Magic Quadrant for Operational Database Management Systems

Published: 02 November 2017 **ID:** G00317993

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Summary

The OPDBMS market in 2017 brings cloud and fully managed options center stage for execution. Market-defining vision includes features for machine learning, serverless scenarios and streaming integration. Data and analytics leaders must balance current and future needs against this market landscape.

Strategic Planning Assumptions

Through 2020, relational technology will continue to be used for at least 70% of new applications and projects.

By 2019, the separation of storage and compute designed for cloud DBMS architectures becomes the dominant dbPaaS model and begins to appear on-premises, also.

Market Definition/Description

This document was revised on 3 November 2017. The document you are viewing is the corrected version. For more information, see the Corrections (http://www.gartner.com/technology/about/policies/current_corrections.jsp) page on gartner.com.

The operational database management system (OPDBMS) market includes relational and nonrelational DBMS products suitable for a broad range of enterprise-level transactional applications (see Note 1 for a nonrelational DBMS explanation). The market also consists of DBMS products that support interactions and observations as alternative types of transactions. These OPDBMS products include purchased business applications, such as those for ERP, CRM, the Internet of Things (IoT), catalog management and security event management, plus custom transactional systems built by organizations' own development teams. (For a definition of an OPDBMS workload, see Note 2.)

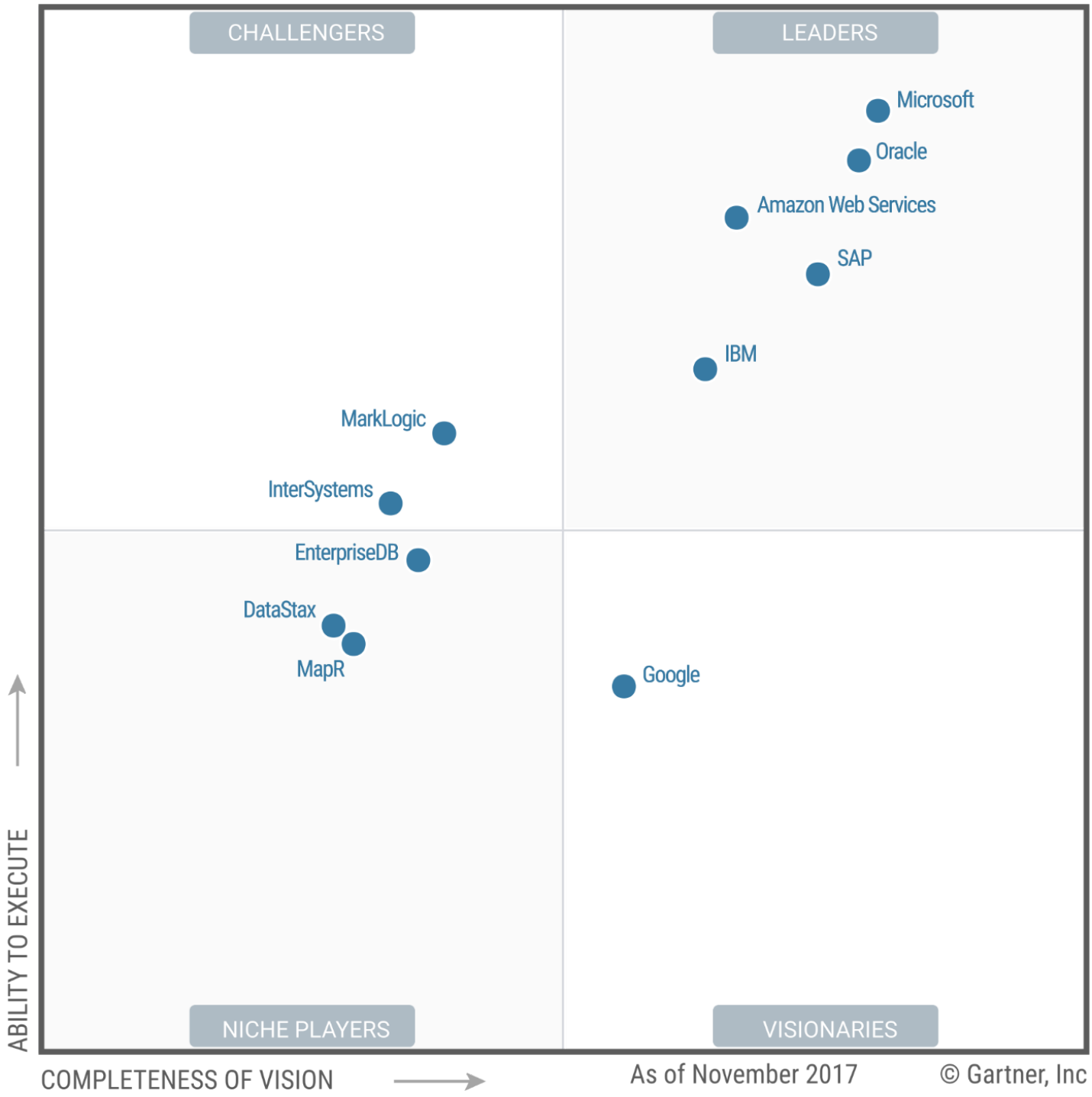
Gartner defines a DBMS as a complete software system used to define, create, manage, update and query a database. A database is an organized collection of data that may be in multiple formats and may be stored in some form of storage medium (e.g., hard-disk drives, flash memory, solid-state drives and/or DRAM). Additionally, according to Gartner's definition, DBMSs provide interfaces to independent programs and tools that both support and govern the performance of a variety of concurrent workload types. There is no presupposition that DBMSs must support the relational model or the full set of possible data types in use today. OPDBMSs must include functionality to support backup and recovery, and have some form of transaction durability — although the atomicity, consistency, isolation and durability (ACID) model is not a requirement.

OPDBMSs may support multiple delivery models, such as stand-alone DBMS software, certified configurations, cloud (public and private) images or versions, and database appliances (as defined in Note 3). These are discussed and evaluated together in the analysis of each vendor.

For the purposes of this Magic Quadrant, we treat all of a vendor's products as a set. If a vendor markets more than one DBMS product that can be used as an OPDBMS, we describe each product in the section specific to that vendor, but we evaluate all of that vendor's products together as a single entity. (Products from each of these vendors are specifically evaluated in the related Critical Capabilities document.) Strengths and Cautions relating to a specific offering or offerings are also noted in the individual vendor sections. It may be important for organizations to evaluate different offerings from the same vendor separately, as the portfolio of choices becomes broader and as purchasers more frequently pursue best-fit engineering strategies.

