Critical Capabilities for Cloud Database Management Systems for Analytical Use Cases

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Initiatives: Data Management Solutions

Data and analytics leaders looking for analytic data management solutions will find a good range of choices to meet their needs. The market for cloud-based DBMSs for analytical use cases has matured and settled in the past year, with a mix of modernized traditional and newer offerings.

This Critical Capabilities is related to other research:

Magic Quadrant for Cloud Database Management Systems

View All Magic Quadrants and Critical Capabilities

Overview

Key Findings

- **Vendors now embrace the cloud.** In previous years, different vendor offerings did not fully embrace cloud attributes, instead using “cloudwashing” to appear to have cloud-based products. This is no longer the case. Vendors with decades of experience on-premises now offer fully cloud-based services.
- **Vendors are moving toward richer data ecosystems.** Many solution areas that relate to database management, such as data quality, data governance, master data management and data integration, are becoming more tightly integrated with (and within) cloud analytics platforms. This richer functionality is being offered through new product capabilities and partners.
- **Mature vendors are getting more ‘cloudy’ while cloud-native vendors are getting more mature.** Vendors with a rich depth of capabilities developed on-premises have adapted to the cloud environment, and less mature cloud offerings are increasing the depth and capabilities of their services. Qualities central to the cloud include dynamic elasticity and new pricing models. Mature qualities are characteristics like advanced workload management. Both types of vendor see that there are things they can gain by emulating the strengths of the other type of vendor.

Recommendations

As a data and analytics leader responsible for choosing data management solutions, you should:

- Select a vendor based on your commitment to a particular cloud service provider (CSP) or incumbent vendor. Cloud-native offerings from a particular CSP will, by and large, be better integrated with other services from the same CSP. Cloud offerings from an incumbent vendor will benefit from existing skill sets, familiarity and reduced migration expenses.
- Judge on results, not promises or architecture. Data and analytics leaders should understand the requirements for their use cases and ensure that these requirements can be met by production capabilities. One of the fundamental attributes of the cloud is the opaque nature of implementation. As a consumer, you cannot see nor modify the underlying implementation. Therefore, look at results when making decisions for a cloud analytics platform, whether those results relate to performance, workload scalability or cost. Take care that functionality you require for production scenarios is both in production and robust enough for your requirements.

- Evaluate your needs for multicloud and intercloud. Multicloud is the ability to run a service on multiple clouds, and intercloud is the ability to access data transparently across multiple clouds. Both can be valuable features. Although your overall data estate will probably be spread over multiple clouds, individual use cases may very likely not need data from outside their silos. Depending on use cases, simple solutions such as replication between clouds and other service offerings can provide the required access to diffuse data, so multicloud or intercloud capabilities will not provide explicit value.

Strategic Planning Assumptions

By 2023, cloud preference for data management will reduce the vendor landscape, while the growth of multicloud will increase the complexity of data governance and integration.

By 2022, cloud DBMS revenue will account for 50% of the DBMS market's total revenue.

What You Need to Know

Data and analytics leaders can use this research to guide the evaluation and initial vendor selection for cloud database management system (DBMS) offerings for analytical use cases. This research is one of a family of three pieces of research that should be considered together:

1. Magic Quadrant for Cloud Database Management Systems — This research evaluates selected vendors of DBMS that run in the cloud for both analytical and operational use cases. The Magic Quadrant is used to judge the suitability of cloud DBMS vendors for either analytical or operational use, or for both.

2. **Critical Capabilities for Cloud Database Management Systems for Analytical Use Cases** — This report evaluates specific cloud DBMS products offered by the vendors in the Magic Quadrant for their suitability to support four analytical use cases, using nine critical capabilities. The findings from this research are one of the inputs into the evaluations of the cloud DBMS vendors in the Magic Quadrant.

3. Critical Capabilities for Cloud Database Management Systems for Operational Use Cases — This research evaluates particular cloud DBMS products provided by the vendors in the Magic Quadrant for their suitability to support four operational use cases, using 12 critical capabilities. The findings from this document are one of the inputs into the evaluations of the cloud DBMS vendors in the Magic Quadrant.

Most of the capabilities are common to the two Critical Capabilities reports, but may be scored differently for the analytical and operational use cases. The scores for each capability may also carry different weights in each report. For each vendor in the Magic Quadrant, there may be the same, or two different, products in each of the Critical Capabilities documents. The Critical Capabilities reports evaluate individual products that each vendor has chosen.

Previous Gartner research has documented the move of DBMS to the cloud; the majority of the growth in the DBMS market is taking place in the cloud (see The Future of the DBMS Market Is Cloud).

Enterprises use cloud DBMS for analytical use cases to provide support for the following capabilities:

- **Tactical and ad hoc analysis of structured information** — The information used by mainstream business processes, such as finance, HR, supply chain, customer relationship management and supplier relationship management, requires the analysis and provision of results to a large number and a wide range of user types. This is typically the domain of the traditional data warehouse, which structures data for efficient access by many different use cases and frequently combines data from multiple sources.
- **Data science and other advanced analytics** — Artificial intelligence (AI), machine learning (ML) and advanced statistics require the provision of reliable data of known quality. Algorithms may run within the cloud DBMS, or interface to a separate service. Cloud DBMS can also be used for data engineering, which is a precursor to the analysis.
- **Multiple levels of data structure** — It is now common for analysis to be performed on a wide variety of data other than structured information. The Internet of Things (IoT), social media, video, audio, documents and blogs are commonly used to provide a fuller analytical picture. These data types can be used in data lakes, which typically provide less structure and validation for the data.
- **Virtualized data** — The Gartner concept of the logical data warehouse (LDW) is now firmly established in architectural best practice for analytics (see The Practical Logical Data Warehouse). It is now common to find products with preintegration between the data warehouse and data lake, and with access to many remote sources.

- **Real-time or near-real-time analysis** — The need for analytical results in real time or near real time to provide information to mainstream business processes is now the norm. This may be real-time querying of analytical data stores, the mixing of real-time and offline analytics, real-time data ingestion, real-time analytics on an event stream, or feeding real-time data through APIs.
- **Intercloud, multicloud and hybrid operations** — Data is being spread across multiple cloud platforms and on-premises. The ability to run products on different platforms, as well as access data across platforms, is becoming increasingly relevant.

The following trends also impact this market:

- **The emergence of the data and analytics ecosystem as the basis for competition** — This is where products or vendors are evaluated, not on single product solutions, but on an ensemble of solutions that are integrated to work together. Typical scenarios include integration of the data warehouse, data lake and ML services. This research evaluates individual products.
- **The use of a single database product for both transactional and analytical use cases, rather than separate products** — In some cases, the same product may be used, but it may be configured differently for the two types of use case.

How to Use This Research

Data and analytics leaders should use this research to learn how the evaluated cloud DBMS solutions support the nine critical capabilities defined by Gartner as relevant to analytical use cases. They should then consider how those capabilities, in turn, support the four analytical use cases. The interactive version of this document can be used to customize the weighting of the scores. All the while, the organization should take into account the weighting of these factors that reflects what is important to them. The interactive version enables users to adjust the weightings to reflect their own requirements.

While all of the products evaluated address cloud DBMS analytical use cases, they can be very different in nature and achieve their ends in different ways. In particular, there are relational and nonrelational products, and CSP- and independent software vendor (ISV)-native products that are cloud-agnostic. Buyers should ensure that they understand the implications for their organization of the type of product that they are acquiring.

The vendor product scores reflect Gartner analysts' input combined with Gartner client feedback. However, it does not provide a complete evaluation of the vendor or tool being evaluated. It is essential to also consider each vendor's market presence, track record, financial and organizational strength, availability of skills, product support and outlook, such as its vision and adaptability to market changes and disruption. In that regard, this research should be used in conjunction with Magic Quadrant for Cloud Database Management Systems.

The critical capabilities used during our evaluations were chosen based on their usefulness in differentiating between vendor offerings. If a capability is common in its availability and implementation across all vendors, it will not be used as a critical capability in this research.

