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LeadLeo

2023 China Data Management Solutions Market Report

Data Lakehouse、Data Intelligence、Cloud Native、Data Governance

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LeadLeo Research Institute
Frost & Sullivan (China)

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1.1 The two major trend themes revolving around technological dynamics

Key findings

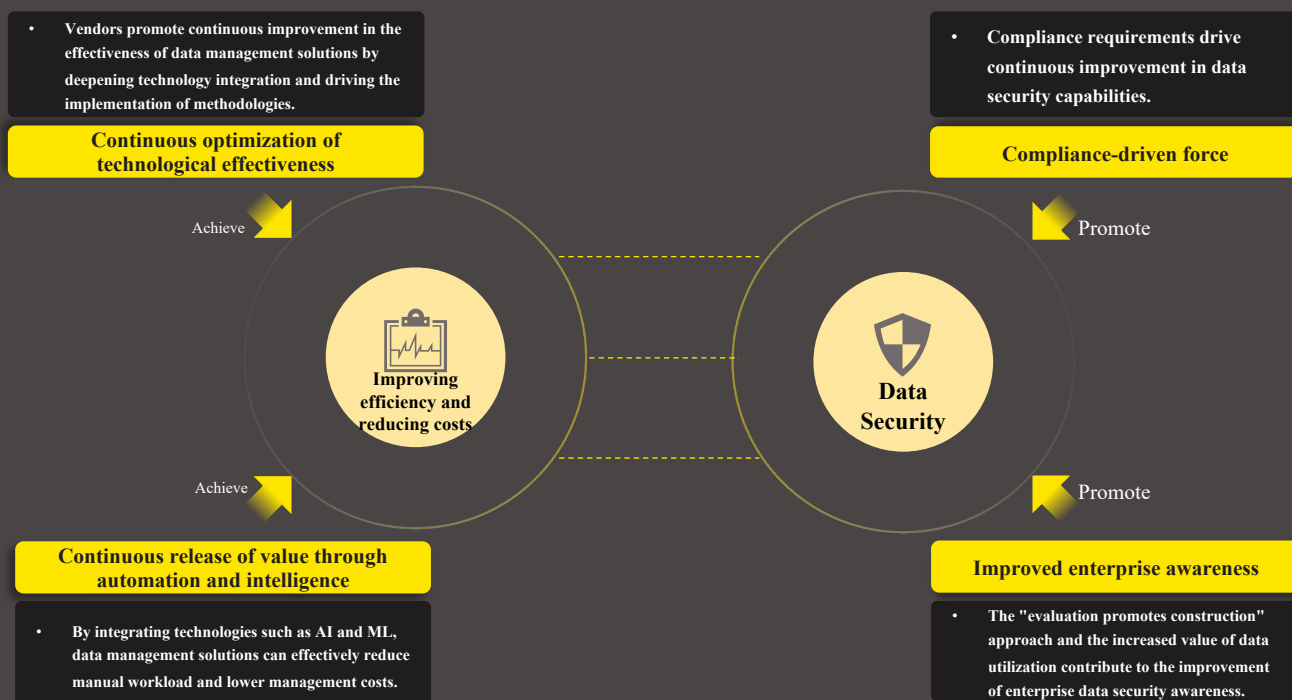
Vendors' technological dynamics revolve around two main themes: improving efficiency and reducing costs, and ensuring data security. This is done to enhance the commercial implementation effectiveness of data management solutions, strengthen the alignment between data management solutions and the sustainable development of enterprise data management capabilities, and facilitate the flow and release of data value.

□ Improving efficiency and reducing costs, and ensuring data security

With the continuous optimization of data management technology in recent years, coupled with the increasing attention from the government on the development of the data field, Chinese enterprises have strengthened their practical implementation of data management technology, and the level of data management is gradually improving. However, enterprises still face the challenge of not fully unleashing the value of data even after implementing the technology. This is primarily due to the fact that in the process of digital transformation, enterprises need to iterate their technology while considering their existing IT architecture and organizational structure. Merely pursuing new technologies without considering the inherent attributes of the enterprise can result in a failure to connect data value with the company's business development. For example, technological complexity exacerbates data silos, and increased communication costs between data teams and business teams.

In this context, we observe that vendor's technological dynamics revolve around two main themes: improving efficiency and reducing costs, and ensuring data security. By implementing technology integration and methodologies, they enhance the performance and implementation effectiveness of solutions in specific scenarios while reducing costs. Additionally, by enriching data security functionalities, they facilitate data circulation. These strategies will strengthen the alignment between data management solutions and the sustainable development of enterprise data management capabilities, thereby improving the effectiveness of solution implementation.

The two major trend themes around which technological dynamics revolve



01 Improving efficiency and reducing costs: continuous release of value through automation and intelligence

□ Advancements in AI technology have expanded its role in the field of data management

In the early stages, automation and intelligence were primarily based on predefined rules and models, which could alleviate some of the pressures on data management teams. However, the functionalities and impact were limited. With the improvement of AI technology, the range of achievable intelligent capabilities has expanded. These include predictive functions, adaptive functions, natural language understanding, and more. These advanced capabilities not only help businesses further alleviate team pressures and gain better data insights, but also reduce data management and operational costs. They also lower the barriers to data usage and expand the range of data users. This in turn helps businesses address both technology implementation and organizational collaboration challenges, making data more usable, valuable, and accessible. Ultimately, it empowers business development by leveraging the full potential of data.