Magic Quadrant

Figure 1. Magic Quadrant for Operational Database Management Systems



Source: Gartner (November 2017)

Vendor Strengths and Cautions

Amazon Web Services

Amazon Web Services (AWS (https://aws.amazon.com/)) is a wholly owned subsidiary of Amazon.com, based in Seattle, Washington, U.S. AWS offers the Amazon Relational Database Service (Amazon RDS), with relational database engines for MariaDB, Microsoft SQL Server, MySQL, Oracle and PostgreSQL, Amazon Aurora for MySQL, Amazon Aurora for PostgreSQL and Amazon DynamoDB (a nonrelational document and key-value DBMS), as well as other DBMS services.

STRENGTHS

Dominant cloud market share: AWS is the clear market leader in cloud services, in both IaaS and platform offerings, including DBMS. Its cloud-only dbPaaS revenue improved its placement, in terms of market share, in Gartner's DBMS market share evaluation for 2016. Amazon's vision continues to be focused on cloud.

Diverse and flexible product capabilities: AWS offers a broad range of product capabilities across many different services, including both relational and nonrelational dbPaaS. Its vision is to offer multiple services delivering best-fit capabilities in a unified cloud platform environment.

Pricing and integration: In this year's reference customer survey, AWS scored second of all vendors for both suitability of pricing and ease of integration. Its approach to integration differs from those of traditional best-of-breed vendors, making it easier to integrate multiple services.

CAUTIONS

Limited on-premises capabilities: AWS offers its services only in the cloud. Although some AWS offerings are based on on-premises products, and it has robust migration services, the lack of on-premises versions is a limiting factor for some organizations. AWS does have connectors to on-premises MariaDB to help in a hybrid environment.

The "Amazon effect": Of growing concern is the perception that organizations competing with Amazon, such as other e-commerce or retail companies, should not use AWS because that would only serve to enrich their competitor.

Functionality and customer support: Based on the reference customer survey, AWS achieved only average scores for these categories. Multimodel and tunable consistency were specifically called out as lacking in the relational services, although DynamoDB (nonrelational) does support multimodel. There is room for improvement in customer service and support, especially for customers that do not have a Business or Enterprise support plan.

DataStax

Based in Santa Clara, California, U.S., DataStax (https://www.datastax.com/) provides DataStax Enterprise (DSE), a nonrelational multimodel DBMS in an integrated platform. DSE targets mixed workloads and is built on the Apache Cassandra DBMS, with wide-column, key-value and document/JavaScript Object Notation (JSON) support, plus a graph store. The product is available in three different subscription package levels: Basic, Standard and Max. DSE is available on-premises, through multiple cloud providers or as a hybrid cloud deployment. DataStax also offers a dbPaaS, DataStax Managed Cloud, in multiple public cloud environments.

STRENGTHS

Expanding cloud offerings and partnerships: DataStax recently introduced DataStax Managed Cloud, a dbPaaS solution available on AWS, to simplify administration and management of DSE for cloud customers. The company also has a rich partnership development program enabling its partners across OEMs, system integrators, cloud providers and technology partners.

Rich vertical industry: DataStax has developed a strong vertical story that is supported by specialized marketing and partnership programs as well as its sales organization. The company has established reference customers within targeted industries, such as banking and financial services, technology companies, retail and telecom.

Reliability in demanding environments: Reference customers for DataStax repeatedly cited the resiliency of DSE in geographically distributed environments, and praised the product's fit for specific types of workload.

CAUTIONS

Uneven support and tooling: Reference customers for DataStax cited widely varying support experiences, from exceptional to poor. They also noted inconsistencies in how problems were resolved and the lack of best-practice documentation for unique circumstances. OpsCenter, the DSE management console, was repeatedly highlighted by references for its lack of troubleshooting capabilities. DataStax continues to invest in developing OpsCenter and its Performance Service feature to aid in cluster troubleshooting.

Increasing competition from megavendors and startups: Several vendors in this market have introduced wide-column-style DBMSs that are conceptually similar to the core DataStax DSE product. Many of these competitors are also DataStax technology partners. The company must therefore focus on breadth in its integrated capabilities, such as graph and search, in order to maintain differentiation.

Open-source future in question: Some reference customers cited DataStax's apparent withdrawal from the Apache Software Foundation as concerning, and questioned the effectiveness of ongoing support if DSE diverges from open-source Apache Cassandra. DataStax also terminated its popular Startup Program, which provided DSE to startups, in July 2017.

EnterpriseDB

Based in Boston, Massachusetts, U.S., privately held EnterpriseDB (https://www.enterprisedb.com/) ships EDB Postgres in Developer, Standard and Enterprise subscriptions, based on the PostgreSQL open-source DBMS. EDB Postgres is available on-premises, as a managed cloud and as a private cloud built on OpenStack. It is an OPDBMS standard in over half of the surveyed reference customers, where it has typically been in production for four years or more.

STRENGTHS

Increasing visibility and growth: EnterpriseDB continues to gain inquiry volume with Gartner's inquiry service, usually around the Oracle compatibility feature. It also continues to participate in the Postgres community, adding new features and strengthening existing ones. The result is continued strong growth, according to Gartner's DBMS market share report for 2016.

Deployment flexibility: Cloud deployment via AWS and Google Cloud, together with the EDB managed service and containers and a strong clustering option, allows customers the flexibility that is necessary in modern implementations. Core-based pricing also allows EnterpriseDB to offer subcapacity pricing.

Improved customer satisfaction: Reference customers scored EnterpriseDB well above average for overall customer satisfaction. This was led by strong scores for documentation, ease of programming, operations and integration, and the value received for the price of the product.

CAUTIONS

Competitive environment: The competitive environment has shifted rapidly during the past two years. All cloud service providers are now offering some type of PostgreSQL dbPaaS, and most are not adopting EDB Advanced Server (bar Chinese cloud provider Alibaba for its Aliyun Cloud Platform). In addition, MariaDB will be introducing Oracle's Procedural Language/Structured Query Language (PL/SQL) in a planned release (currently available for customer test). This may put pressure on EnterpriseDB's marketing to show the unique value of the company's product.

Ecosystem building: Adoption by third-party software vendors continues to be a challenge for EnterpriseDB, especially in the application space. Also, as stated above, cloud service providers continue to use open-source PostgreSQL.

Functionality and roadmaps: Many comments from EnterpriseDB reference customers centered on missing functionality and a lack of transparency in the roadmap for EDB Advanced Server. The missing functionality mentioned included items such as in-memory, XML functions and additional management tools.

Google

Google (https://cloud.google.com/) , based in Mountain View, California, U.S., is a wholly owned subsidiary of the Alphabet holding company. Google dbPaaS offerings in the Google Cloud Platform include Cloud Spanner RDBMS, Cloud Datastore and Cloud Bigtable for nonrelational data warehouse uses, and Firebase Realtime Database for mobile applications. To support data in other platforms, Cloud SQL is offered for managed MySQL and PostgreSQL (beta), and Cloud Dataproc is offered for Apache Spark, Apache Hadoop and Apache Flink. Google Cloud Platform also has partnerships with many database vendors, allowing easy creation and administration of database images on virtual machines.