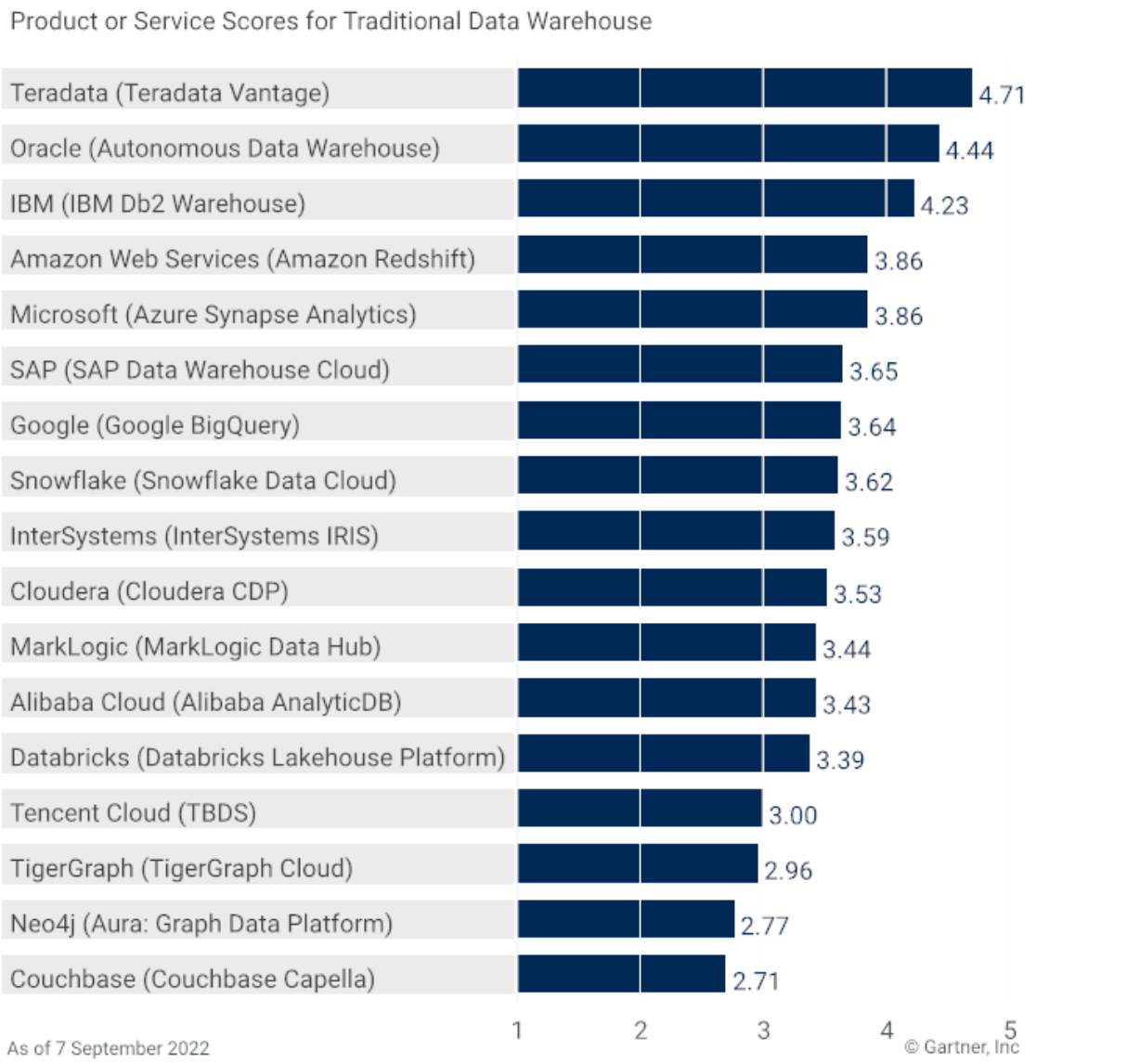
The scoring system used for the critical capabilities ranges from a low of 1 to a high of 5. A score of 3 indicates that the offering meets the requirements for that capability. As would be expected, most offerings score a 3 or higher on all use cases, as the vendors that qualify for this research represent the best offerings available for these use cases. A score below 3 does not mean that the service cannot be used for the use case. Rather, it means users may have to do additional work on their own to ensure the solution meets the standard requirements for that use case.

The critical capabilities assessed in this report represent a subset of the evaluation criteria that Gartner recommends when selecting vendors and tools. Therefore, the positioning of vendors in the graphics and tables do not represent overall vendor positioning in the market, and do not always coincide with the positioning of vendors in the corresponding Magic Quadrant.

