leaders

Stressful data issues for data leaders



Data leaders see data execution as a stressful exercise.

The most pressing data management challenges involve data governance and control (33%), data provenance and compliance (18%), and data infrastructure and integration (18%).

Strategic Recommendations from Denodo:

It's Time to Consider a “Logical” Approach to Data Management

The survey results reveal a critical insight: Only 20% of data leaders are confident that their current data management systems are ready to support AI initiatives. To meet the demands of Generative AI (GenAI) and other advanced analytics, agencies need to rethink their approach to data management. A logical approach—one that emphasizes unifying, governing, and optimizing data access across distributed environments—offers a powerful way to bridge this gap. Here are five key areas to consider when modernizing your data foundation:

Capabilities for Modern Data Management:

1. Unified Data Access:

Break down data silos by creating a centralized virtual abstraction layer that provides seamless access to data, regardless of where it resides or its format. This ensures that all users and AI applications can access the data they need without costly duplication or rigid integration efforts.

2. Data Tailored for Business Users:

Develop a semantic layer that translates complex, technical data into user-friendly formats, enabling non-technical users to query, analyze, and leverage data without needing constant IT support. This empowers broader adoption of AI-driven insights across the organization.

3. Simplified Data Discovery and Rich Metadata:

Invest in tools and processes that enhance data visibility and accessibility. Use rich metadata, detailed lineage, and AI-powered search capabilities to make data discovery intuitive and efficient. Additionally, consider leveraging this metadata as vector embeddings in a knowledge graph or database to support AI workflows, enabling LLMs to ground responses in accurate, context-specific data.

4. Real-Time Insights:

Enable timely access to real-time data by integrating systems that provide dynamic, up-to-date information. This ensures faster, more informed decision-making and equips agencies to respond rapidly to changing conditions and mission needs.

Federated Data Management with Centralized Governance:

Adopt a federated approach to data management that empowers all users across the organization to access and work with data. At the same time, maintain centralized controls to enforce security, governance, and compliance policies. This balance ensures both flexibility and accountability, crucial for delivering AI-ready data while protecting sensitive information. By focusing on these strategic areas, agencies can build a robust and adaptable data foundation capable of supporting their missions and advancing AI initiatives. A logical approach to data management will not only address current challenges but also prepare agencies to meet the evolving demands of the future.

About



CDO Magazine is the premier digital publication giving voice to global executives in data, analytics, AI and security. The publication delivers C-suite-worthy format and quality content — insights essential to accelerating organizational adoption of enterprise disciplines that are key to success in our digital society.

Our passion is to gather leaders in regional communities and connect them to our global executive community. We want to help data, analytics, AI and security executives experience a more profound sense of community through a platform where the best ideas, innovations, companies and leaders are celebrated. CDO Magazine hosts CDO forums in cities, countries and regions around the world.

With an audience approaching 400,000 readers, CDO Magazine is read in 95% of countries globally. Notably, the Global Editorial Board is composed of leading executives from 26 nations. CDO Magazine grew out of the annual Chief Data Officer and Information Quality (CDOIQ) Symposium, founded in 2007 by the MIT Sloan School of Management, in partnership with the International Society of Chief Data Officers (isCDO) and ComSpark.



Denodo is a global leader in data management. We partner with federal departments and agencies to help them accelerate the implementation of their data-driven strategies. The Denodo platform offers governments a logical data fabric architecture powered by data virtualization, that enables data democratization and secure data sharing at speed and scale. This architecture effectively achieves agile, high-performance data access and integration, data abstraction, data governance and real-time data services across the whole enterprise and across hybrid and multi-cloud environments at a fraction of the cost of traditional approaches.

Denodo's logical data management platform provides users and data-driven applications a means to access real-time, integrated views of all relevant data, from one logical data source. Our platform creates real-time views of source data, on an as-needed basis, while leaving that source data exactly where it is. This minimizes data movement and maximizes query performance. But it also is a great complement to data warehouse, enterprise service bus integration or ETL technologies that agencies might have already invested in. And, it supports federal data leaders into the future as they look to deploy AI and GenAI and other data-driven initiatives. Visit www.denodo.com to learn more.