02 Improving efficiency and reducing costs: continuous optimization of technological effectiveness

□ Strengthen cloud native development, integrate methodologies into solutions, and continuously optimize technical performance

Technologies such as data lakes, data warehouses, and HTAP have gained traction and implementation in recent years as they can address challenges brought by business growth. However, the full potential of these technologies has yet to be fully realized. The main obstacles lie in the need to integrate new technologies with existing IT and organizational architectures. Common challenges include the learning curve required for the collaboration between new technologies and existing IT architectures and the increased operational pressure after technology implementation. Additionally, the complexity of the system is heightened with technology implementation, while the data usage processes remain unchanged or difficult to update, resulting in technology implementation that falls short.

To address these challenges, vendors offer solutions based on cloud-native approaches combined with methodologies to unlock the value of technology. For example, cloud-native solutions can make the implementation more lightweight and provide higher performance ceilings, reducing operational pressures and improving performance. Methodologies provide guidance from a holistic perspective to build new architectures, thus enhancing data management efficiency and organizational collaboration. By choosing these approaches, businesses can gradually overcome obstacles and fully leverage the efficiency of the technology.

03 Data security: The drive for compliance and increased awareness among enterprises has elevated the importance of data security capabilities

□ The data security capabilities directly impact whether the value of data can be fully explored and unleashed

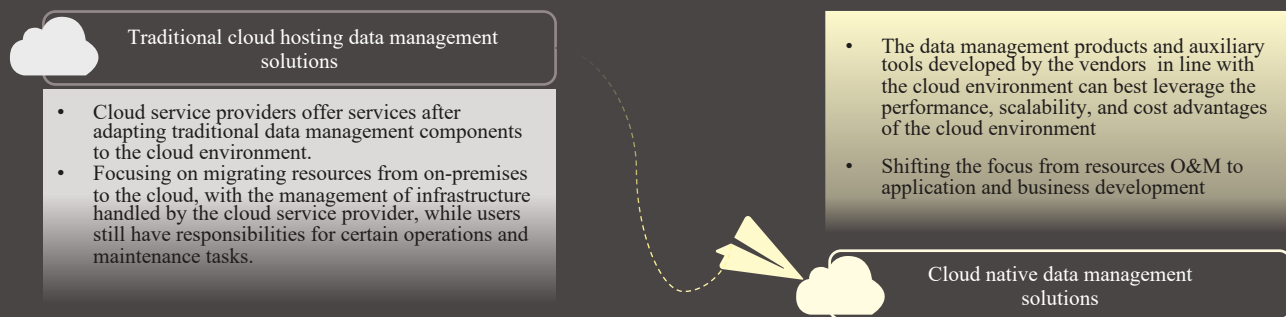
The core issue of data security lies in ensuring the compliant and secure flow of data internally and externally, and the extent of this flow determines whether the value of data can be truly explored and unleashed. With the increasing awareness of enterprises in data management and the drive for compliance, the importance of data security has been recognized, leading to an increased willingness to invest in this area. Vendors assist enterprises in building data security capabilities by providing methods and tools for data security management and data sharing. This facilitates the compliant, secure, and smooth flow of data, enabling its full utilization and value extraction.

1.3 Cloud native become more accessible in data management solutions

Key findings

Vendors are focusing on and strengthening their investment in cloud-native solutions to fully leverage the performance, scalability, and cost advantages of data management solutions in the cloud. Among them, vendor solutions are beginning to achieve varying degrees of serverless implementation, aiming to optimize the release of operational pressures and reduce operational costs for enterprises, thus fully realizing the value of the cloud.

Traditional cloud hosting data management solutions and cloud native data management solutions



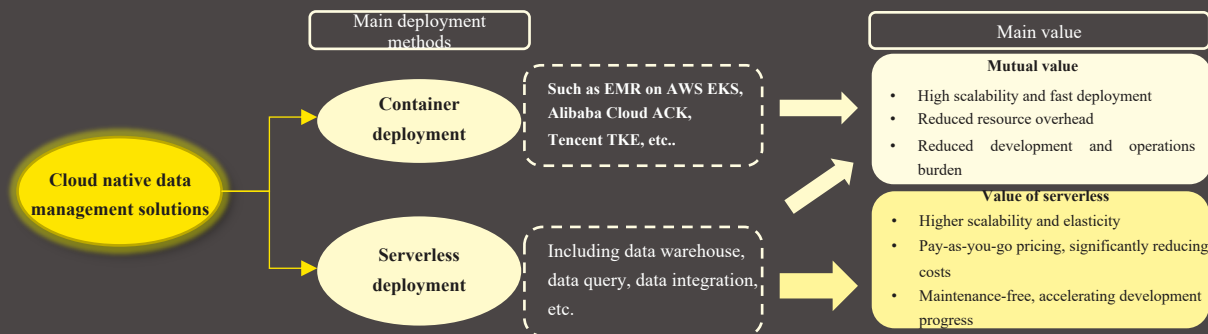
❑ The maturation of Serverless deployment will facilitate the gradual deepening of the cloud-native transformation process for data management solutions

Cloud-native data management solutions leverage technologies such as containers and Serverless to fully harness the scalability, elasticity, and cost-saving benefits of the cloud.