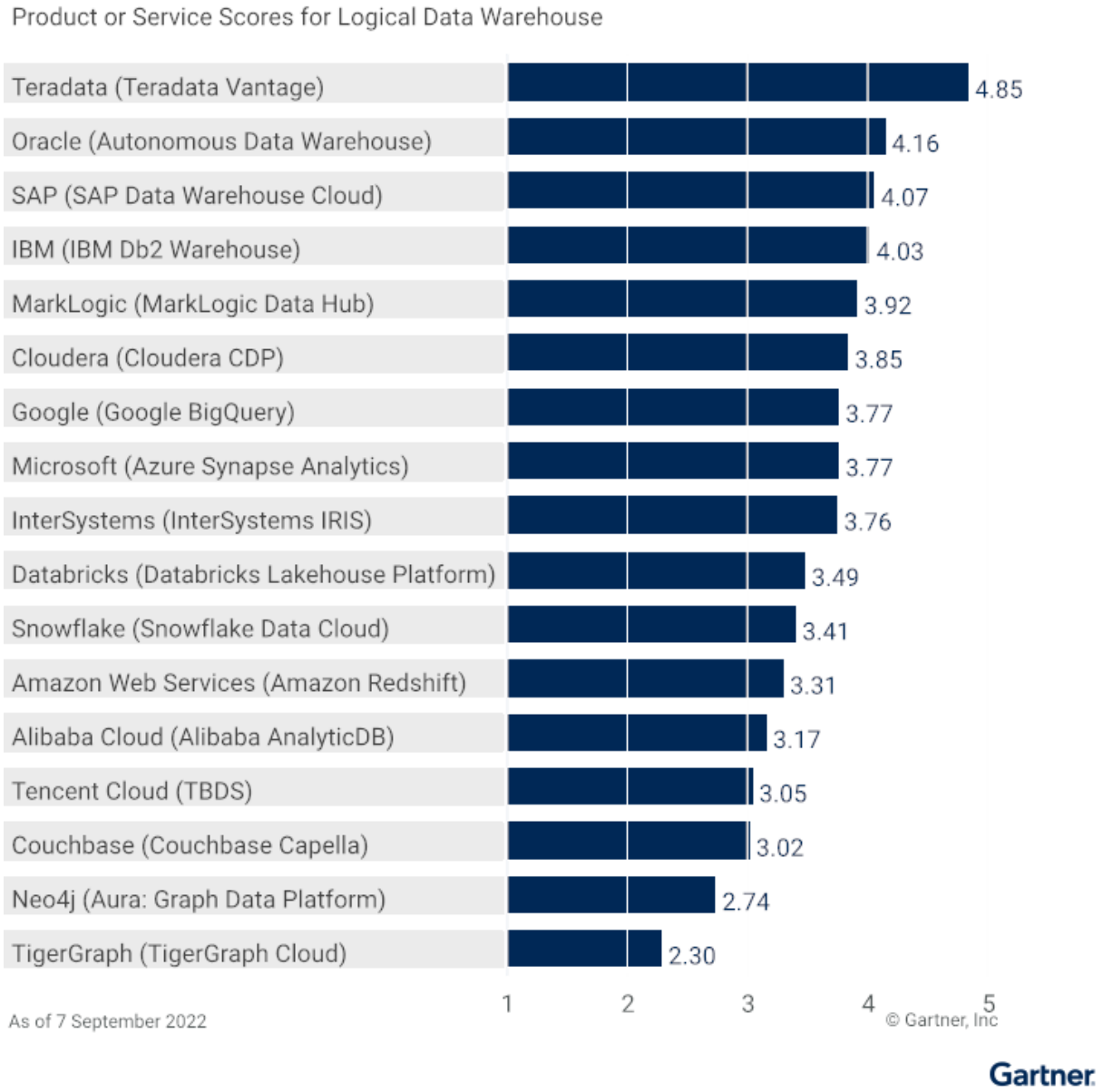
Analysis

Critical Capabilities Use-Case Graphics

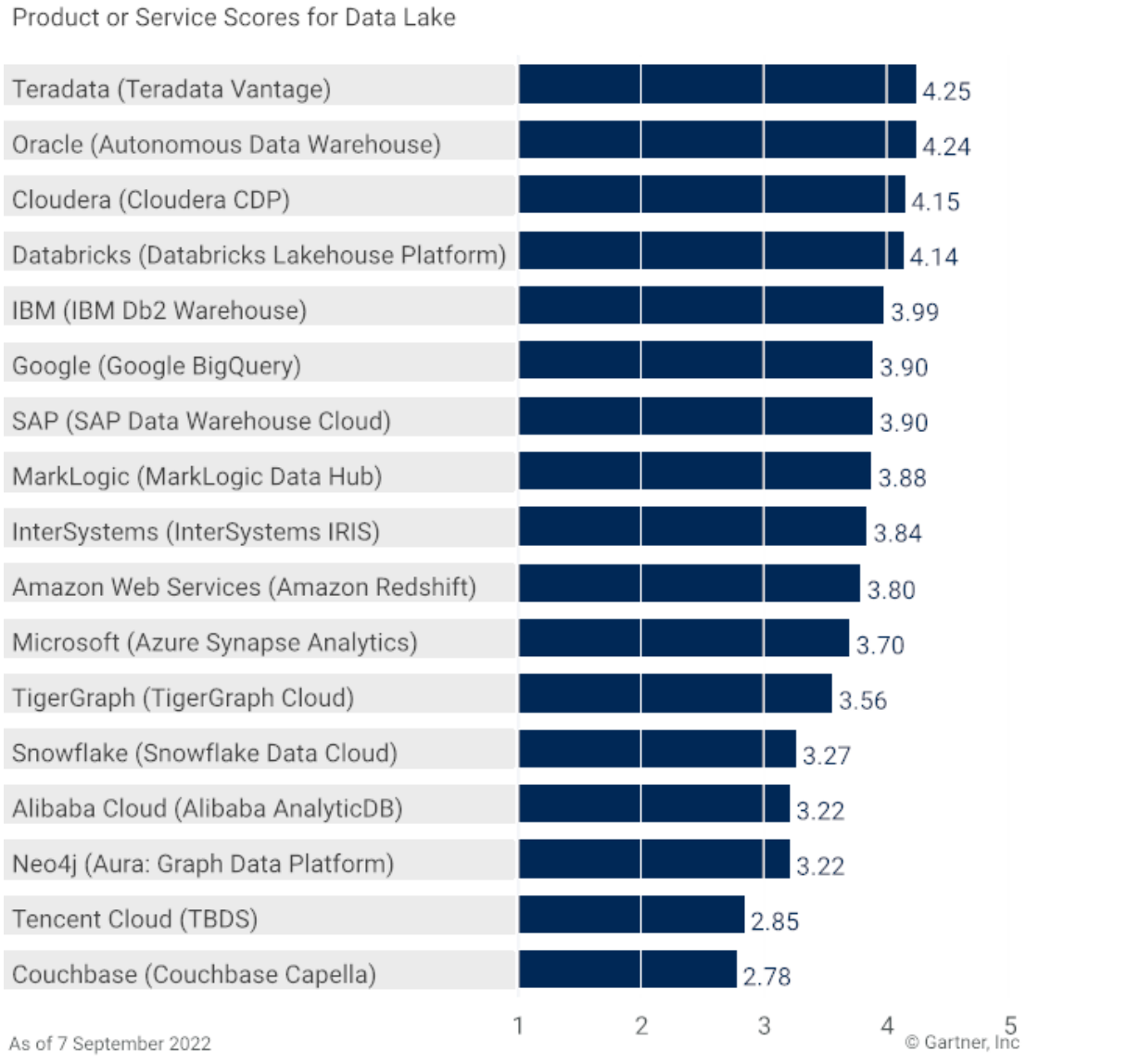
Vendors' Product Scores for Traditional Data Warehouse Use Case



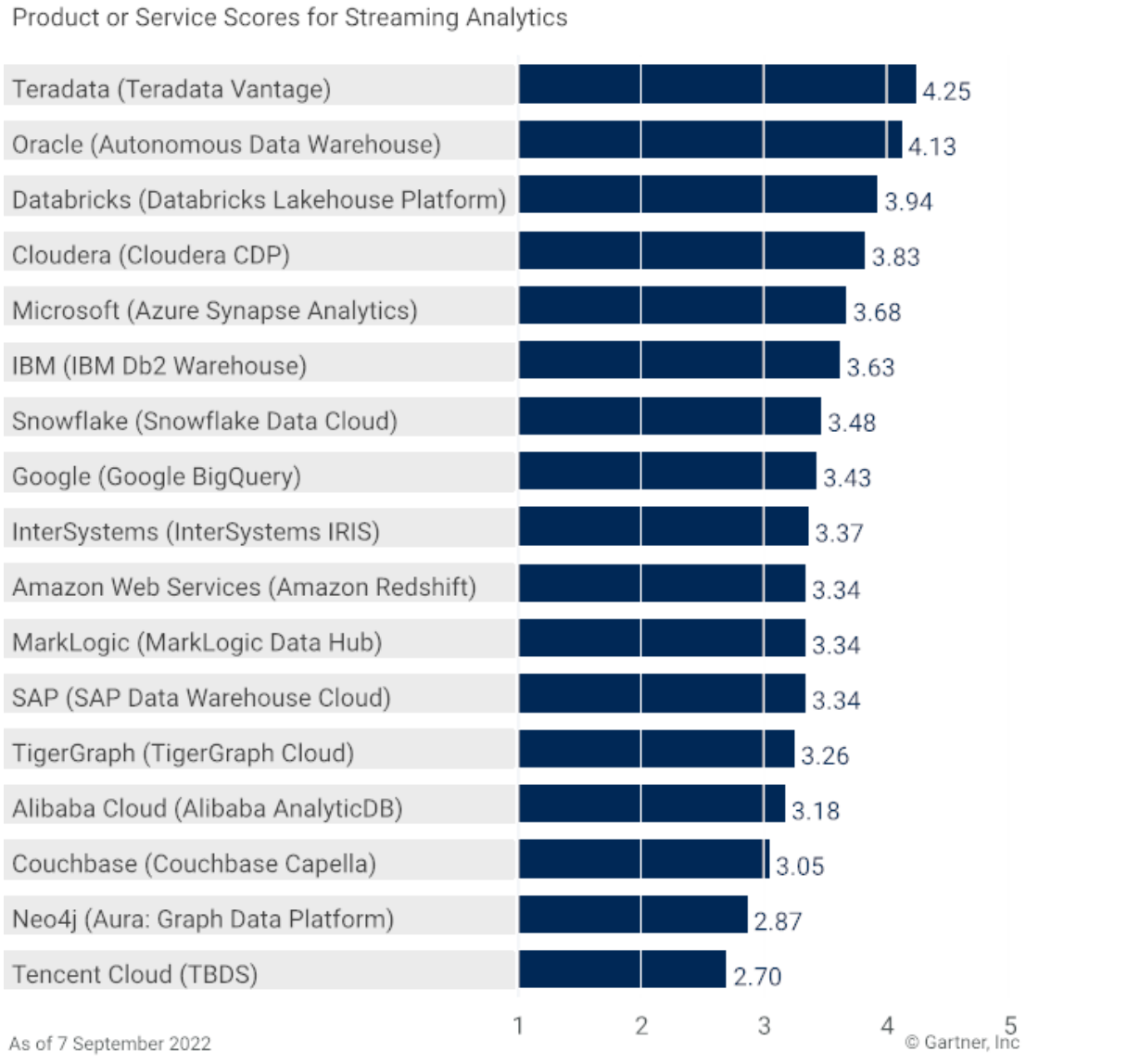
Vendors' Product Scores for Logical Data Warehouse Use Case



Vendors' Product Scores for the Data Lake Use Case



Vendors' Product Scores for Streaming Analytics Use Case



Vendors

Alibaba Cloud (Alibaba AnalyticDB)

Alibaba Cloud is the largest cloud service provider in China and Asia, and the fourth largest cloud service provider in the world by revenue. Its offerings are in use across a wide range of industries and different organization sizes.

Alibaba Cloud's DBMS offerings include PolarDB (compatible with MySQL, PostgreSQL, and Oracle) and PolarDB-X for operational use cases, AnalyticDB and MaxCompute for analytical use cases. It also provides Lindorm, GDB and Tair for nonrelational and real-time use cases. This research evaluates AnalyticDB.

