

# Magic Quadrant for Cloud AI Developer Services

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To build next-generation applications, developers need services that enhance application capabilities in the areas of automated machine learning, language and vision. Software engineering leaders should use our analysis of CAIDS vendors to select the best partner for their organization.

**This Magic Quadrant is related to other research:**

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## Market Definition/Description

Cloud AI developer services (CAIDS) are cloud-hosted or containerized services that enable development teams and business users who are not data science experts to use artificial intelligence (AI) models via APIs, software development kits (SDKs) or applications. They help these users deliver services with capabilities in the areas of automated machine learning (autoML), language and vision — for example, natural language understanding (NLU), sentiment analysis, image recognition and machine learning (ML) model pipeline services.

Our view of the CAIDS market focuses on each vendor's ability to deliver on the future needs of end users. We do not focus on the market as it is today. Vendors that offer only language services or vision services — as well as vendors that specialize only in specific use cases — were excluded from this Magic Quadrant.

## Magic Quadrant

Figure 1: Magic Quadrant for Cloud AI Developer Services



Source: Gartner (May 2022)

## Vendor Strengths and Cautions

### Aible

Aible is a Niche Player in this Magic Quadrant. Aible provides innovative, ROI-centered autoML services, as well as language and vision services. Its operations are focused in the U.S. and Europe, and it has customers in a variety of industries. Aible's platform has ML, optimization, simulation, recommendation and monitoring capabilities. All offerings are serverless-first (for security and computational efficiency), and models can be deployed on Microsoft Azure and Amazon Web Services (AWS). The platform is easy to use, guided and engaging. It allows developers to use no-code, low-code and code-based approaches. They can bring their own models and access Aible via APIs. Aible's 30-day satisfaction guarantee underscores its promise to deliver business impact within a month.

### Strengths

- **Market understanding:** Aible's market understanding underpins its growth, which is fast compared with similar vendors. To create AI strategies that deliver business impact, Aible starts by understanding its customers' business goals and engaging all stakeholders. It delivers an intuitive, end-to-end experience that is driven by data, what-if testing and scenario planning. Starting from the business outcome allows Aible to uniquely position the business value of ML models for business users.
- **Innovation:** Aible seeks to maximize simplicity, ease of use and business impact. Its areas of innovation include serverless-first AI, the "business central nervous system"/augmented enterprise, AI-assisted bottom-up and top-down enterprise planning, and embedded solutions for existing enterprise applications. Its innovative AI Fabrics provide AI solutions for sectors including retail, manufacturing, banking, insurance, healthcare, telecommunications, education and government, as well as functional areas that are the purview of the CMO, CFO, CRO and CIO offices.
- **Product (offering) strategy:** Aible's autoML delivers AI outcomes based on the constraints of the business process. For each solution, Aible deploys more than one model in serverless form and recommends adjusting to the best model with a click, depending on immediate conditions. In 2021, Aible launched guided experiences to help less-skilled users navigate complex processes. These step-by-step guides break down an end-to-end autoML process into a set of microtasks that various users can complete in any order. This guided approach simplifies collaboration between users and enables them to work on sophisticated processes without needing ML skills.

### Cautions

- **Geographic strategy:** Aible's geographic presence is limited to four offices in North America and two offices in Europe. Nearly all its customers are in those two regions. Aible continues to expand in the U.S. and Europe and plans to expand into Asia/Pacific, but, outside the U.S. and Europe, customer support is provided by partners, including several global system integrators. Prospective customers should ensure that Aible and its partners can provide the support they need in their region or regions.
- **Overall viability:** Despite Aible's rapid growth and recognition, it is less well-funded and recognized than its larger and more established competitors. Aible is, however, initiating strong partnerships with large vendors such as Intel, Salesforce, Dell and Boomi.
- **Product or service:** Language and vision services are available, but developers should be aware that Aible uses pretrained third-party models for certain services; it is important to note that in many cases pretrained models are a viable option. These models can be deployed like native Aible models (in serverless form) to minimize costs and maximize scale. The third-party models can be stand-alone or chained with other models. Developers should be mindful that growing complexity has to be carefully monitored in this instance.

## Alibaba Cloud

Alibaba Cloud is a Challenger in this Magic Quadrant. The Alibaba Cloud product offers a complete set of CAIDS, spanning language, vision and autoML services. The company packages these services in a number of ways to suit professional and citizen developers. It also offers prebuilt services for industries including banking, finance, insurance, education, government, healthcare, manufacturing, media and entertainment, retail, transportation/logistics, and gaming. Alibaba Cloud is a subsidiary of Alibaba, a publicly traded company with 48 global offices. Its operations are mostly in China. It also has a smaller presence in EMEA, North America and other Asia/Pacific countries.