STRENGTHS

Financial strength funding investment: Google is a financial giant with resources from its other businesses to fund development of solutions. For the past decade, Google research, much of it provided to the open-source community, has driven technology advances in DBMS. Its leadership continued in 2016 with the introduction of the innovative Cloud Spanner.

Large internet presence: Google's infrastructure supports its own businesses globally at massive scale, and provides both experience and a platform for others to use its wide range of cloud offerings at competitive prices. This has led to deployment agility, with Google's time to deployment the shortest of all vendors in the reference customer survey. Its global network allows fast data transfer and many database services to be multiregion by default.

Customer enthusiasm: Google has found an early adopter audience among cloud enthusiasts, who seem relatively self-sufficient and not dependent on training and documentation — and for their early projects they are generally quite pleased. Many reference customers commented that moving to the cloud was key, despite its challenges; several wished they had moved sooner.

CAUTIONS

Challenges with support: Satisfying mainstream deployment requirements is Google's next challenge. Reference customers reported issues with support and rated Google lowest of all the vendors evaluated, citing slower-than-desired responses to requests and operational issues as

well as lack of dedicated customer reps. They also scored documentation and training very low.

Product functionality: Product maturity is progressing, but significant gaps remain in SQL functionality, security capabilities and tooling (such as debugging). Reference customers were positive but aware of limitations, rating Google lowest of all vendors evaluated for overall capabilities and on programmability for HTAP. References cited missing features, including replication and backup — although some were satisfied regardless. They scored permission management and database activity monitoring the lowest of all vendors in the survey.

Cloud-only focus and lack of partner capabilities: Google's reference customer score for hybrid deployment was the lowest in this evaluation. Although some third parties offer on-premises software that is API-compatible with Google's cloud offerings, Google's partner program is a work in progress.

IBM

Based in Armonk, New York, IBM (https://www.ibm.com/) offers Db2, Db2 for z/OS, Db2 Hosted, Db2 on Cloud, Db2 Event Store, Db2 Warehouse on Cloud, Db2 Warehouse, the Db2 Analytics Accelerator appliance, IBM Graph, Information Management System (IMS), Informix, IBM Compose for several open-source managed DBMSs (including non-IBM ones) in the cloud, and IBM Cloudant (proprietary but based on Apache CouchDB).

STRENGTHS

Rich features: IBM's OPDBMS portfolio and near-term vision include multiple RDBMSs, document stores, column stores, event stores, graph stores, geospatial and time-series capabilities. It makes aggressive use of popular open-source components, such as Hadoop, Kafka, Parquet and Spark, as well as backup and restore to and from Swift and AWS S3.

Global presence: IBM offers support, implementation and services in multiple vertical markets, and has a global network of software, hardware and service partners. IBM's substantial 2017 efforts toward portfolio simplification and support for simpler digital distribution show promise. The resulting realignment of resources and increased leverage of open source recently led IBM to drop its own Apache Hadoop offering and instead sell Hortonworks Data Platform.

Cloud and hybrid capabilities: IBM's increasingly cloud-driven DBMS presence reflects aggressive repositioning and the growing influence of its acquisitions and open-source commitments. A new Data Management Bundle option permits automated movement to equal or better customer entitlements across a set of products that share a common analytics engine.

CAUTIONS

Sales execution: IBM's 2016 DBMS revenue and market share were down, according to Gartner, continuing a multiyear trend. Several reference customers commented on pricing and licensing difficulties, as well as the need to update licensing structure for modern deployment styles. IBM has introduced a new "download-and-go" model, a free developer edition with enterprise-class features, and subscription pricing programs, backed with new sales team structures and highly engineered, multistep user experience tracking, but these are not yet reflected in Gartner conversations with clients or in IBM's sales numbers.

Shifting portfolio: IBM has made significant changes to simplify its brand (including changing DB2 to Db2), but customers seem indifferent to or unaware of them. By adding support for other DBMSs in the cloud with IBM Compose, IBM dilutes its proposition and invites competition with established strong plays from Amazon, Microsoft and the emerging Google Cloud Platform. Several reference customers noted challenges with integration, and the added pieces may exacerbate that difficulty.

Documentation/training lag: IBM was given the lowest reference customer scores of all vendors evaluated for the quality and availability of its end-user training. Time to deployment was the longest across all vendors, reinforcing the notion that IBM is still not "agile" to use and is encumbered by needless complexity — a frequent comment during Gartner inquiries with IBM clients. New containerization work as part of the download-and-go initiative should improve this, but is not yet evident in customer discussions.

InterSystems

Based in Cambridge, Massachusetts, U.S., InterSystems (https://www.intersystems.com/) was founded in 1978. It markets Caché as a hybrid, multimodel DBMS that supports relational and nonrelational access, including HTAP processing. Recently, InterSystems released Iris Data Platform, integrating Caché with analytics for HTAP. Caché began, and remains, in a strong position in the healthcare sector.

STRENGTHS

Functionality: Caché is a multimodel DBMS supporting SQL, object and nonrelational models. This continues to be a strength for InterSystems, and Caché is gaining adoption outside its strong base in healthcare due to its functionality, flexibility and strong reputation for support.

Loyal customer base: Reference customers expressed clear satisfaction with Caché and InterSystems, with a majority planning to buy more and use it outside of their original projects. This not only provides growth from within the customer base, but also helps InterSystems to gain new customers through strong customer references.

Stability and support: For the second year, InterSystems has the second-highest reference customer scores for the least downtime as well as for overall service and support. A majority of survey comments were about the strength of the support organization.

CAUTIONS

Market perception: InterSystems is making headway outside the healthcare sector, as evidenced by the number of reference customers in other industries. However, Caché's healthcare focus causes prospects to doubt its strength outside the healthcare industry. InterSystems must continue with strong marketing in other industry segments.

Skills and functionality: For the second year, several reference customers called out a lack of skilled resources in the market as a continuing issue with InterSystems. Also, several called out a lack of clustering options for scaling and high availability, although they may be unware of the clustering capabilities in Caché.

Documentation: InterSystems scored below average for documentation. This is significant as it was the only negative score for InterSystems from its reference customers and was based on a higher-than-average number of responses.

MapR

Based in San Jose, California, U.S., MapR (https://mapr.com/) provides the MapR Converged Data Platform, which includes one or more of MapR-DB, MapR-XD for file and container support, and MapR Streams. Optional Hadoop, Spark or machine-learning components are also available. MapR-DB is a multimodel OPDBMS compatible with the Apache HBase API. MapR also offers a small-footprint version of its Converged Data Platform, called MapR Edge, that is suitable for IoT-style deployments. Converged Data Platform is available on-premises and through various cloud providers.