AnalyticDB scores above 3.0, "meets requirements," for all four analytical use cases. Its highest rated use case is the traditional data warehouse use case, for which it shows a substantial improvement on last year's score, driven by innovation in core analytical capabilities like resource optimization and financial governance. Its scores for the data lake, logical data warehouse and streaming analytics use cases are similar to last year's.

AnalyticDB received above 3.0 for most capabilities. However, its score for multicloud/intercloud/hybrid is quite low due to its limited ecosystem compatibility with other CSPs and ISVs. AnalyticDB received scores of 3 for some capabilities, like multimodel support. Another product, Lindorm, is Alibaba's main DBMS service targeting this area.

Amazon Web Services (Amazon Redshift)

Amazon Web Services (AWS) offers a very wide variety of services for data management. These include, among others, Amazon Redshift for analytic workloads, Amazon Aurora for transactional workloads, Amazon DynamoDB for workloads appropriate to key value stores, and storage in Amazon Simple Storage (S3) for data lake use cases. Amazon Redshift was evaluated for this Critical Capabilities report.

Amazon Redshift scored over 3.0, "meets expectations," in all four use cases. Redshift scored best in the traditional data warehouse use case, which is the primary focus of this service. Redshift ranked in the middle for the other three use cases, largely because of its lack of a multicloud strategy and its less-than-optimal distributed capability to non-AWS data.

Amazon Redshift received its highest score for the performance features capability, with a score of 4.5. This rating stems in part from features like Advanced Query Accelerator (AQUA), which provides additional performance by moving processing to the storage layer, and Concurrency Scaling, which monitors work queues for read/write queries and runs them on other Amazon Redshift clusters.

Cloudera (Cloudera CDP)

Cloudera Data Platform (CDP) consists of multiple integrated cloud data services, including CDP Data Hub, CDP Data Warehouse, CDP Machine Learning, CDP Data Engineering, CDP DataFlow and CDP Operational Database. Cloudera Replication Manager is used to migrate workloads in hybrid and multicloud scenarios. Cloudera Shared Data Experience (SDX) provides hybrid, intercloud and multicloud unified security, governance and metadata management. CDP is available as an on-premises private cloud deployment and as a managed service on AWS, Microsoft Azure and Google Cloud Platform (GCP). Since these components are tightly integrated, we have evaluated the overall CDP offering.

CDP meets the requirements of all four analytical use cases. Its best score, for which it placed third among all solutions evaluated in this report, was for the data lake use case, owing to its roots in Apache Hadoop and surrounding technologies. Its strong support for and management of multiple streaming technologies also earned it a top four placement for the streaming analytics use case.

CDP ranked in the top third for logical data warehouse and in the middle of the rankings for traditional data warehouse. This reflects the vendor's relatively low level of historical focus on the optimization of relational data that forms the foundation of so many data warehouses. Out of the critical capabilities evaluated, its highest score was for the multicloud/intercloud/hybrid capability, where it leads in providing cross-platform policy enforcement and governance for multiple data types. The latter also helped earn it a leading score for multimodel support.

CDP scored its lowest marks in the relational attributes and financial governance capabilities. Since its acquisition by affiliates of Clayton, Dubilier & Rice and KKR in October 2021, the company has communicated its intent to continue to aggressively develop and mature its offerings.

Couchbase (Couchbase Capella)

Couchbase offers Couchbase Capella as a unified cloud offering for both operational and analytical use cases. Couchbase has developed its solution from a document database with in-memory capabilities to a broader offering in the cloud, which includes SQL support and an emphasis on edge and disconnected computing.

The main focus of Capella is operational workloads, especially those that require edge processing and potentially disconnected access. Because of this, Capella fell below a 3.0, "meets expectations," in two of the use cases. Capella did score above a 3.0 for the logical data warehouse and streaming analytics use cases. As stated above, a score below 3.0 does not mean that the product cannot be used for any of those use cases, but it may take more implementation effort to achieve results.

Couchbase Capella received a score of 2.0, "below expectations," for the data science capability, which is not a key focus area for the product. It received its highest score for multimodel support, which stems from its foundation as a document database.

Databricks (Databricks Lakehouse Platform)

Databricks offers the Databricks Lakehouse Platform, which combines the capabilities of a data lake with those of a relational data warehouse. The data warehouse aspects of the Lakehouse Platform are built on top of the data lake foundation.

The Databricks Lakehouse Platform scored highest for the data lake and streaming analytics use cases, for which it was ranked third and scored over 3.9.

The solution did not score as highly for the traditional data warehouse or logical data warehouse use cases, although it still scored well over 3.0, "meets expectations," for both. This lower ranking was, in part, due to the relative immaturity of the relational capabilities of the Lakehouse Platform and the Unity Catalog, which are expected to mature quickly.

The Lakehouse Platform received a score of 4.5 or higher for the stream optimization, data science and multimodel support critical capabilities. Databricks' high score for data science stems from its deep integration with Spark.

Google (Google BigQuery)

Google Cloud Platform (GCP) supports many database platform-as-a-service (dbPaaS) products, including fully managed versions of products from third-party providers, as well as the vendor's own dbPaaS products. These include AlloyDB, BigLake, Cloud SQL (PostgreSQL, MySQL and SQL Server), Cloud Spanner, Cloud Bigtable, BigQuery, Dataproc, Cloud Firestore and Google Firebase Real Time Database, with Dataplex as the data fabric.

Google BigQuery is the dbPaaS product evaluated here. Google BigQuery meets the requirements of all four use cases, and places in the upper half of all four use-case ratings. Google uses a serverless approach, which gives BigQuery customers more flexible pricing and resource fluidity and positions Google well for AI-driven optimization.

BigQuery Omni provides the capability to analyze data that resides on other cloud providers from the familiar Google control plane. Its performance in the analytical use cases was assisted by its very flexible and granular resource allocation. Google BigQuery scores well for the use cases for which integration and ease of use of data science are important.

IBM (IBM Db2 Warehouse)

IBM offerings coalesce around Cloud Pak for Data, a unified integration layer for containerized DBMS services built on Red Hat OpenShift and which runs a variety of services. This is in addition to other containerized and on-premises delivery modes. IBM Db2 Warehouse on Cloud is the product under evaluation for this research. It is highly code-compatible with other members of the Db2 family, both in the cloud and on-premises.

Db2 Data Warehouse on Cloud provides a wide range of data warehouse features, including a wide range of built in data science routines, distributed access to other databases and to data lakes. This includes the use of cloud object stores and open standards data formats, such as Parquet.

Db2 Data Warehouse on Cloud achieves a high score for the data warehouse and logical data warehouse use cases and provides above average capabilities for streaming and data lake. As would be expected for a system with such a long pedigree, the breadth of functions available place Db2 Data Warehouse cloud well for these fundamental analytical use cases.

The legacy of decades of Db2 development has led the offering to high scores for the resource usage, relational attributes and operational reporting capabilities.

InterSystems (InterSystems IRIS)

InterSystems offers InterSystems IRIS, a mature multimodel hybrid DBMS built atop an object-oriented foundation. InterSystems has a global presence, primarily in healthcare, but increasingly in other industries such as financial services and supply chain. InterSystems IRIS is available as a public, fully managed dbPaaS cloud service on Amazon Web Services, Google Cloud Platform, Microsoft Azure and Tencent. A private fully managed dbPaaS version is also available.

InterSystems IRIS meets the requirements of all four analytical use cases. It ranks just below the middle for all analytical use cases except streaming analytics, for which it ranks in the bottom quarter. It scored highest for the financial governance, multimodel support, distributed capabilities, operational intelligence, data science and multicloud/intercloud/hybrid critical capabilities.

InterSystems IRIS received its lowest capability scores for stream optimization, analytics and analytics on streaming data in this year's rankings, but still received a 3.0, "meets expectations," in these categories.

MarkLogic (MarkLogic Data Hub)

MarkLogic offers the MarkLogic Data Hub product. The focus of this product is, and has been, as much on data integration as on more standard analytical use cases. MarkLogic utilizes its universal index to provide optimized access to data on other platforms, and combines this with its transactional multimodel data platform background and emphasis on metadata usage and analysis.

Based on its strongly integrated approach to distributed data, the MarkLogic Data Hub did best in the logical data warehouse use case, placing fifth in the rankings with a score of 3.92. MarkLogic placed in the middle of the rankings for the other three use cases, traditional data warehouse, data lake and streaming analytics, while still scoring well over a 3.0, "meets expectations."