Container deployment allows organizations to optimize resource utilization and enhance elastic scaling capabilities without changing their existing applications, making it a primary approach for transitioning data management technologies to the cloud-native environment. Serverless deployment enables automatic configuration, allocation, and scalability of resources, helping businesses deploy data management technologies in a more lightweight manner, reducing the learning curve and operational costs associated with data management, accelerating technical development and implementation efficiency, and maximizing the value of the cloud.

With Serverless data management solutions continuously improving their capabilities, the options for enterprises to embrace the cloud-native path become more diverse. As the willingness of Serverless users gradually increases, the process of cloud-native transformation for data management solutions will deepen, fully unleashing the value of the cloud.

Value of cloud native data management solutions



Source: LeadLeo

❑ **A comprehensive product matrix will be crucial for driving the deep development of Serverless data management solutions**

The value of Serverless deployment lies in the ability for users to assemble modular, API-driven, and ready-to-use services based on their specific needs, without having to worry about managing and maintaining underlying technologies. This allows users to focus on business development, significantly improving efficiency and resource utilization while reducing resource costs.

Different enterprises have varying requirements for data management solutions, such as business logic and technical architectures. As a result, the realization of Serverless value can be hindered by the lack of flexibility in the product matrix. Insufficient flexibility can affect service integration (such as Serverful data integration + Serverless data warehousing, with different scaling speeds), leading to users being unable to perceive the value of Serverless. A robust product matrix and end-to-end capabilities can enhance the flexibility for users to assemble solutions according to their specific needs. This not only facilitates the adoption of Serverless data management solutions by enterprises but also accumulates best practices, which are key to driving technology adoption and promotion.

❑ **Users' acceptance of cloud-native has significantly improved, providing an environment for further development**

With the technological advancements in cloud-native and the optimization of vendor products, users have experienced substantial cost savings and efficiency improvements, leading to a deeper adoption of cloud-native practices. Container technology has been a primary means for enterprises to transition to cloud-native environments, with an adoption rate of nearly 80% according to a survey conducted by the China Academy of Information and Communications Technology (CAICT). Serverless adoption has also reached over 30% in production environments, with Function as a Service (FaaS) at 38%, Serverless Container Services at 38%, and Serverless Application Hosting Services at 32%. Overall, the promotion of the Serverless concept has achieved good results.

The dynamics of cloud-native and serverless aspects in the supply and demand side.

Two major public cloud vendors improve the serverless product matrix



Vendors

In recent years, vendors have been continuously improving their layout for serverless data management solutions.

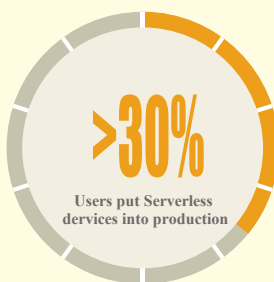
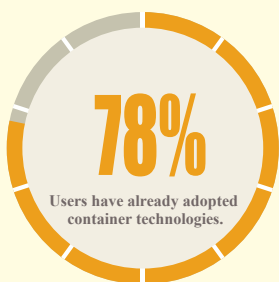


After the release of Amazon OpenSearch Serverless at the 2022 re:Invent conference, a comprehensive serverless transformation was achieved for six data management solution services, including data querying, big data processing, and real-time analytics services.



At the 2022 Hangzhou Yunqi Conference, it was proposed to promote comprehensive containerization and full serverless transformation of core products. Currently, the serverless products for big data include MaxCompute, Hologres, Real-time Computing with Flink, and Elasticsearch.

Survey on Cloud Native/Serverless Users in China in 2022



Customers

- There is a significant willingness among users to adopt cloud-native technologies.
- The promotion of the serverless concept has shown positive results.

Source: China Academy of Information and Communications Technology, Amazon Web Services, Alibaba Cloud, LeadLeo

1.5 Methodology helps improve data management solutions

Key findings

Vendors can help enterprises leverage technology effectively and optimize data culture at the organizational level by incorporating methodologies into their solutions or directly offering relevant solutions. This enables businesses to achieve long-term, sustainable data-driven practices and extract timely and valuable insights from their data in an efficient manner.

□ Methodologies support the continuous and orderly construction and adoption of data management technologies

Methodologies support the continuous and orderly construction and adoption of data management technologies. As the volume, types, and application scenarios of data continue to expand, it drives the evolution and performance optimization of data management technologies to meet the complex and evolving needs of enterprises. However, over time, if various data management technologies are not systematically constructed and implemented in the organization, it can burden the enterprise and lead to technical issues such as decreased stability and availability, as well as organizational issues such as knowledge barriers and hindered collaboration among different business teams, resulting in reduced efficiency in data analysis.

The main reason for these issues is that effective data management goes beyond the adoption of technologies. It also requires addressing the barriers in technical knowledge and collaboration between departments, as well as considering factors such as data toolchain management and component governance, which can significantly impact the effectiveness of technology adoption. Methodologies can serve as tactical guiding principles, helping enterprises take a holistic approach to data management. This enables the sustainable development of data management technologies and the continuous optimization of the enterprise's data management system, allowing data to be generated more effectively and quickly to deliver value.

□ Three popular data management methodologies: DataOps, Data Fabric, Data Mesh

The three major data management methodologies have the same goal, which is to break down data silos so that data can be used in a timely and efficient manner. In terms of focus, DataOps focuses on improving data usage efficiency and delivering high-quality data more quickly; both Data Fabric and Data Mesh focus on solving the problem of data dispersion, but the two solve the problem in different ways. The former builds a virtual management layer to manage the data in a unified way (centralization), while the latter is to hand over the data to a team with a better understanding of data requirements and a deeper understanding of data by establishing common governance rules (decentralization). These methodologies are not mutually exclusive, and a proper combination can play a complementary role.