## Strengths

- **Innovation:** Alibaba Cloud's AliceMind platform is an open platform on which developers can customize their AI models. It offers large-scale, pretrained models and source codes on GitHub. The company's strong R&D support, powered by the Alibaba DAMO Academy (Academy for Discovery, Adventure, Momentum and Outlook), further accelerates innovation. Its newest developments include a "digital human," few-shot learning for natural language, and document AI achieved via multimodal deep learning, which involves layout analysis, understanding of table content, font analysis, and paragraph hierarchy generation and understanding. Additionally, Alibaba Cloud's strong multimodal pretrained model could help translate sign language into voice or text output.
- **Market responsiveness and track record:** Alibaba Cloud has an extensive set of CAIDS, of industry-leading accuracy, packaged for use by both professional and citizen developers. Its AI marketplace offers more than 1,600 models.
- **Sales execution and pricing:** Alibaba Cloud's CAIDS offering maintained good sales momentum in 2021. The company offers flexible pricing: either pay-as-you-go or periodic charges. It also provides some free APIs for developers (especially startups).

## **Cautions**

- **Offering (product) strategy:** Although Alibaba Cloud's new Lingjie brand provides language, vision and AutoML services with comprehensive capabilities, the solution had not been fully integrated with the AliceMind platform during the evaluation period for this Magic Quadrant.
- **Geographic strategy:** Alibaba Cloud has limited coverage outside Asia/Pacific. About 99% of its CAIDS clients are based in China. Alibaba Cloud has only a small footprint in the U.S., Europe and the Middle East, and has no coverage of South America. Its 2022 expansion plans continue to focus on China and Asia/Pacific.
- **Customer support:** Although Alibaba Cloud provides comprehensive customer support for its CAIDS, it has fewer CAIDS service partners than its major competitors. This might limit its ability to expand the depth and breadth of its solutions.

## Amazon Web Services

Amazon Web Services (AWS) is a Leader in this Magic Quadrant. Its AI services, including Amazon SageMaker and other popular language and vision services, are designed to automate the full AI development and operationalization cycle. It has a strong global presence in the CAIDS market, with customers across all industries. AWS allows customers to build solutions on their own, with the assistance of dedicated AWS personnel, or with the help of consulting partners. AWS is an attractive choice for production workloads, due to low operational costs and the breadth of its AI services and infrastructure choices.

### Strengths

- **Execution:** AWS is the highest-scoring vendor for Ability to Execute. It demonstrates strong AI product strategy, market understanding, marketing strategy, sales strategy and business model execution. As a result, AWS is steadily expanding its presence in the CAIDS market by attracting hundreds of thousands of customers to its AI services.
- **Geographic strategy:** AWS offers an extensive global cloud infrastructure. Its Availability Zones provide greater coverage than any of its competitors, spanning most regions. There are also plans to expand into more regions. AWS makes it simple for customers to deploy their models on autoscaling Amazon ML instances across multiple Availability Zones.
- **Product or service:** AWS excels in terms of AI operationalization and production scalability. Using Amazon SageMaker, developers can deploy trained models in production environments with a single click. Additionally, SageMaker's architecture enables developers to integrate their new models into an application simply by giving basic instance specifications, and changes to models do not require changes to application code. AWS offers a variety of instances and has built its own chips for AI to support training and inferencing. It also innovates to optimize the performance of open-source tools like TensorFlow and PyTorch.

### Cautions

- **Vertical/industry strategy:** AWS provides strong general-purpose AI capabilities, but lacks a breadth of industry solutions. AWS is, however, making some progress in this regard by offering fragmented solutions such as Amazon Forecast, Amazon Transcribe Medical, Amazon Comprehend Medical, Amazon Lookout for Equipment and Amazon Monitron. AWS fills the gaps in otherwise complete solutions with its guidance and blueprints. It has also introduced Amazon SageMaker JumpStart to get developers started on the most common use cases.

- **Innovation:** AWS is behind its competitors in terms of responsible AI. Amazon SageMaker Clarify represents, however, a promising step toward providing explainability. AWS must accelerate its responsible-AI efforts to compete with the other Leaders in this regard.
- **Offering (product) strategy:** AWS is the only Leader lacking a multicloud and hybrid-cloud vision. Customers looking for multicloud and hybrid-cloud solutions from AWS have limited options and will likely need to partner with other vendors in this Magic Quadrant, such as Dataiku and H2O.ai. For computer vision, however, customers can consider AWS Panorama, an ML appliance and SDK, which can use on-premises cameras to make predictions locally.

## Baidu

Baidu is a Challenger in this Magic Quadrant. Baidu offers an extensive range of AI services for autoML, language and vision functions. Its operations and clients are mostly in China, but it also has some presence in the U.S. Its Baidu Brain services support its internal AI and its commercial AI services. Baidu has more than 1,300 employees who focus on the commercial CAIDS portfolio. Baidu's AI Technology Group and AI Labs have about 2,000 employees, who develop technologies such as PaddlePaddle (an open-source deep learning framework), AI chips, DuerOS (a virtual assistant) and Baidu Apollo (for autonomous driving).