Of the evaluated critical capabilities, MarkLogic Data Hub received its highest scores for distributed capabilities and multimodel support, with a 4.5 in each. MarkLogic also has an innovative pricing model that provides an accumulation of credits to be applied when bursts of computing are needed, which enabled it to receive a high score for financial governance.

Microsoft (Azure Synapse Analytics)

Microsoft is a leading CSP with customers spread across a wide range of industries and deployment sizes worldwide. It offers a broad range of cloud DBMS offerings, including Azure Synapse Analytics, Azure SQL Database, Azure SQL Managed Instance, Azure SQL Edge, Azure Cosmos DB, Azure HDInsight, Azure Database for PostgreSQL, MySQL and MariaDB, and Dataverse. Azure Synapse Analytics is evaluated here.

Microsoft Azure Synapse Analytics meets the requirements of all four use cases, and is in the upper half of reviewed products for three of the four. Several vendors have caught up to Microsoft in the data science and multimodel capabilities, pushing it into the lower quarter of reviews for the data lake use case. Other parts of Microsoft's product family have received significant attention for those capabilities, but are not reviewed here.

Among the critical capabilities evaluated in this report, Azure Synapse Analytics received its highest scores for application development support, analytics, resource management and financial governance. Its management and administration capabilities were also rated highly, with the introduction of Microsoft Purview for governance being a key reason, although its lack of support for Microsoft's own Dataverse offering is a concern.

Also notable is the low score the solution received for multicloud/intercloud/hybrid, as Azure Synapse Analytics is not available on any other platforms.

Neo4j (Aura: Graph Data Platform)

Neo4j offers the Neo4j Graph Database and Neo4j Graph Data Science Library for integrated AI/ML. The Professional tier of the managed service AuraDB, available on AWS and GCP and evaluated here, was introduced in January 2021.

Neo4j AuraDB meets the requirements for the data lakes use case, but not for the others evaluated in this report. Graph DBMS are more broadly used for graph analytics uses than for data warehouses, although they are often used to supplement the latter by customers who have become familiar with general purpose DBMS' limitations for those purposes.

AuraDB scores high marks for its application development capability, as Neo4j has created innovative tools for the creation of databases that are modeled and built quite differently from other DBMS categories. Its data science score is also high, reflecting an extensive library of algorithms that are highly suitable for evaluating numerous typical graph-related cases.

AuraDB's Professional tier is relatively new to the cloud, and as with other vendors' cloud offerings, this is reflected in its scores for the resource usage and management and administration capabilities, areas that are likely to see improvement in future releases. Challenges with integrating streaming technologies such as Kafka drive one of its lower capability scores. Neo4j now supports Apache Arrow to push streaming data straight into memory for higher performance.

Oracle (Autonomous Data Warehouse)

Oracle's cloud product, the Autonomous Database, is available in different services for different use cases. The Autonomous Data Warehouse (ADW) was evaluated for this report. The Autonomous Data Warehouse takes the productivity provided by the cloud to the level of automatic performance tuning.

Oracle has been one the strongest database offerings for decades, and continues to do well in this year's research. It placed second in all four use cases, and Oracle Autonomous Database had a score over 4.0 for all use cases in this report.

Oracle received the highest possible score of 5.0 for the performance features capability, and a score of 4.5 or above for relational attributes, multimodel support, management and administration, analytics and operational intelligence. Its lowest score, 3.3, was for the multicloud/intercloud/hybrid capability. Oracle Autonomous Warehouse only runs on Oracle's cloud, but seamless and low-latency integration with Microsoft Azure is available at this time. Oracle is a leading on-premises provider of DBMS products, and offers its fully managed cloud service in a private cloud, Cloud@Customer.

SAP (SAP Data Warehouse Cloud)

SAP products include SAP HANA Cloud, SAP Data Warehouse Cloud (DWC), SAP Adaptive Server Enterprise, SAP IQ and SAP SQL Anywhere. The vendor's products address both operational and analytical DBMS use cases. SAP DWC is the product evaluated here.

SAP Data Warehouse cloud provides a wide range of modern features. These include distributed access and the concept of "Spaces," which can be thought of as physical or virtual data marts. Business functionality is also provided, with comprehensive integration into the wider SAP and non-SAP ecosystems. SAP Data Warehouse Cloud Spaces provide support for both IT and business metadata, enabling each constituency to use the language that is most appropriate, while also collaborating with each other. Toward the end of 2021, SAP added the ability for SAP Business Warehouse data to appear as a Space within SAP DWC, thus simplifying the integration of SAP data.

SAP DWC scores higher than a 3.0, “meets requirements,” for all use cases. It places in the top three solutions for the logical data warehouse use case due to its interconnectivity with SAP and non-SAP data using the SAP HANA Smart Data Access feature and the wide diversity of deployment options. SAP DWC scored lower for streaming analytics, although it did meet the requirements for this use case.

Snowflake (Snowflake Data Cloud)

Snowflake provides Snowflake Data Cloud as an offering in the data warehouse and analytics market. It is a multicloud platform that offers dynamic elasticity and data sharing, and can be used to share both data and functions upon the data. It also incorporates the vendor’s Snowpark data science features.

Snowflake Data Cloud meets the requirements of all four use cases. It places in the top half among vendors evaluated in this report for the traditional data warehouse use case, as would be expected given its success in the market. In particular, its ease of use and elasticity contributed to its score. The dynamic elasticity of the system remains a strength, and is often named as such by Snowflake customers.

Snowflake scored above a 3.0, “meets requirements,” for the logical data warehouse use case. A Snowflake-centric approach has tended to emphasize putting all your data in Snowflake and using it for both data warehouse and data lake, although it does support external tables and materialized views built upon them.

Snowflake did not score as highly for those use cases where data science analytics figures strongly, as this research is assessed based on functionality that was generally available as of 1 July 2022. The Snowpark data science features were generally available on that date, with language support for Java and Scala. However, support for Python, one of the most in-demand data science languages, was in preview but not yet generally available. When evaluating vendors, check the current availability of that feature.

Tencent Cloud (TBDS)

Tencent Cloud is a leading cloud service provider based in China. Its product portfolio spans infrastructure, software platforms, DBMS and AI. Its DBMS business covers a wide range of industries, including finance, retail and gaming. Its solutions have been adopted by organizations of all sizes, but mostly based in China.

Tencent Cloud's analytical DBMS offering is Tencent Big Data Suite (TBDS), a one-stop cloud analytical DBMS solution focused on the data warehouse and data lake use cases. Its DBMS product family also includes nonrelational products like KeeWiDB for KV store, CTSDB for Time Series and KonisGraph for Graph. For the purposes of this research, TBDS is evaluated for analytical use cases.

TBDS scores at or above a 3.0, "meets requirements," for the traditional data warehouse and logical data warehouse use cases, at which it is explicitly targeted. For all use cases, TBDS has received higher scores in this year's iteration of this report than it received in 2020. However, the bulk of its deployments are still in the private cloud, which contributes to its incomplete public cloud capabilities. In addition, TBDS enjoys only limited market recognition as a comprehensive and proprietary analytical DBMS solution, which contributes to its overall low ratings.

Teradata (Teradata Vantage)

Teradata provides Teradata Vantage which addresses all four analytical DBMS use cases. Relative to the other solutions evaluated in this report, Teradata Vantage places at the top for all four use cases. Teradata has appeared at the top of data warehouse evaluations for over 30 years, as might be expected for a product that has been consistently evolving for over 40 years.

For the traditional data warehouse use case, Teradata's top score reflects its rich analytical functionality, including a wider range of inbuilt analytical techniques such as a well-stocked data science library. Its operational robustness also contributed, reflecting the vendor's traditional strength in workload management. Teradata Vantage can run mixed workloads of operational style queries, as well as heavy analytical workloads, and can do so reliably at high scaling factors.

For the logical data warehouse and data lake use cases, Teradata's scores are supported by its strong distributed access, data sharing and data placement features. This positions Teradata well as an enabling hub for multiple analytical systems, rather than just Teradata itself, and reflects the vendor's open and customer-centric approach to analytics. It offers the capability to decide which analytical system should be chosen to run a particular analytical task.

TigerGraph (TigerGraph Cloud)

TigerGraph offers graph DBMS solutions and applications. Its clients mainly come from the retail, finance and manufacturing verticals. It has a broad geographical market presence, covering not only North America and Europe, but also the Asia/Pacific region, including China, India and Southeast Asia.