Introduction to the three major data management methodologies



DataOps

Derived from DevOps, DataOps is a methodology that focuses on utilizing data pipelines and tools to improve the quality of data production and operations. It aims to enhance the collaborative efficiency between data teams and business teams by promoting a cultural shift within organizations.

Requirements: Moderate, requires organizational culture change, suitable for most organizations



Data Fabric

The methodology involves building a metadata-driven virtual management layer that shields the differences in data sources, environments, platforms, and more. It enables unified management of diverse and heterogeneous data sources in a standardized manner.

Requirements: Low, suitable for most organizations



Data Mesh

The approach advocates for "domain-oriented governance" of data. Each data domain team leverages their understanding of their specific data requirements and utilizes their chosen technologies for data management. This methodology encourages the decentralized and agile handling and sharing of data.

Requirements: high, requires organizational culture change, suitable for large and complex organizations

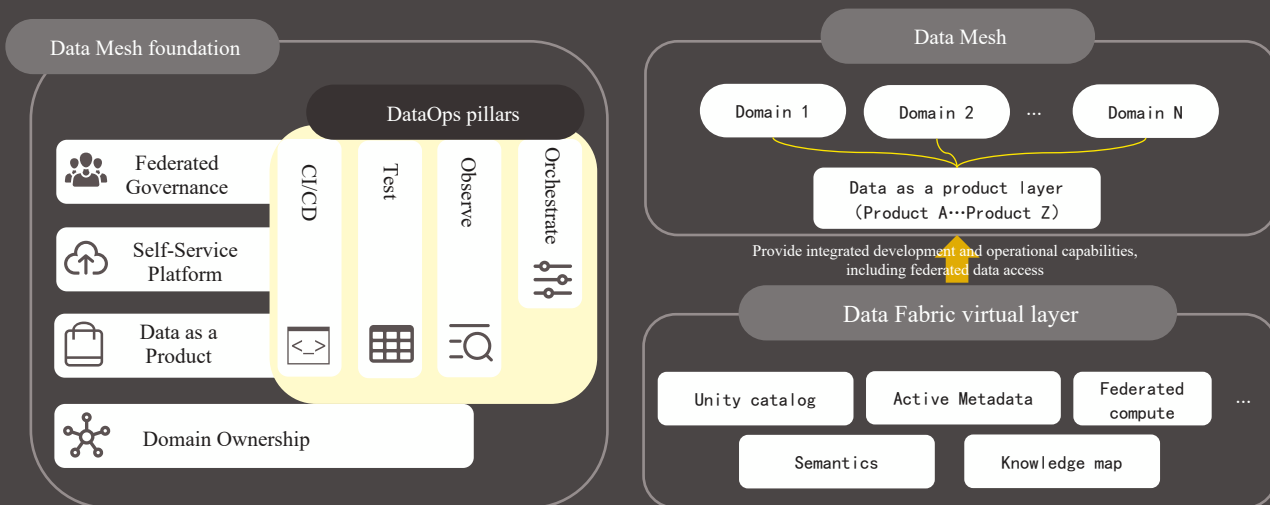
□ How do the three methodologies enhance data management?

- DataOps: The core focus is on data flow, ensuring observability and reusability of data in the production pipeline. It involves establishing data standards and practices to facilitate mutual understanding among data engineers, data scientists, and business personnel. This improves the efficiency of data development and utilization, ultimately enhancing the overall data literacy of the organization. DataOps enables fast and high-quality data delivery while improving data utilization.
- Data Fabric: It manages heterogeneous data in a unified manner. It combines machine learning, knowledge graphs, semantic layers, and active metadata management to address challenges caused by scattered data, such as difficulties in finding desired data or knowing what data can be used. Data Fabric enhances an organization's data insights.
- Data Mesh: It leverages the deep understanding of domain experts to unlock the value of data within their respective domains. Domain-oriented constructs also play a role in clarifying data ownership, facilitating better data management, and ensuring secure data sharing. Data Mesh enables effective data utilization and secure sharing.

□ DataOps and Data Fabric can serve as the implementation support for Data Mesh

- DataOps and Data Fabric can be implemented based on existing IT architectures or with partial architectural modifications. By utilizing the methodologies and corresponding toolkits, organizations can promote their adoption and subsequently focus on building organizational culture and gradually optimizing their technology. This approach is suitable for most organizations. On the other hand, Data Mesh has higher requirements for data boundaries and data definitions. It necessitates a high level of data management capability within the organization and a shift from the traditional centralized IT architecture to a decentralized one. Therefore, implementing Data Mesh can be challenging. For enterprises aiming to establish Data Mesh, it is recommended to prioritize the implementation of DataOps or Data Fabric as foundational support. DataOps can help optimize data processes, data governance, and standardize data products across various data domains, enhancing data predictability and reusability. Data Fabric, on the other hand, can serve as the technical foundation for realizing Data Mesh, enabling data serviceization, cross-domain orchestration, and analysis.

DataOps and Data Fabric can serve as the implementation support for Data Mesh



Source: Eckerson Group, Alibaba Cloud, LeadLeo

2.1 Opportunities and Challenges in Market Implementation

Key findings

In the context of improved awareness and proficiency in enterprise data management in China, data management technologies, when combined with AI, cloud-native approaches, methodologies, and other optimizations, will better support data management solutions in addressing the challenges encountered during market implementation. This will further expand the scale of commercialized implementation of these solutions.