STRENGTHS

Market-responsive strategy: MapR's investment in its Converged Data Platform strategy, combining streaming, operational and analytical use cases in a single platform, is an effective extension of its existing enterprise-friendly functionality around security, storage tiering and multitenancy. The MapR Edge offering further extends the strategy to IoT use cases.

Platform for innovation: In competitive evaluations, reference customers selected MapR over other vendors in order to drive innovation and operational efficiencies. They cited product functionality and performance as key factors in selecting MapR, as well as its product roadmap and future vision.

Speed of deployment and support capabilities: More than half of MapR reference customers reported deploying the product within three months. Many credit MapR's support services as a vital part of successfully deploying the product and resolving production challenges.

CAUTIONS

Functionality and performance concerns: Nearly half of MapR reference customers cited missing features such as full ANSI SQL and secondary indexes as functionality gaps — the biggest proportion of all vendors evaluated. Reference customers also scored MapR's security capabilities well below average for encryption and data masking, and several references cited performance problems with Apache Drill. MapR has recently added secondary indexes and performance improvements to Apache Drill to address this.

Proprietary software baggage: Gartner clients and reference customers have regularly cited MapR's proprietary software as a barrier to adoption when compared to other vendors in its peer group. However, some references stated that these concerns are overblown and that the proprietary elements provide considerable value.

Pricing model: MapR's pricing suitability received an average score from its customer references, although some expressed concern about the cost of growing clusters based on per-node pricing, as well as the fact that MapR's offering is more expensive than those of its direct competitors. In response, MapR has introduced per-terabyte pricing for MapR-XD.

MarkLogic

Based in San Carlos, California, U.S., MarkLogic (http://www.marklogic.com/) offers a nonrelational multimodel DBMS that it describes as "operational and transactional." The product is available in two editions: Essential Enterprise and a free developer edition. Essential Enterprise can be deployed in on-premises environments and on cloud and virtualization platforms, including those of AWS, Microsoft Azure, Google Cloud and VMware.

STRENGTHS

Data silo unification: MarkLogic has a focused and clear vision for its products of integrating silos of information, showing an understanding of current and future market challenges. Over half of its reference customers chose it because of its product roadmap and future vision for an innovative blending of semantics and document-oriented data (JSON, XML) via integrated Resource Description Framework (RDF) querying. MarkLogic is ideally suited for the integration of data silos and metadata-intensive applications.

Product features and security: Reference customers scored MarkLogic as above average for product capabilities, particularly for data ingestion. They also gave it above-average scores for security — specifically, permission management, encryption and data masking.

Expanding global presence: MarkLogic's global reach continues to extend beyond its U.S. base, with increasing sales and implementation services in EMEA and Asia/Pacific, particularly in Australia. The company has improved its execution with the use of strategic partners and continues to expand into new verticals.

CAUTIONS

Availability of developer skills: Several reference customers cited difficulty in finding MarkLogic skills in their local markets. They also scored the vendor below average for ease of programming, although above average for documentation and training.

Operational challenges: Over half of MarkLogic's reference customers have been running the product for two years or less. Reference customers scored it below average for ease of operation, citing a steep learning curve.

Increasing competition: MarkLogic's vision of unifying data silos does resonate with customers, but several companies have recently started adopting a similar message. The company faces competition from Hadoop and enterprise search vendors, as well as from pure open-source options.

Microsoft

Based in Redmond, Washington, U.S., Microsoft (https://www.microsoft.com/) markets its SQL Server DBMS and Azure SQL Database (a DBMS PaaS based on SQL Server) as flagship products for the OPDBMS market. It also markets Azure Cosmos DB, a nonrelational, globally distributed document DBMS PaaS solution, which is compatible with SQL, Azure Tables, MongoDB and Gremlin Graph APIs.

STRENGTHS

Market-leading execution: Gartner's 2016 revenue data for the DBMS market shows that Microsoft's revenue grew above the market rate. Microsoft is being increasingly aggressive, with a new free Developer Edition of SQL Server and a Database Migration Service to port both SQL

Server and Oracle databases to its Azure SQL Database, opening another area of competition with AWS. Microsoft's competitive cost, license mobility and willingness to offer "the only financially backed database SLA across availability, latency, throughput and consistency" also get attention.

Market vision: Microsoft continues to lead the market in vision with its multimodel SQL offerings for IMDBMS and nonrelational (document, key-value and now graph via Apache Gremlin support), as well as built-in access to analytics (supporting HTAP) and mobility support. Its hybrid deployment support via SQL Server 2016 Stretch Databases is now joined by Azure CosmosDB cross-region policy control in the cloud, and multiple data consistency choices permit selective, use-case-based design.

Customer satisfaction: Microsoft received the highest reference customer scores of all vendors evaluated for overall experience, meeting needs, value for money, negotiation experience, integration and deployment, service and support, professional support, ease of programming, and tunable consistency. It was among the top 25% of evaluated vendors in terms of reference customers planning to buy additional products from their vendor within a year.

CAUTIONS

Pricing pressures expand competition: Microsoft's pricing in the cloud will remain under pressure from both AWS and Google, both of which gained high scores from their reference customers for their pricing models. Several on-premises competitors fared better in the reference survey for their pricing models, though Microsoft scored well in value for money. This suggests that more buyers are willing to selectively substitute alternatives to Microsoft, opening internal competition for future workloads.

Cloud challenges in product and channel: Microsoft's cloud deployment partners have not fared well in comparison to those of AWS. Some tools are lagging behind those of other vendors in the Magic Quadrant — notably development tools.

Megavendor pricing syndrome: Although Microsoft's reference customers praised good value for money and the pricing negotiation process, they were not happy with Microsoft's pricing methods . References noted that pricing can be opaque unless the product, and how it will be used, is well-understood.

Oracle

Based in Redwood Shores, California, U.S., Oracle (https://www.oracle.com/index.html) markets a complete set of DBMS products for operational systems. These include Oracle Database, Oracle TimesTen, Oracle Berkeley DB, Oracle NoSQL Database and MySQL. In addition to stand-alone software and cloud versions, several of Oracle's DBMSs are available in engineered systems (appliances).

STRENGTHS

Modernizing strategy: Oracle is working to expand its already robust portfolio with a consistent strategy around its public cloud product, encompassing IaaS, PaaS and SaaS offerings, including Cloud at Customer for managed services within a customer's data center. The company continues to embrace a developer-first approach by offering the latest programming APIs and support for various data types.

Performance heritage: Three-quarters of Oracle reference customers have been running Oracle Database for more than 10 years. The product's performance, features and reliability are routinely cited by both its survey references and Gartner clients.

Product satisfaction: Reference customers for Oracle scored it as above average for overall product satisfaction, quality of end-user training and documentation. The company also received above-average scores for the security features of its solutions.