TigerGraph's dbPaaS solution is TigerGraph Cloud, a graph-native DBMS available on the AWS, Microsoft Azure and GCP marketplaces. It covers both operational and analytical workloads. Its analytical use cases and capabilities are evaluated in this research.

TigerGraph Cloud scored above 3.5 for the data lake use case, mainly due to its strong ML capabilities and built-in graph data science library and algorithms. TigerGraph Cloud also scored well for the streaming analytics use case, based on its support for analytics on streaming data. It scored below 3.0 for the remaining two use cases, traditional data warehouse and logical data warehouse, reflecting its niche use-case coverage compared to mainstream analytical DBMS vendors.

One of TigerGraph Cloud's highest capability scores was 4.0 for data science for the reasons mentioned above. It also received good scores for application development support, multimodel support and analytics on streaming data.

Context

The market for cloud DBMSs for analytical workloads has matured, with vendors that were late in moving to the cloud having now become fully cloud-enabled. The market includes offerings from major CSPs, traditional analytical offerings from the on-premises world, newer services developed specifically for the cloud and a variety of more specialized products that address a smaller range of use cases. Clients should be cognizant of the full range of capabilities and functionality they need, as the products in this research have maturity varying from a few years to many decades.

In addition, there is a tendency for cloud vendors to offer multiple services for analytics. This best-engineered approach has become the dominant strain in the cloud, since one of the great disadvantages of multiple products was the multiplied overhead to keep them all running. Since cloud vendors do most of this administrative work, the best-engineered approach carries less of a downside than on-premises.

This approach also means that many of the vendors in this research offer additional products that can be used to supplement their capabilities, and that are well integrated with the products covered here.

Whenever selecting an offering, you should be well aware of the scope of the use cases you are looking to address, both within your organization's individual system and the wider data ecosystem.

Product/Service Class Definition

Cloud DBMS for analytical use cases include the following types of system:

- Relational DBMS (RDBMS)
- Nonrelational DBMS
- Key-value databases, including, but not limited to, those included with Hadoop/Spark distributions

Critical Capabilities Definition

During the research process for the companion Magic Quadrant, we relied on ongoing briefings from the vendors selected, an RFI issued in relation to specific features relevant to this research, and information collected in the course of ongoing interactions with Gartner clients.

Analytics

The product's ability to perform advanced analytic operations within the dbPaaS. It is evaluated on the basis of what functionality is offered in the current version of the product, and what functionality is being used by customers.

Analytics on Streaming Data

Analytical capabilities specifically tied to stream data, including windowing analytics, analytics on in-flight data, joins to static data and support for streaming standards, among others.

Stream Optimization

The ability to optimize the capture, ingestion and analysis of stream data.

Operational Intelligence

The ability to handle large numbers of concurrent users running fixed short analytical queries while still providing appropriate performance SLAs for operational workloads.

Data Science

The ability to build, train and deploy models in the DBMS, the inclusion of a data science workbench, the ability to implement a smooth flow of model development and deployment, support for feature stores and other capabilities relevant to the exercise of data science workloads.

Multicloud/Intercloud/Hybrid

The ability to deploy and operate analytical activities across multiple cloud environments and on-premises.

Multicloud means the ability to operate on multiple cloud platforms, intercloud means the ability to use data across multiple clouds as a single logical entity, and hybrid means the ability to run on-premises and in clouds.

Distributed Capabilities

The ability to access data outside the internal storage of a DBMS and optimize distributed access by a variety of methods, such as push-down, extended metadata, statistics collection and a distributed catalog, among others.

This category also covers the ability to carry out distributed transactions.

Financial Governance

The ability to forecast, budget usage, monitor and control costs by throttling, workload or user prioritization or other means.

It can include governing types and numbers of resources used, and recommending and implementing less costly storage strategies. Tools for modeling costs and blended pricing models facilitate this capability.

Application Development Support

The ability to support multiple application languages and their APIs, the ability to support stored procedures and UDFs, and the ability to implement constraints, among other features.

Performance Features

This capability includes optimization, statistics collection, the ability to use static and dynamic plans, partitioning, partition elimination and storage tiering for performance and materialized views, among other features.

Relational Attributes

The ability to support complex relational operations involving many tables.

Multimodel Support

The ability to support different storage and logical models within the DBMS, such as JSON data and external tables, efficiently and with performance optimization, as well as additional capabilities such as temporal, time series, geospatial and graph, among others.

Management and Administration

The ability to manage instances and resources, monitor operations, track and implement security, high availability and disaster recovery, and to do these and other tasks at enterprise scale.

Resource Usage

The ability to automatically handle different types and sizes of workload simultaneously while enforcing or dynamically extending policy-based resource limits, handle varying and conflicting workloads while optimizing response times and prioritize workloads to meet policy-defined service levels.

This capability also includes the ability to elastically scale resources dynamically.

Use Cases

Traditional Data Warehouse

Managing structured historical data from multiple sources in a single DBMS instance.

Data is structured to make it flexibly available to a wide variety of use cases and support high performance.

Logical Data Warehouse

Managing data variety and volume for structured and other content data types, acting as a logical tier to a variety of data sources, both internal and external.

Data is distributed across multiple platforms and/or repositories.

Data Lake

Storage and processing of data of all different structures. Includes data engineering, data science and other use cases, at scale.

Streaming Analytics

Analyzing streaming data as it enters the system. Data may be transformed, analyzed, stored or discarded.

Vendors Added and Dropped

Added

The following vendors have been added to this year's Critical Capabilities for Cloud Database Management Systems for Analytical Use Cases that were not in last year's research:

- Neo4J
- Tencent
- Tigergraph

Dropped

The following vendors have been dropped from this year's Critical Capabilities for Cloud Database Management Systems for Analytical Use Cases, having been included in last year's research:

- Exasol
- Huawei
- MariaDB
- SingleStore

Inclusion Criteria

For Gartner clients, Critical Capabilities research identifies and then analyzes the most relevant providers and their products in a market.

The inclusion criteria represent the specific attributes that analysts believe are necessary for inclusion in this research.

To qualify for inclusion in this Critical Capabilities report, vendors had to meet the following criteria:

- Offer a generally available software product that met Gartner's definition of a Cloud DBMS.
  - Support more than one of the following cloud DBMS use cases:
  - Traditional data warehouse
  - Logical data warehouse
  - Data lake
  - Streaming analytics
- Rank among the top organizations in a market momentum index defined by Gartner for this Critical Capabilities report. Data inputs used to calculate market momentum include the following measures, amongst others:
  - Gartner customer search and inquiry volume and trend data.
  - Volume of job listings on a range of employment websites in the U.S., Europe and China.
  - Frequency of mentions as a competitor to other Cloud DBMS vendors in reviews on Gartner's Peer Insights forum during the year ending March 2022.
- Have a market presence in at least three of the following regions (regional market presence is defined as the existence of dedicated sales offices or distribution partnerships in a specific region) and a minimum of 5% of the cloud revenue.
  - North America (Canada, Mexico and the U.S.)
  - Central and South America
  - Europe (including Western Europe and Eastern Europe)
  - Middle East and Africa (including North Africa)
  - Asia/Pacific
  - Japan

- Have a cloud DBMS service generally available as of midnight, U.S. Eastern Daylight Time on 1 July 2022. This includes any new functionality added to the service(s) by the specified date. We did not consider beta, "early access," "technology preview," or other not generally available functionality or services. Additionally:
  - Any acquired product or service must have been acquired and offered by the acquiring vendor as of 1 July 2022. Acquisitions after this date were considered under their pre-acquisition identities, if appropriate, and are represented separately until the publication of the following year's Critical Capabilities report.

Note that analysts may need to update the inclusion criteria as they progress through the research process. You will be explicitly notified of the change(s) should they happen.

Critical Capabilities Exclusion Criteria

Vendors marketing only products from the list below are explicitly excluded from this Critical Capabilities research:

- Streaming services whose use cases are dominated by immediate event processing, and which are rarely (if ever) used for subsequent management of the data involved.
- Prerelational DBMS products.
- Object-oriented DBMS products.
- Data grid products.
- BI and analytical solutions that offer a cloud DBMS that is limited specifically to the vendor's own BI and analytical tools.
- Analytics query accelerators (SQL interfaces to object stores or file systems).
- Vendors of data virtualization, data fabric and data federation that do not provide data persistence of their own.