□ Data management solutions have strong development momentum

On the path to expanding their presence in the Chinese market, data management solutions face challenges such as the need to adapt to evolving technologies and diverse scenario-based requirements. Currently, solution providers are strategically positioning themselves to better meet the growing demand for sustainable data management capabilities in enterprises. Additionally, the government is increasing its focus on the field of data management to drive digital transformation in businesses. In this environment, data management solutions have a favorable outlook for development.

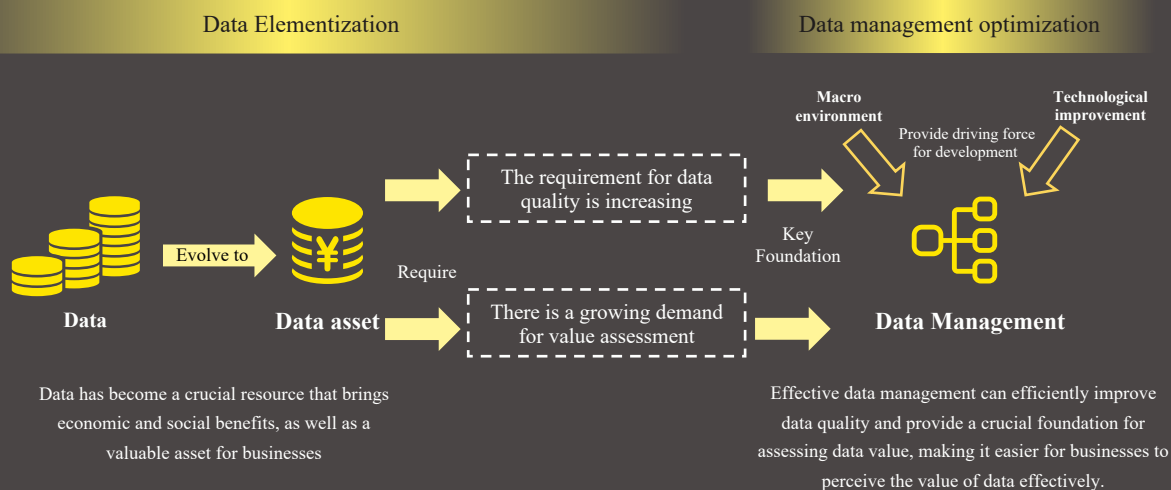
01 Opportunities: The increased awareness of data management in enterprises continues to fuel the momentum for the implementation of data management solutions in the market

□ Data management solutions are the crucial foundation for unlocking the value of data

In the era of the digital economy, data has become a critical production factor and an important asset for enterprises. In this environment, effective data management plays a dual role. On one hand, it helps improve data quality and ensures data security, providing support for unlocking the value of data. On the other hand, it enriches the application scenarios of data assets, facilitating the circulation and commercialization of data elements, enabling enterprises to fully recognize and leverage the value of their data assets.

Data management solutions offer cost-effective, fast, and accurate data transformation capabilities, alleviating the burden of data management for enterprises. This allows enterprises to focus on utilizing data to respond to internal and external changes. Therefore, data management solutions serve as a crucial foundation for unlocking the value of data within an organization.

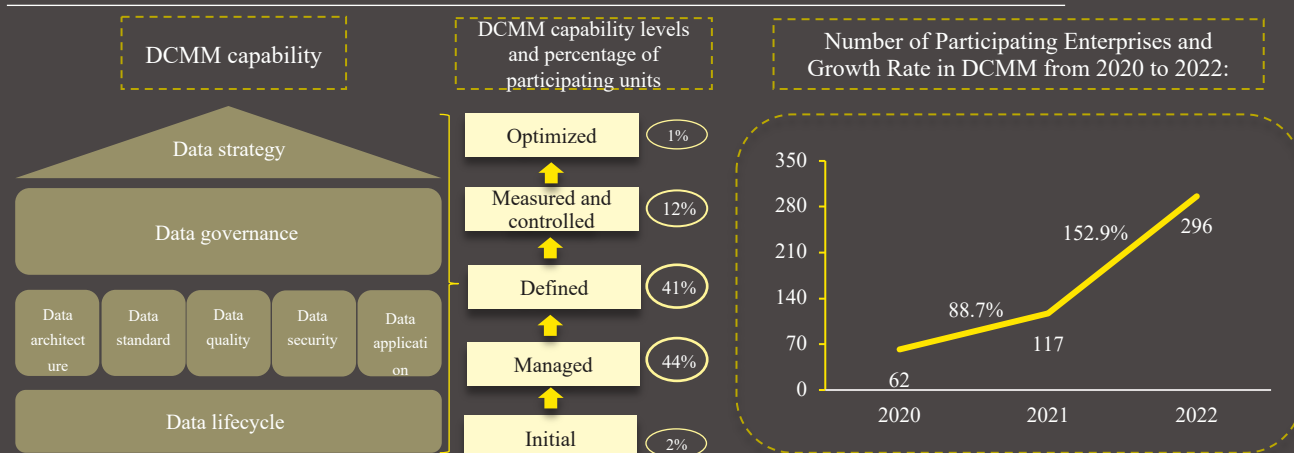
Data value to economy, society and businesses has been enhancing, driving the development of data management