CAUTIONS

Cloud competition: Oracle's push into the cloud has begun in earnest. To drive customers to its own cloud over those of its competitors, the company has increased the number of Oracle processor licenses required to run its software on competing clouds, which effectively doubles the cost of running Oracle. The company is also limiting some new features, such as In-Memory on Active Data Guard, to the Oracle Cloud and Oracle engineered systems running on-premises.

License flexibility and complexity: Multiple reference customers for Oracle cited license complexity and challenging negotiations as continuing issues. Some also requested more flexibility around licensing, such as simplifying licensing virtual servers, rolling over metered subscriptions credits and introducing pay-as-you-go pricing. To begin addressing these concerns, Oracle has recently introduced Universal Credits and Bring Your Own License options, as well as overall PaaS price reductions.

Support and patching challenges: In an ongoing issue, reference customers described Oracle's support organization as being challenging to work with, and that getting adequate support often requires escalation. Some cited the number of patches as being tedious and challenging to deploy. The company has moved to a quarterly release update model to simplify patching.

SAP

Based in Walldorf, Germany, SAP (https://www.sap.com/index.html) has several DBMS products that are used for OPDBMS systems: SAP Adaptive Server Enterprise (ASE), SAP SQL Anywhere and SAP Hana. SAP Hana is available as an appliance or as software only (as SAP Hana Tailored Datacenter Integration [TDI]). Both SAP ASE and SAP Hana are available as cloud offerings.

STRENGTHS

Continued strong DBMS growth: SAP maintained its place in Gartner's market share statistics for 2016, with strong growth due to SAP Hana. According to SAP, SAP Hana had more than 18,000 customers as of October 2017, which is half the SAP application installed base.

Market vision: SAP has advanced its vision this year in several directions, emphasizing cloud and additional functionality in the SAP Hana platform (including more multimodel support and stronger integration of Spark and Hadoop). It has a strong plan for the support of non-SAP applications and data — a continuing challenge for SAP.

Speed, performance and HTAP: The majority of SAP's reference customers continued to call out the performance and speed of SAP Hana as strengths, as well as its ability to combine transactions and analytics in the same database (HTAP).

CAUTIONS

Market perception: SAP remained consistent in its execution year over year as the market continues to consider SAP Hana only for SAP applications. SAP must change this perception — positioning and executing on SAP Hana as a general-purpose DBMS — or face the real possibility of being surpassed by the competition.

Mixed survey scores: SAP's reference customer scores were average for overall customer sentiment, but below average for product capabilities and the experience of doing business with SAP when compared to all the evaluated vendors. Comments about implementation were mixed.

SAP Hana pricing perception: SAP's reference customer scores for pricing metrics remained below the average for this Magic Quadrant. Although SAP Hana's runtime pricing is lower than that of some other DBMSs, SAP Hana full-use licenses are priced by memory used for data, and are *perceived* as expensive. This is one reason why SAP Hana is used primarily for SAP applications and not as a general-purpose DBMS. Convincing the market that SAP Hana is not expensive relative to other DBMSs remains a marketing challenge for SAP.

Vendors Added and Dropped

We review and adjust our inclusion criteria for Magic Quadrants as markets change. As a result of these adjustments, the mix of vendors in any Magic Quadrant may change over time. A vendor's appearance in a Magic Quadrant one year and not the next does not necessarily indicate that we have changed our opinion of that vendor. It may be a reflection of a change in the market and, therefore, changed evaluation criteria, or of a change of focus by that vendor.

Added

None

Dropped

The following vendors were dropped from the Magic Quadrant as they did not meet the revenue requirements for inclusion:

Actian

Basho Technologies (ceased operations)

Clustrix

Couchbase

Fujitsu

MemSQL

MongoDB

Neo4J (formerly Neo Technologies)

NuoDB

Redis Labs

Inclusion and Exclusion Criteria

Market Presence: The vendor's OPDBMS products must have production presence in a minimum of three of the following industry sectors:

- Accommodation and food services
- Administrative and support and waste management and remediation services
- Agriculture, forestry, fishing and hunting
- Arts, entertainment and recreation
- Construction
- Educational services
- Finance and insurance
- Healthcare and social assistance
- Information
- Management of companies and enterprises
- Manufacturing
- Mining
- Professional, scientific and technical services
- Public administration
- Real-estate rental and leasing
- Retail trade
- Transportation and warehousing
- Utilities
- Wholesale trade

Vendors must have market presence in a minimum of three geographic regions (North America, Latin America, Europe, Middle East and Africa, Asia/Pacific, and Japan). Regional market presence is represented by dedicated sales offices or distribution partnerships in a specific region.

Software Availability: Vendors must have OPDBMS software that has been generally available for licensing or supported download for at least a year, as of the start of 1 July 2017 (U.S. Eastern Daylight Time).

Software Releases: We use the most recent generally available release of the software to evaluate current technical capabilities. We do not consider beta, "early access," "technology preview," "ramp up" or other, not generally available releases. For reference customers and reference survey responses, all versions currently used in production are considered. When older versions are in use, we consider whether later releases may have addressed reported issues, but also the rate at which customers move to newer versions.

Feature Availability: Product evaluations include technical capabilities, features and functionality present in the product or supported for download through midnight, U.S. Eastern Daylight Time on 1 July 2017. Capabilities, product features or functionality released after this date can be included at Gartner's discretion and in a manner that Gartner deems appropriate for ensuring the quality of our research product on behalf of our nonvendor clients. We also consider how such later releases can reasonably impact the end-user experience.

Customers and Revenue: Inclusion in the Magic Quadrant was based on Gartner's "Market Share: All Software Markets, Worldwide, 2016." For 2017, only vendors in the DBMS market segment with OPDBMS products were considered; of these, vendors with estimated 2016 DBMS revenue at or over $100 million were included. Gartner may include additional vendors based on undisclosed references in cases of known use for classified but unspecified use cases.

Support: The vendor must provide support for its OPDBMS products. For the open-source DBMS, maintenance and support must be available from a vendor that owns or has substantial control over the source code and offers it under an open-source license, such as the General Public License (GPL) or Apache License (ASL). However, only the core DBMS engine must be under the open-source license to classify as an open-source DBMS.

Services: A vendor participating in the OPDBMS market must demonstrate its ability to deliver the necessary services to support transaction systems via the establishment and delivery of support processes, professional services, and/or committed resources and budget.

Product Breadth of Use: The vendor must demonstrate support for production OPDBMS customers in at least *three* of the major geographic regions (North America, Latin America, Europe, the Middle East and Africa, and Asia/Pacific). The vendor must also demonstrate production use in a minimum of three industry segments (see the market presence criterion above for a list of industry segments).