These exclusion criteria match those applied in the Magic Quadrant for Cloud Database Management Systems.

Table 1: Weighting for Critical Capabilities in Use Cases

(Enlarged table in Appendix)

Critical Capabilities	Traditional Data Warehouse	Logical Data Warehouse	Data Lake	Streaming Analytics
Financial Governance	15%	10%	10%	5%
Application Development Support	5%	5%	10%	10%
Performance Features	10%	0%	5%	0%
Relational Attributes	15%	10%	0%	0%
Multimodel Support	0%	0%	20%	5%
Management and Administration	10%	10%	5%	15%
Distributed Capabilities	0%	40%	0%	0%
Resource Usage	20%	5%	0%	5%
Analytics	10%	10%	10%	5%
Analytics on Streaming Data	0%	0%	0%	25%
Stream Optimization	0%	0%	0%	25%
Operational Intelligence	10%	0%	0%	0%
Data Science	0%	0%	35%	0%
Multicloud/Intercloud/ Hybrid	5%	10%	5%	5%
As of 7 September 2022				

Source: Gartner (December 2022)

This methodology requires analysts to identify the critical capabilities for a class of products/services. Each capability is then weighted in terms of its relative importance for specific product/service use cases.

Each of the products/services that meet our inclusion criteria has been evaluated on the critical capabilities on a scale from 1.0 to 5.0.

Critical Capabilities Rating

Table 2: Product/Service Rating on Critical Capabilities

(Enlarged table in Appendix)

Critical Capabilities	Alibaba Cloud (Alibaba AnalyticDB)	Amazon Web Services (Amazon Redshift)	Cloudera (Cloudera CDP)	Couchbase (Couchbase Capella)	Databricks (Databricks Lakehouse Platform)	Google (Google BigQuery)	IBM (IBM Db2 Warehouse)	InterSystems (InterSystems IRIS)	MarkLogic (MarkLogic Data Hub)	Microsoft (Azure Synapse Analytics)	Neo4j (Aura: Graph Data Platform)	Oracle (Autonomous Data Warehouse)	SAP (SAP Data Warehouse Cloud)	Snowflake (Snowflake Data Cloud)	Tencent Cloud (TBDS)	Teradata (Teradata Vantage)	TigerGraph (TigerGraph Cloud)
Financial Governance	3.5	4.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.5	3.0	3.0	3.0	4.5	3.0
Application Development Support	4.0	4.0	3.5	3.0	4.0	3.5	4.0	3.5	3.5	4.0	4.0	4.0	4.0	3.5	3.0	4.0	4.0
Performance Features	4.0	4.5	3.5	3.0	3.5	3.5	4.3	3.7	3.5	3.5	3.0	5.0	4.0	3.5	3.0	4.5	2.0
Relational Attributes	3.7	3.7	3.0	2.5	3.0	3.5	4.5	3.1	2.8	3.4	3.0	4.7	4.5	4.3	3.0	5.0	3.0
Multimodel Support	3.0	3.5	4.5	4.0	4.5	3.5	4.0	4.0	4.5	4.0	2.0	4.5	4.0	4.0	3.0	4.0	3.5
Management and Administration	3.5	4.0	4.0	2.5	3.0	3.5	4.0	4.0	3.5	4.0	2.0	4.5	3.5	4.0	3.5	4.5	3.0
Distributed Capabilities	3.0	3.0	4.0	3.5	3.5	4.0	4.0	4.0	4.5	4.0	2.5	4.0	4.5	3.0	3.0	5.0	1.0
Resource Usage	3.3	3.9	3.5	2.4	3.7	4.1	4.5	3.4	3.2	4.5	2.0	4.2	3.0	4.0	3.0	4.9	2.5
Analytics	3.5	4.0	4.0	2.5	4.0	3.5	4.0	3.0	3.5	4.0	3.0	4.5	4.2	3.0	3.0	5.0	3.5
Analytics on Streaming Data	3.0	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	3.0	3.0	2.5	4.0	4.0
Stream Optimization	3.0	3.0	3.5	3.5	4.5	3.5	3.5	3.0	3.0	3.0	2.0	4.0	3.0	3.5	2.0	4.0	2.5
Operational Intelligence	3.0	4.0	3.5	3.0	3.0	3.0	4.5	4.0	3.5	4.0	3.0	4.5	3.5	3.0	2.5	4.5	3.5
Data Science	3.0	4.0	4.5	2.0	4.6	4.5	4.0	4.0	3.8	3.5	4.0	4.0	4.0	2.7	2.5	4.0	4.0
Multicloud/Intercloud/Hybrid	1.8	1.4	5.0	3.0	4.0	3.4	3.5	4.0	4.0	2.0	3.4	3.3	4.0	4.0	3.0	5.0	3.2

As of 7 September 2022

Source: Gartner (December 2022)

Table 3 shows the product/service scores for each use case. The scores, which are generated by multiplying the use-case weightings by the product/service ratings, summarize how well the critical capabilities are met for each use case.

Table 3: Product Score in Use Cases

(Enlarged table in Appendix)

Use Cases	Alibaba Cloud (Alibaba AnalyticDB)	Amazon Web Services (Amazon Redshift)	Cloudera (Cloudera CDP)	Couchbase (Couchbase Capella)	Databricks (Databricks Lakehouse Platform)	Google (Google BigQuery)	IBM (IBM Db2 Warehouse)	InterSystems (InterSystems IRIS)	MarkLogic (MarkLogic Data Hub)	Microsoft (Azure Synapse Analytics)	Neo4j (Aura: Graph Data Platform)	Oracle (Autonomous Data Warehouse)	SAP (SAP Data Warehouse Cloud)	Snowflake (Snowflake Data Cloud)	Tencent Cloud (TBDS)	Teradata (Teradata Vantage)	TigerGraph (TigerGraph Cloud)
Traditional Data Warehouse	3.43	3.86	3.53	2.71	3.39	3.64	4.23	3.59	3.44	3.86	2.77	4.44	3.65	3.62	3.00	4.71	2.96
Logical Data Warehouse	3.17	3.31	3.85	3.02	3.49	3.77	4.03	3.76	3.92	3.77	2.74	4.16	4.07	3.41	3.05	4.85	2.30
Data Lake	3.22	3.80	4.15	2.78	4.14	3.90	3.99	3.84	3.88	3.70	3.22	4.24	3.90	3.27	2.85	4.25	3.56
Streaming Analytics	3.18	3.34	3.83	3.05	3.94	3.43	3.63	3.37	3.34	3.68	2.87	4.13	3.34	3.48	2.70	4.25	3.26
As of 7 September 2022																	

Source: Gartner (December 2022)

To determine an overall score for each product/service in the use cases, multiply the ratings in Table 2 by the weightings shown in Table 1.

Acronym Key and Glossary Terms

AI	artificial intelligence
AWS	Amazon Web Services
CSP	cloud service provider
dbPaaS	database platform as a service
DBMS	database management system
GCP	Google Cloud Platform
HR	human resources
IoT	Internet of Things
ISV	independent software vendor
KV store	key-value store
LDW	logical data warehouse
ML	machine learning
MPP	massively parallel processing
MQTT	message queue telemetry support
OLTP	online transaction processing
SLA	service-level agreement
UDF	user-defined function

Evidence

Our analysis in this Critical Capabilities research is based on information gathered from interactions with Gartner clients during the 12 months leading up to June 2022.

We also took account of:

- Earlier information and any news about vendors' products, customers and finances that came to light during the time frame for our analysis.

- The findings in:
  - Market Share: All Software Markets, Worldwide, 2020
  - Market Share: Enterprise Platform as a Service, Worldwide, 2020
  - Gartner Peer Insights

Critical Capabilities Methodology

This methodology requires analysts to identify the critical capabilities for a class of products or services. Each capability is then weighted in terms of its relative importance for specific product or service use cases. Next, products/services are rated in terms of how well they achieve each of the critical capabilities. A score that summarizes how well they meet the critical capabilities for each use case is then calculated for each product/service.

"Critical capabilities" are attributes that differentiate products/services in a class in terms of their quality and performance. Gartner recommends that users consider the set of critical capabilities as some of the most important criteria for acquisition decisions.