□ Increased awareness of enterprise data management brings demand to the market for data management solutions

The level of awareness regarding data management in enterprises affects their investment in data management. Establishing standards and evaluation models is a core approach to nurturing industry awareness of data management and promoting industry development. In foreign countries, maturity models such as CMMI-DMM, Oracle MDM, and EDM-DCAM were established earlier, leading to progress in cultivating the data management market. In China, based on existing industry experience and practices, combined with the Chinese context and corporate culture, the DCMM was officially released in 2018. Through a "promote construction through evaluation" approach, it guides Chinese enterprises to establish and evaluate their own data capabilities and continuously improve their data management organization, processes, and systems. Overall, most companies participating in DCMM scoring are concentrated at a medium to low level, indicating significant room for development. However, there has been a significant increase in the number of companies participating in the scoring, reflecting the continuous improvement in data management awareness and providing momentum for the implementation of data management solution in the market.

Proportion of Participating Units by DCMM Capability Level and Changes in the Number of Participating Units



02 Opportunity: Continued support from national policies paves the way for the development of the data management solutions market

□ National policies continue to support the improvement of enterprise awareness and drive the development of the data management solutions market

With the advent of the "14th Five-Year Plan" period, multiple data-related policies have been implemented successively, continuously paving the way for the development of China's data field. At the same time, these policies outline plans to promote the development of data management, elevating the status of data management and laying the foundation for strengthening enterprise awareness and capabilities in data management, as well as facilitating the implementation of data management solutions in the market. Furthermore, policymakers have recognized the varying difficulties faced by different industries and small and medium-sized enterprises (SMEs) in implementing data management and achieving digital transformation. To accelerate the development of the data management field and promote practical implementation of digital transformation, relevant policies have been formulated specifically for industries such as finance and for SMEs. These policies provide targeted measures and have already achieved significant progress in their respective stages.

01 Challenges: Serverless deployment has the potential to fully leverage the value of data management solutions in the cloud. However, widespread adoption still requires addressing user concerns

- ❑ To achieve large-scale adoption of serverless data management solutions, both the supply and demand sides need to work together.

The scalability, elasticity, and hands-off management of underlying data management technologies in serverless deployments are a result of changes in architecture and development operations. Resources are abstracted into on-demand services, allowing users to focus solely on business logic development. While these changes bring convenience, they also raise concerns associated with new technologies, such as:

- Reduced user control: Users hand over the maintenance of underlying technologies to the provider, relinquishing control. They may worry about the difficulty of self-diagnosis if issues arise with black box delivery.
- Changes in development habits: Changes in architecture and development operations require users to adapt and learn, leading to higher learning and adaptation costs.

As Serverless technology continues to improve and more use cases are implemented, user concerns will gradually diminish. However, the widespread adoption of Serverless requires collaboration between supply and demand. On the demand side, businesses should consider partnering with providers that offer mature Serverless data management solutions to reduce the learning curve and trial-and-error costs. On the supply side, providers should develop more scenario-specific capabilities and enhance the product portfolio of Serverless data management solutions to flexibly meet various business needs and increase the number of industry use cases.

User concerns regarding serverless can be addressed with suitable solutions

Seven Major Concerns for Users Before Applying Serverless Services

Technological optimizations and solutions provided by vendors



02 Challenge: Enterprises already have existing data warehouses, and integrating data lakes with them or achieving seamless coordination between the two poses difficulties

- Vendors have developed solutions that are closely aligned with enterprise needs, reducing the resistance to technological evolution

Vendors have developed solutions that are closely aligned with enterprise needs, reducing the resistance to technological evolution. Whether building a data lake on top of a warehouse or building a warehouse alongside a data lake, the ultimate goal is to achieve efficient storage and retrieval of various types of data. However, most enterprises already have legacy data warehouses, and without proper data definition, data boundary delineation, and data lineage management, the result will be data being stored but not effectively utilized.

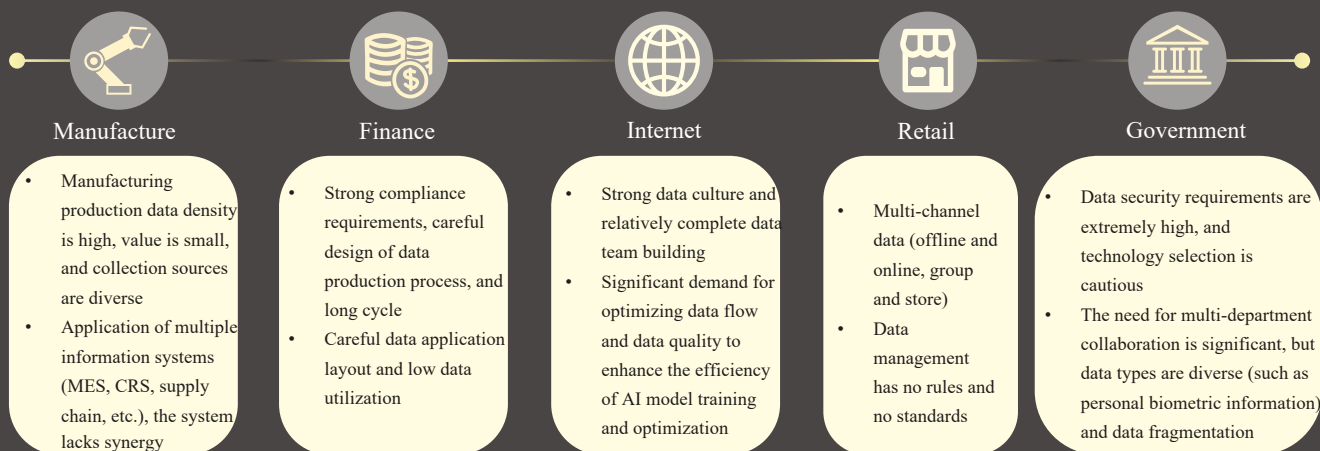
Currently, solution providers are offering AI-based data labeling and metadata management functionalities, reducing the technical transition effort. By combining methodological concepts and building comprehensive solutions, they improve data lineage observability and data operations efficiency, helping enterprises establish a seamless connection between their data warehouses and data lakes. Additionally, during the process of technological evolution, enterprises can adopt cloud-native technologies to ensure a smooth transition, such as running both old and new systems simultaneously based on containers. Overall, the resistance to technological evolution is decreasing, and close collaboration with suppliers that possess mature solution capabilities can overcome this challenge.