Excluded Products: Some products are explicitly excluded from this Magic Quadrant and the related Critical Capabilities research. Products that "add a layer" to and require or embed a complete or near-complete implementation of another commercially marketed product, such as MySQL, HBase or PostgreSQL, are excluded. Highly specialized engines such as embedded-only, text-only or object-only databases, which may perform some transactions to target small subsets of operational use cases, are excluded. OPDBMS products with over 50% of production deployments as embedded are excluded. Finally, "streaming" engines, whose use cases are dominated by immediate event processing and which are rarely if ever used for subsequent management of the data involved, are also excluded.

Product categories specifically excluded from this Magic Quadrant are:

- Data warehousing-only DBMS and DMSA-only products
- Prerelational DBMS products
- Desktop DBMS products
- Object DBMS products
- Data grid products
- CEP or streaming data engines

Evaluation Criteria

Ability to Execute

Ability to Execute criteria are primarily concerned with a vendor's capabilities and maturity. These criteria also consider products' portability and their ability to scale and run in different operating environments (giving the customer a range of options).

Ability to Execute criteria are critical to customers' satisfaction and success with a product, so interviews with and survey responses from reference customers are weighted heavily throughout.

Product or Service includes the technical attributes of the DBMS, as well as features and functions built specifically to manage the DBMS when used as a platform for transactions, interactions and observations. We include HA/DR, performance and scalability, and support for multiple deployment options (such as virtualization cloud and hybrid cloud/on-premises), multiple development languages, and new hardware and memory models. These attributes are evaluated across a variety of database sizes and application workloads. We also consider the automated management, tools and resources necessary to manage a database environment, especially as it scales to more-complex application workloads. Finally, we consider the flexibility of the DBMS to incorporate new data types and application types, as well as new requirements for distributing data across multiple servers and geographies.

Overall Viability includes corporate aspects, such as the skills of the personnel, financial stability, R&D investment, and merger and acquisition activity. It also covers the management's ability to respond to market changes and the company's ability to weather market difficulties (crucial for long-term survival). Vendors are further evaluated on their capability to establish dominance in meeting a specific market demand.

Sales Execution/Pricing covers the price/performance and pricing models of the DBMS, and the ability of the sales force to manage accounts (judging from feedback from interviews, surveys and inquiry interactions with our clients). We also consider the market share of the DBMS software products. Also considered are the diversity and innovative nature of the vendor's packaging and pricing models, including the ability to promote and sell the products globally.

Market Responsiveness/Record includes the diversity of the vendor's offerings in response to changing market demand (for example, its ability and flexibility to offer appliances, cloud deployment, new data types and new programming requirements). We consider general market perceptions of vendors and their products. We assess vendors' ability to adapt to market changes during the previous 18 months, and their flexibility in response to market dynamics over a longer period.

Marketing Execution evaluates such activities as lead generation, including traditional methods and internet-enabled trial software delivery, and the execution of channel development through partnering agreements (including co-seller, co-marketing and co-lead management arrangements). We consider vendors' coordination and delivery of education and marketing events throughout the world and across vertical markets. Also included is the creation and support of "community" activities that help to raise awareness and develop skills among buyers and prospective buyers.

Customer Experience is assessed primarily on the basis of interviews with and survey responses from vendors' reference customers, [1] as well as discussions with users of Gartner's inquiry service during the previous six quarters. [2] We consider vendors' track records in POCs, customers' perceptions of their products, and customers' loyalty to the vendors (this reflects their tolerance of vendors' practices and can indicate their level of satisfaction). Additionally, customer input regarding the applicability of products to limited use cases can be considered significant, depending on the success or failure of a vendor's approach to this market.

Operations covers the alignment of a vendor's organization, as well as whether and how this enhances its ability to deliver. Aspects considered include field delivery of appliances, manufacturing (including the identification of diverse geographic cost advantages), internationalization of the products in light of both technical and legal requirements, and adequate staffing.

Table 1. Ability to Execute Evaluation Criteria

Evaluation Criteria	
Product or Service	
Weighting	High
Overall Viability	
Weighting	Medium
Sales Execution/Pricing	
Weighting	Medium
Market Responsiveness/Record	
Weighting	High
Marketing Execution	
Weighting	Medium
Customer Experience	
Weighting	High
Operations	

Weighting	Low

Source: Gartner (November 2017)

Completeness of Vision

Completeness of Vision encompasses a vendor's ability to understand the functional capabilities needed to support operational environments, to develop a product strategy that meets the market's requirements, to comprehend overall market trends and to influence or lead the market when necessary. A visionary leadership role is necessary for the long-term viability of both product and company. A vendor's vision may be demonstrated — and improved — by its willingness to extend its influence throughout the market by working with independent third-party application software vendors that deliver both added functionality for the operational environment and commercial off-the-shelf software. A successful vendor will be able not only to understand the competitive landscape of operational transactions, but also to shape its future.

Market Understanding assesses a vendor's ability to understand the market and shape its growth and vision. In addition to examining a vendor's core competencies in this market, we consider its awareness of new trends, such as the increasing sophistication of end users, growing scalability needs (especially across server clusters), the cloud as a platform for DBMSs, the demand for in-memory computing and HTAP, the use of new consistency models, and the growing desire to use data structures other than relational ones.

Marketing Strategy refers to a vendor's marketing themes, product R&D focus, and its ability to choose appropriate target markets and third-party software vendor partnerships to enhance the marketability of its products. For example, we consider whether the vendor encourages and supports independent software vendors in its efforts to support its DBMS in native mode (via, for instance, co-marketing or co-advertising with "value-added" partners). This criterion includes the vendor's responses to the market trends identified above and any offers of alternative solutions in its marketing materials and plans.

Sales Strategy assesses how a vendor designs and targets its channels and partnerships to assist with selling. It is especially important for younger organizations, because a good sales strategy can enable them to greatly increase their market presence while maintaining lower sales costs (for example, through downloadable free community editions, co-selling and joint advertising). This criterion also covers a vendor's strategy for communicating its vision to its field organization and, therefore, to existing and prospective customers.

Offering (Product) Strategy covers the design of product packaging and deployment options, including the availability of developer editions, cloud versions, managed offerings and appliances based on the vendor's DBMS. Vendors should demonstrate a diverse strategy that enables customers to choose what they need to build a complete solution for an operational environment. Also covered are partners' offerings that include technical, marketing, sales and support integration.

Business Model covers how a vendor's model of a target market combines with its products and pricing, and whether the vendor can generate profits with this model, judging from its packaging and offerings. Also included are pricing innovations and strategies, such as new licensing arrangements

and cloud-based models for elastic provisioning to support peak demand. Additionally, we consider reviews of publicly announced earnings and forward-looking statements relating to an intended market focus. For private companies, and to augment publicly available information, we use proxies for earnings and new customer growth, such as the number of Gartner clients who have indicated interest in, or awareness of, a vendor's products during calls to our inquiry service.

Vertical/Industry Strategy affects a vendor's ability to understand its clients. We consider aspects such as vertical-market sales teams and partnerships with vertical-market service providers.