In defining the product/service category for evaluation, the analyst first identifies the leading uses for the products/services in this market. What needs are end-users looking to fulfill, when considering products/services in this market? Use cases should match common client deployment scenarios. These distinct client scenarios define the Use Cases.

The analyst then identifies the critical capabilities. These capabilities are generalized groups of features commonly required by this class of products/services. Each capability is assigned a level of importance in fulfilling that particular need; some sets of features are more important than others, depending on the use case being evaluated.

Each vendor's product or service is evaluated in terms of how well it delivers each capability, on a five-point scale. These ratings are displayed side-by-side for all vendors, allowing easy comparisons between the different sets of features.

Ratings and summary scores range from 1.0 to 5.0:

1 = Poor or Absent: most or all defined requirements for a capability are not achieved

2 = Fair: some requirements are not achieved

3 = Good: meets requirements

4 = Excellent: meets or exceeds some requirements

5 = Outstanding: significantly exceeds requirements

To determine an overall score for each product in the use cases, the product ratings are multiplied by the weightings to come up with the product score in use cases.

The critical capabilities Gartner has selected do not represent all capabilities for any product; therefore, may not represent those most important for a specific use situation or business objective. Clients should use a critical capabilities analysis as one of several sources of input about a product before making a product/service decision.

Document Revision History

Critical Capabilities for Cloud Database Management Systems for Analytical Use Cases - 14 December 2021

Critical Capabilities for Cloud Database Management Systems for Analytical Use Cases - 7 September 2021

Recommended by the Authors

Some documents may not be available as part of your current Gartner subscription.

How Products and Services Are Evaluated in Gartner Critical Capabilities

Magic Quadrant for Cloud Database Management Systems

Critical Capabilities for Cloud Database Management Systems for Operational Use Cases

The Future of the DBMS Market Is Cloud

There Is Only One DBMS Market

Solution Comparison for Cloud Data Warehouse Platforms

How to Plan for Optimal Multicloud and Intercloud Data Management

The Impacts of Emerging Cloud Data Ecosystems: An Architectural Perspective

Overcome Economic Uncertainty Through Financial Governance of Your Cloud Data Management Environment

The Practical Logical Data Warehouse

Table 1: Weighting for Critical Capabilities in Use Cases

Critical Capabilities	*Traditional Data Warehouse*	*Logical Data Warehouse*	*Data Lake*	*Streaming Analytics*
Financial Governance	15%	10%	10%	5%
Application Development Support	5%	5%	10%	10%
Performance Features	10%	0%	5%	0%
Relational Attributes	15%	10%	0%	0%
Multimodel Support	0%	0%	20%	5%
Management and Administration	10%	10%	5%	15%
Distributed Capabilities	0%	40%	0%	0%
Resource Usage	20%	5%	0%	5%
Analytics	10%	10%	10%	5%
Analytics on Streaming Data	0%	0%	0%	25%
Stream Optimization	0%	0%	0%	25%
Operational Intelligence	10%	0%	0%	0%
Data Science	0%	0%	35%	0%

Critical Capabilities	*Traditional Data Warehouse*	*Logical Data Warehouse*	*Data Lake*	*Streaming Analytics*
Multicloud/Intercloud/Hybrid	5%	10%	5%	5%
As of 7 September 2022				

Source: Gartner (December 2022)

Table 2: Product/Service Rating on Critical Capabilities

Critical Capabilities	*Alibaba Cloud (Alibaba AnalyticDB)*	*Amazon Web Services (Amazon Redshift)*	*Cloudera (Cloudera CDP)*	*Couchbase (Couchbase Capella)*	*Databricks (Databricks Lakehouse Platform)*	*Google (Google BigQuery)*	*IBM (IBM Db2 Warehouse)*	*InterSystems (InterSystems IRIS)*	*MarkLogic (MarkLogic Data Hub)*	*Microsoft (Azure Synapse Analytics)*	*Neo4j (Aura: Graph Data Platform)*	*Oracle (Autonomous Data Warehouse)*	*SAP (SAP Data Warehouse Cloud)*	*Snowflake (Snowflake Data Cloud)*	*Tencent Cloud (TBDS)*	*Teradata (Teradata Vantage)*	*TigerGraph (TigerGraph Cloud)*
Financial Governance	3.5	4.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.5	3.0	3.0	3.0	4.5	3.0
Application Development Support	4.0	4.0	3.5	3.0	4.0	3.5	4.0	3.5	3.5	4.0	4.0	4.0	4.0	3.5	3.0	4.0	4.0
Performance Features	4.0	4.5	3.5	3.0	3.5	3.5	4.3	3.7	3.5	3.5	3.0	5.0	4.0	3.5	3.0	4.5	2.0

Relational Attributes	3.7	3.7	3.0	2.5	3.0	3.5	4.5	3.1	2.8	3.4	3.0	4.7	4.5	4.3	3.0	5.0	3.0
Multimodel Support	3.0	3.5	4.5	4.0	4.5	3.5	4.0	4.0	4.5	4.0	2.0	4.5	4.0	4.0	3.0	4.0	3.5
Management and Administration	3.5	4.0	4.0	2.5	3.0	3.5	4.0	4.0	3.5	4.0	2.0	4.5	3.5	4.0	3.5	4.5	3.0
Distributed Capabilities	3.0	3.0	4.0	3.5	3.5	4.0	4.0	4.0	4.5	4.0	2.5	4.0	4.5	3.0	3.0	5.0	1.0
Resource Usage	3.3	3.9	3.5	2.4	3.7	4.1	4.5	3.4	3.2	4.5	2.0	4.2	3.0	4.0	3.0	4.9	2.5
Analytics	3.5	4.0	4.0	2.5	4.0	3.5	4.0	3.0	3.5	4.0	3.0	4.5	4.2	3.0	3.0	5.0	3.5
Analytics on Streaming Data	3.0	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	3.0	3.0	2.5	4.0	4.0
Stream Optimization	3.0	3.0	3.5	3.5	4.5	3.5	3.5	3.0	3.0	3.0	2.0	4.0	3.0	3.5	2.0	4.0	2.5
Operational Intelligence	3.0	4.0	3.5	3.0	3.0	3.0	4.5	4.0	3.5	4.0	3.0	4.5	3.5	3.0	2.5	4.5	3.5
Data Science	3.0	4.0	4.5	2.0	4.6	4.5	4.0	4.0	3.8	3.5	4.0	4.0	4.0	2.7	2.5	4.0	4.0

Multicloud/Intercloud/Hybrid	1.8	1.4	5.0	3.0	4.0	3.4	3.5	4.0	4.0	2.0	3.4	3.3	4.0	4.0	3.0	5.0	3.2

As of 7 September 2022

Source: Gartner (December 2022)

Table 3: Product Score in Use Cases

Use Cases	*Alibaba Cloud (Alibaba AnalyticDB)*	*Amazon Web Services (Amazon Redshift)*	*Cloudera (Cloudera CDP)*	*Couchbase (Couchbase Capella)*	*Databricks (Databricks Lakehouse Platform)*	*Google (Google BigQuery)*	*IBM (IBM Db2 Warehouse)*	*InterSystems (InterSystems IRIS)*	*MarkLogic (MarkLogic Data Hub)*	*Microsoft (Azure Synapse Analytics)*	*Neo4j (Aura: Graph Data Platform)*	*Oracle (Autonomous Data Warehouse)*	*SAP (SAP Data Warehouse Cloud)*	*Snowflake (Snowflake Data Cloud)*	*Tencent Cloud (TBDS)*	*Teradata (Teradata Vantage)*	*TigerGraph (TigerGraph Cloud)*
Traditional Data Warehouse	3.43	3.86	3.53	2.71	3.39	3.64	4.23	3.59	3.44	3.86	2.77	4.44	3.65	3.62	3.00	4.71	2.96
Logical Data Warehouse	3.17	3.31	3.85	3.02	3.49	3.77	4.03	3.76	3.92	3.77	2.74	4.16	4.07	3.41	3.05	4.85	2.30
Data Lake	3.22	3.80	4.15	2.78	4.14	3.90	3.99	3.84	3.88	3.70	3.22	4.24	3.90	3.27	2.85	4.25	3.56

Streaming Analytics	3.18	3.34	3.83	3.05	3.94	3.43	3.63	3.37	3.34	3.68	2.87	4.13	3.34	3.48	2.70	4.25	3.26
As of 7 September 2022																	

Source: Gartner (December 2022)