03 Challenge: Industry demands vary significantly, requiring suppliers to have a deep understanding of industry-specific business needs

- Suppliers need to provide comprehensive industry-specific solutions to expand the market deployment scale

China's digital transformation of enterprises is still in its early stages, and the data management capabilities of most companies, especially small and medium-sized enterprises and non-digital-native industries, are still relatively low. This is mainly due to the long investment cycle and slow results of data management. Companies in the early stages of digital adoption may not prioritize data management due to unclear data usage demands and a lack of planning, resulting in weak foundational capabilities. Therefore, the market deployment of data management solutions requires suppliers to understand industry pain points, engage in deep cooperation with enterprises to enhance their understanding of industry-specific business needs. This will support continuous improvement of supplier capabilities and allow them to establish best practices, strengthen the influence of their solutions in different industry domains, and expand the market deployment scale.

Different industries have varying demands due to their distinct business requirements and foundational capabilities



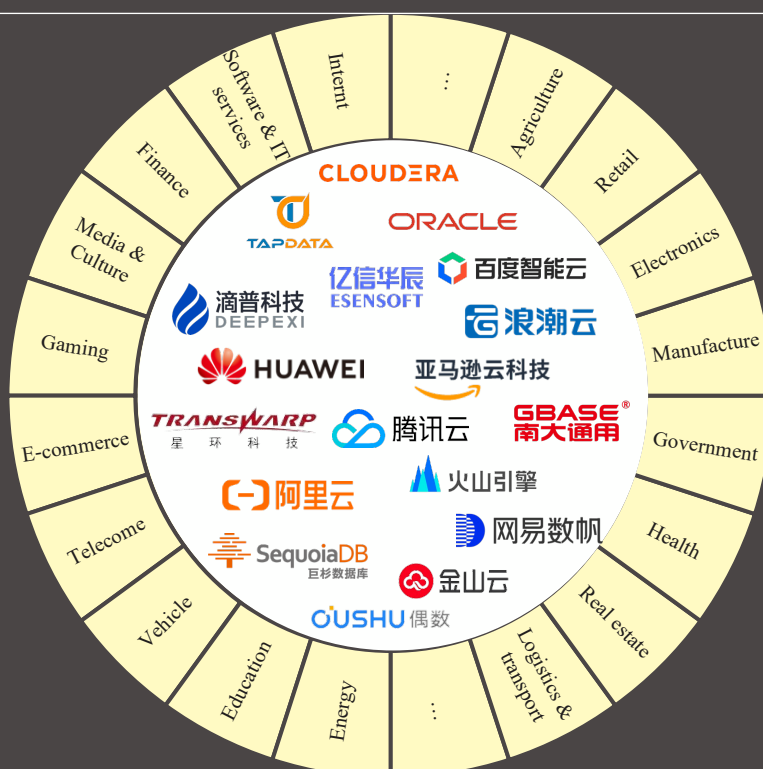
Source: LeadLeo

2.3 Industry coverage map of suppliers

Key findings

Currently, Chinese enterprises require suppliers to provide solutions that are more aligned with their specific industries and business scenarios, in order to facilitate the implementation of solutions with lower burdens. Therefore, having a rich portfolio of industry benchmark cases and deepening the understanding of industry-specific business needs will be crucial for suppliers to expand their market presence. Vendors that excel in this aspect will have a significant competitive advantage.

With the joint efforts of suppliers, data management solutions have achieved coverage in multiple industries



- Suppliers penetrate experience into various vertical industries through different paths, and the depth of each industry should be strengthened in the future

Data management solution providers expand industry coverage through two main approaches. First, they leverage their experience and understanding of industries with strong digital native characteristics, such as the internet and e-commerce, to penetrate vertical industries and implement their technology capabilities in large-scale data management scenarios. Second, they capitalize on enterprise resources, including customers and partners, to deeply cultivate industries with high requirements for data compliance and security. This approach enhances their understanding of data and its value to business from a broader perspective, enabling them to better implement their technical capabilities and data compliance and security capabilities across various vertical industries. Each approach has its advantages. The former is easily understood and implemented by companies with different foundational capabilities, thanks to their experience in digital native industries. The latter establishes an image of data compliance and security capabilities, attracting enterprises that prioritize data security.