Innovation assesses a vendor's approach to developing new functionality that aligns with its market, offering strategies by allocating and managing R&D expenditure, and leading the market in new directions. The use of new storage and hardware models are key examples of such an approach.

Geographic Strategy includes a vendor's worldwide reach. It is evaluated by considering a vendor's plan to use its resources in different regions, as well as the resources of its subsidiaries and partners. This criterion considers a vendor's plan for supporting clients throughout the world, around the clock and in many languages. Anticipation of regional and global economic conditions is also considered.

Table 2. Completeness of Vision Evaluation Criteria

Evaluation Criteria	
Market Understanding	
Weighting	High
Marketing Strategy	
Weighting	High
Sales Strategy	
Weighting	Medium
Offering (Product) Strategy	
Weighting	High
Business Model	
Weighting	Low
Vertical/Industry Strategy	

Weighting	Medium
Innovation	
Weighting	High
Geographic Strategy	
Weighting	Medium

Source: Gartner (November 2017)

Quadrant Descriptions

Leaders

Leaders generally demonstrate the most support for a broad range of operational applications, based on support for a wide range of data types and multiple use cases. These vendors demonstrate consistent customer satisfaction and strong customer support. Many have competed in this market for many years, and have built a broad partner ecosystem for their products. Hence, Leaders generally represent the lowest risk for customers in the areas of performance, scalability, reliability and support. As the market's demands change, so Leaders demonstrate strong vision in support not only of the market's current needs, but also of emerging trends. These include, but are not limited to, hybrid deployments and management, containerization, and diversity of operational processing and query capabilities. Finally, the messaging, product R&D and delivery of Leaders are in line with today's market and with new trends in both DBMS software and hardware technology.

Challengers

Challengers are stable vendors with strong, established offerings but a relative lack of vision. It is normal for some to have high scores for execution but to lag in terms of the adoption levels and vision needed for leadership. Challengers normally show strong corporate viability and financial stability, and demonstrate strong customer support. However, they lack some features to support the new trends in the OPDBMS market, such as support for interaction and observation data in transactions, and a roadmap for moving toward multimodel DBMS capabilities. Although they may be lacking in relation to some of the market's innovative concepts, Challengers offer stability, simplicity of installation and support, and strong performance. As with the Niche Players, Gartner considers support for only a limited number of data types and hardware models as evidence of limited vision.

Visionaries

Visionaries take a forward-thinking approach to managing the hardware, software and end-user aspects of an OPDBMS environment. Visionaries typically have innovative ideas for new functionality and advanced use of new hardware. They have the requisite number of production

customers, but lack the market momentum of Leaders. In this market, Visionaries are often young, small and innovative vendors with great new ideas that are spurring on the more mature vendors and the market in general.

Niche Players

Niche Players generally deliver a highly specialized product with limited market appeal. A Niche Player frequently provides an exceptional OPDBMS product, but is isolated or limited to a specific end-user community, region or industry. Although the solution itself may not have limitations, adoption is limited. The Niche Players quadrant contains vendors with OPDBMSs that may lack one or all of the following:

- A strong or large customer base
- The breadth of functionality of those of the Leaders
- The general customer acceptance or proven functionality to move beyond their niche status

Context

This Magic Quadrant deals with the key DBMS capabilities for operational processing. It should therefore interest anyone involved in defining, purchasing, building or managing an operational data processing environment — notably, CIOs, CTOs, data and analytics leaders, infrastructure managers, database and application architects, database administrators, and IT purchasing managers.

For 2017, cloud has moved to center stage. Extremely large companies, defined as having over 10,000 employees and several billion in annual revenue, are building roadmaps to be "all in" on public cloud infrastructure in three to five years. While it is unlikely that many will achieve their ambitious goals, it is clear that on-premises deployments will experience lower growth as organizations shift to cloud.

Vendors are supporting this transition by introducing or expanding their database platform as a service (dbPaaS) offerings. In this year's Magic Quadrant, at least seven vendors offer at least one dbPaaS product. Megavendors are the most visible in dbPaaS, but smaller vendors also have dbPaaS offerings with a unique value proposition: less vendor lock-in. It is unknown how much influence this message will have in the market.

The focus on dbPaaS builds on our observation in 2016 that there is less focus on innovation as a differentiator, and more focus on engaging developers in the line of business (LOB) and making products easier to use. Incumbent and insurgent vendors face distinct difficulties to realize these objectives:

- Incumbent vendors must transition sales and marketing efforts to new audiences and new sales time frames. An 18-month sales cycle is no longer sustainable when end users are trying to capture new market opportunities faster than competitors are. Incumbent vendors must also mask product complexity until it is needed by DevOps staff.
- Insurgent vendors, already skilled at selling to LOB developers, must continue to simplify their products while improving manageability, security, performance and stability.

Both groups of vendors must also continue developing expertise in running managed services for demanding clients. Megavendors can focus on their own cloud environments, but insurgent vendors must build expertise across multiple clouds.

Market Overview

The online transaction processing DBMS market, from which the OPDBMS market evolved, was very mature in the early 2000s. However, as internet usage and availability grew, so did the applications necessary to support the associated growth in infrastructure and the use cases to support them. Many new vendors therefore entered the OPDBMS market with products to support the specialized applications required by a new and global business arena.

The explosive growth of features, and the vendors emerging to implement them, continue to slow. The features that initiated the expansion, such as storing new data types, geographically distributed storage, cloud and flexible data consistency models, have become common; today, nearly every established or emerging DBMS vendor supports them to some degree. In 2016, the OPDBMS market shifted from a phase of rapid innovation to a phase of maturing products and capabilities. This has continued into 2017.

Nearly all vendors in this market offer in-memory capabilities, multimodel, cloud (dbPaaS or a hosting model, or both) and HTAP programming capabilities. The smaller vendors in this market remain focused on execution. This is supported by our survey data, in which this year's scores are generally better for stability and support than 2016's, and converging more to the mean. [1]

There is some movement toward innovation and vision from the larger, established vendors, especially toward support of streaming data and machine learning (ML). With the current industry focus on developing applications with ML, we now believe that this will lead to broader use of ML in DBMS optimization and maintenance tasks. This is clearly one of the new areas of innovation within the OPDBMS market. We will begin to see more self-managing features from these vendors. We also see many innovating in the cloud with features such as separation of compute and storage as well as new pricing models. We believe that this will spread even to on-premises over the next few years.

Finally, we are beginning to see a shift in the OPDBMS market and the DMSA market toward a single DBMS for both sets of use cases. It is becoming increasingly possible to use one vendor's product for both DMSA and OPDBMS needs, pushing those vendors that only fulfill one need toward the Niche Players quadrant. While there remains a need for best-of-fit solutions, the advantages of a single vendor from a cost and skills perspective many times outweigh the benefits from best-of-fit. This is just beginning in 2017 and will grow over the next several years.