As awareness of data management increases among enterprises, the demand for solutions is shifting from "quantity" to "quality." To enhance their industry expertise, suppliers should continuously strengthen and optimize their capabilities in data governance, data compliance, and data security. This will help enterprises navigate the increasingly complex data application landscape. Additionally, suppliers should refine their products and technologies based on accumulated industry experience to ensure that data management solutions can be implemented in a more streamlined manner.

Source: LeadLeo

Innovation Index Evaluation System Indicators

Key findings

This report sets up an innovation index evaluation system to evaluate and analyze data management solutions, with four indicators: data warehouse & data lake basic technology improvement, cloud native innovation, data lakehouse innovation, data management methodology innovation

Tier 1 indicator	Tier 2 indicator	Key points
Data warehouse & data lake basic technology improvement	Data storage module	data life cycle storage, scaling, distributed storage operations, storage formats, compressed storage technologies, data processing and warehousing performance acceleration, storage indexes, etc.
	Data preparation module	knowledge extraction method, extraction mode, classification dimension, consistency check, etc.
	Data analysis support module	query function, query acceleration, federal query, visualized display, machine learning algorithm, machine learning process component, etc.
	Data analysis module	batch data analysis, stream data analysis, online analysis processing (OLAP), etc.
Cloud native innovation	Cloud native technologies innovation	Serverless, compatibility, automation, intelligent, etc.
Data lakehouse innovation	Unified storage capability	Load balancing, data caching acceleration, data organization formats, etc.
	Unified metadata capability	Data source management, metadata auditing, metadata management, metadata lineage, and auditing, etc.
	Unified computing capability	Interactive query engine, interactive analytics engine, machine learning engine, etc.
	Unified services capability	Including unified development capabilities, unified scheduling capabilities, unified openness capabilities, etc.
	Unified O & M capability	Lakehouse integrated operations and maintenance, online upgrades, fault self-healing, etc.
	Security management capability	Achieving data compliance sharing within the same security system.
Data management methodology innovation	DataOps	Optimizing existing solution scenarios based on DataOps, DataOps best practices, etc.
	Data Fabric	Data Fabric research and development progress, implementation status, etc.

Growth Index Assessment System Indicators

Key findings

This report sets up a growth index evaluation system to evaluate and analyze data management solutions, with five indicators: performance & compatibility, security capabilities, services support, ecological construction, maturity of solutions for meeting market's needs

Tier 1 indicator	Tier 2 indicator	Key points
Performance & compatibility	Workflow orchestration and management module	Workflow management - Visual workflow orchestration interface, scheduling and triggering mechanisms, multi-user collaboration Maintainability features - Error diagnostics, fully managed and maintenance-free, multi-dimensional visual system monitoring and alerting Resource management and data management capabilities - Error diagnostics, fully managed and maintenance-free, multi-dimensional visual system monitoring and alerting.
	Compatibility	Data formats & interfaces - structured, unstructured, application programming interfaces. Cloud compatibility & external compatibility - cloud deployment solutions, cross-cloud platform data replication and migration, open-source engines.
	Query and computing performance	Query and analysis performance - query latency, concurrent query count, real-time analysis, data marts. High availability & scalability - SLA, automatic fault detection, online and offline scaling, multi-replication.
Security capabilities	Disaster recovery construction	Data backup and recovery, applause recovery and migration Multi-factor authentication, node access control, log recording elements
	Data security, security protection	Trusted computing services, fully homomorphic encryption, security protection technologies.
Services support	Services support	Implementation services, value-added services, expert teams, product documentation.
Ecological construction	Open source status	Open-source components, contributors, issues, Representative users
	Partners and cooperation in the industry	Hardware, peer companies, middleware, internal product lines, universities.
Maturity of solutions for meeting market's needs	The coverage of solution application scenarios in industries such as finance, internet, telecommunications, entertainment, transportation, logistics, government affairs, healthcare, energy, manufacturing, agriculture, etc., as well as the depth of cooperation with customers.	Industry domain application breadth - The breadth of industry domains in scenario practice Industry domain application depth - The granularity and depth of scenario practices Advantageous technologies or service models - Vertical demand service capabilities.

Methodology

- ◆ Frost & Sullivan has conducted in-depth research on the market changes of 19 major industries and 532 vertical industries in China with more than 1,000,000 industry research samples accumulated and more than 10,000 independent research and consulting projects completed.
- ◆ Rooted on the active economic environment in China, the research institute, starting from data management and big data fields, covers the development of the industry cycle, follows from the enterprises' establishment, development, expansion, IPO and maturation. Research analysts of the institute continuously explore and evaluate the vagaries of the industrial development model, enterprise business and operation model, Interpret the evolution of the industry from a professional perspective.
- ◆ Research institute integrates the traditional and new research methods, adopts the use of self-developed algorithms, excavates the logic behind the quantitative data with the big data across industries and diversified research methods, analyses the views behind the qualitative content, describes the present situation of the industry objectively and authentically, predicts the trend of the development of industry prospectively. Every research report includes a complete presentation of the past, present and future of the industry.
- ◆ Research institute pays close attention to the latest trends of industry development. The report content and data will be updated and optimized continuously with the development of the industry, technological innovation, changes in the competitive landscape, promulgations of policies and regulations, and in-depth market research.
- ◆ Adhering to the purpose of research with originality and tenacity, the research institute analyses the industry from the perspective of strategy and reads the industry from the perspective of execution, so as to provide worthy research reports for the report readers of each industry.

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