For more in-depth examination of the OPDBMS market, see "State of the Operational DBMS Market, 2017."

Acronym Key and Glossary Terms

ACID
AWS

atomicity, consistency, isolation and durability	Amazon Web Services
dbPaaS	
atomicity, consistency, isolation and durability	database platform as a service
HA/DR	
atomicity, consistency, isolation and durability	high availability/disaster recovery
HTAP	
atomicity, consistency, isolation and durability	hybrid transactional/analytical processing
IaaS	
atomicity, consistency, isolation and durability	infrastructure as a service
IoT	
atomicity, consistency, isolation and durability	Internet of Things

JSON	
atomicity, consistency, isolation and durability	JavaScript Object Notation
OPDBMS	
atomicity, consistency, isolation and durability	operational database management system
PaaS	
atomicity, consistency, isolation and durability	platform as a service
POC	
atomicity, consistency, isolation and durability	proof of concept
Serverless	
atomicity, consistency, isolation and durability	A model of IT service delivery where the underlying enabling resources are utilized as an opaque, virtually unlimited shared pool, continuously available without advance provisioning (preprovisioning) and priced in the units of the consumed IT service. Serverless platforms are designed to support serverless computing.

Evidence

Our analysis in this Magic Quadrant is based on information gathered from interactions with Gartner clients during the past 12 months and our survey of the vendors' reference customers (see below). We also considered earlier information and any news about vendors' products, customers and finances that came to light during the time frame for our analysis.

[1] **Survey of Vendors' Reference Customers.** As part of the Magic Quadrant research process, we sought the views of vendors' reference customers (details of whom were supplied by the vendors) via an online survey conducted during April and May 2017. The survey included requests for feedback about vendors' maturity (for example, typical use cases, provision of innovation, responsiveness to new requests, total cost of ownership and pricing) and product capabilities (for example, HA/DR capabilities, support for high-speed ingestion of data, performance, support for multiple data types, and problems encountered with the products). More than 450 organizations, representing all the featured vendors' customers, responded to the survey, with an average of 29 per vendor.

The respondents were generally pleased with their vendors and products, but gave relatively low marks in some areas, which we detail in the analysis of each vendor. Some of the low scores might reflect historical problems, because not all organizations are on the latest product versions.

[2] **Gartner's Client Inquiry Service Data.** Gartner maintains an extensive database of information about all inquiries to our client inquiry service. Our information management team received more than 4,600 inquiries during the Magic Quadrant research period of July 2015 to July 2016, of which more than 900 were specifically about DBMSs. We used the sentiments apparent from these inquiries to formulate the opinions expressed in this Magic Quadrant.

Note 1
Nonrelational DBMS

Previously, we have used the market term "NoSQL" to imply nonrelational; NoSQL formerly implied alternative data types and scaling strategies from relational DBMSs. However, relational DBMSs have added, or are adding, features from NoSQL, while NoSQL DBMSs have added, or are in the process of adding, features from relational DBMSs. Therefore, the term "NoSQL" is no longer useful as a product distinction.

While SQL is frequently associated with relational DBMS products, the availability of SQL does not define a relational DBMS. SQL is a data access language and can be used to access data in any DBMS, whether relational or nonrelational. Further, many of the nonrelational DBMSs have an SQL or SQL-like language (for example, MarkLogic and DataStax).

Note 2
Definition of an OPDBMS Workload

For the purposes of this evaluation, the workloads we expect to be managed by an OPDBMS include:

- Batch/bulk loading
- Real-time or continuous data loading
- Concurrent online and web-based new/update transactions
- Operational reporting
- Management of externally distributed processes, such as "look-aside" queries

OPDBMS products must provide the ability to prioritize these multiple workloads in order to ensure SLAs are met when they operate concurrently.

Note 3
Definition of a DBMS Appliance

Gartner defines a DBMS appliance as a preinstalled DBMS sold on server hardware specifically configured and balanced for optimized performance, with an included storage subsystem. In addition, a single point of contact for support for the appliance is available from the vendor.

Evaluation Criteria Definitions

Ability to Execute

Product/Service: Core goods and services offered by the vendor for the defined market. This includes current product/service capabilities, quality, feature sets, skills and so on, whether offered natively or through OEM agreements/partnerships as defined in the market definition and detailed in the subcriteria.

Overall Viability: Viability includes an assessment of the overall organization's financial health, the financial and practical success of the business unit, and the likelihood that the individual business unit will continue investing in the product, will continue offering the product and will advance the state of the art within the organization's portfolio of products.

Sales Execution/Pricing: The vendor's capabilities in all presales activities and the structure that supports them. This includes deal management, pricing and negotiation, presales support, and the overall effectiveness of the sales channel.

Market Responsiveness/Record: Ability to respond, change direction, be flexible and achieve competitive success as opportunities develop, competitors act, customer needs evolve and market dynamics change. This criterion also considers the vendor's history of responsiveness.

Marketing Execution: The clarity, quality, creativity and efficacy of programs designed to deliver the organization's message to influence the market, promote the brand and business, increase awareness of the products, and establish a positive identification with the product/brand and organization in the minds of buyers. This "mind share" can be driven by a combination of publicity, promotional initiatives, thought leadership, word of mouth and sales activities.

Customer Experience: Relationships, products and services/programs that enable clients to be successful with the products evaluated. Specifically, this includes the ways customers receive technical support or account support. This can also include ancillary tools, customer support programs (and the quality thereof), availability of user groups, service-level agreements and so on.

Operations: The ability of the organization to meet its goals and commitments. Factors include the quality of the organizational structure, including skills, experiences, programs, systems and other vehicles that enable the organization to operate effectively and efficiently on an ongoing basis.

Completeness of Vision

Market Understanding: Ability of the vendor to understand buyers' wants and needs and to translate those into products and services. Vendors that show the highest degree of vision listen to and understand buyers' wants and needs, and can shape or enhance those with their added vision.

Marketing Strategy: A clear, differentiated set of messages consistently communicated throughout the organization and externalized through the website, advertising, customer programs and positioning statements.

Sales Strategy: The strategy for selling products that uses the appropriate network of direct and indirect sales, marketing, service, and communication affiliates that extend the scope and depth of market reach, skills, expertise, technologies, services and the customer base.

Offering (Product) Strategy: The vendor's approach to product development and delivery that emphasizes differentiation, functionality, methodology and feature sets as they map to current and future requirements.

Business Model: The soundness and logic of the vendor's underlying business proposition.

Vertical/Industry Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of individual market segments, including vertical markets.

Innovation: Direct, related, complementary and synergistic layouts of resources, expertise or capital for investment, consolidation, defensive or pre-emptive purposes.

Geographic Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of geographies outside the "home" or native geography, either directly or through partners, channels and subsidiaries as appropriate for that geography and market.

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