## Strengths

- **Innovation:** Baidu is a leading AI innovator. By November 2021, it had more AI patents in China than any other company. It has patents for deep learning, language, vision, autonomous vehicles and industry-specific solutions. It is also a leader in Chinese natural language processing (NLP). Additionally, Baidu recently launched XiLing, a platform that can generate a digital avatar to provide sign language services for people with hearing impairments.
- **Marketing strategy:** Baidu hosted its Create 2021 virtual event for AI developers in its XiRang app. This was the first AI event to offer a metaverse experience. Baidu's proposed "AI middle office" concept draws on Baidu Brain's broad portfolio of AI technologies in a variety of intelligent industry solutions for the finance, energy, internet, education, operations, manufacturing and government sectors, among others. This approach helps customers build a unified AI infrastructure and integrate AI assets. It also promotes collaborative, reusable and agile application development to accelerate the journey toward intelligent applications.

- **Business model:** Baidu's AI acceleration plan helps AI startups to grow by using Baidu's AI techniques. In addition, Baidu's PaddlePaddle is the leading open-source deep learning platform in China, where it serves more than 4 million developers.

## Cautions

- **Geographic strategy:** Baidu's AI solutions are geared primarily to developers in China. Some of its natural language offerings, like text analytics and sentiment analysis, are available only in Chinese. Baidu plans to expand in North America and across Asia/Pacific, but has yet to demonstrate success in these regions. Its lack of non-Chinese language support may limit its ability to expand.
- **Vertical/industry strategy:** Although Baidu's AI technology is market-leading, its strategy for channeling industry solutions is less established than those of its major Chinese competitors (such as Alibaba with its e-commerce platform, or Tencent with its ecosystem built around gaming and social media). As a result, Baidu might face challenges when trying to expand within its target industries.
- **Sales execution and pricing:** Baidu offers competitive prices, but its per-customer contract value is relatively low, compared with its competitors. Baidu's pricing strategy helps it expand its customer base at this stage, but might raise questions about its profitability in the long run.

## Clarifai

Clarifai is a Niche Player in this Magic Quadrant. The company is best known for image services and has been a strong provider in that area for a number of years. Its CAIDS offering and roadmap span all three use cases: language, vision and autoML. Its operations are geographically diversified. Its clients tend to be midsize and large enterprises, from all major sectors. Although Clarifai grew significantly in terms of sales and partnerships in 2021, it is still a midstage startup and not yet profitable.

## Strengths

- **Market understanding:** Clarifai has a strong understanding of the market, with a sharp focus on developer workflows. It provides software engineering teams with all the features they need to build AI-enabled business applications, including APIs, accelerators, pretrained models (with the ability to fine-tune them) and end-to-end machine learning operations (MLOps) features.



- **Offering (product) strategy:** Clarifai plans to strengthen its offering further in 2022. Its roadmap includes industry-focused solutions, new hardware accelerators, on-demand synthetic data generation, community-driven and custom plug-ins, crowdsourced labeled datasets, token-level tags, the ability to upload models, improved drift statistics and improved embedding visualization.
- **Innovation:** Clarifai invests more than half its revenue in research and development. Planned innovations in language services include zero-shot text classification, knowledge graph linking and speaker identification. Its innovation plan for vision services includes 3D data labeling, spatial-temporal video action detections and synthetic data generation for manufacturing. Clarifai also plans to develop distributed learning and federated learning capabilities for the autoML use case.

## Cautions

- **Overall viability:** Clarifai is a relatively small, venture-funded company that is competing with the cloud giants. Although Clarifai has grown consistently since 2013, it must continue to execute strongly to sustain its financial growth.
- **Geographic strategy:** Clarifai does not have personnel in all the regions where its customers are located. Prospective customers should make sure that they will get the service and support they need within the SLA parameters they desire.
- **Operations:** Clarifai has dedicated operations and support personnel spread across EMEA and U.S. time zones. However, the number of personnel is low, compared with other vendors we evaluated. Large enterprises must work closely with Clarifai to ensure they get the level of support they expect.

## Dataiku

Dataiku is a Niche Player in this Magic Quadrant. Its platform provides strong autoML services and some language and vision services, and offers data, analytics and AI designed for a variety of users. Dataiku's operations are global and its services are available in most regions. It has customers across most industries. Dataiku enables developers to build data pipelines, data visualizations, ML and deep learning projects, and end-user applications. It has MLOps and ModelOps capabilities to scale AI within enterprises. It emphasizes its platform's ease of use, time to value, composability and support for collaboration between various roles in order to deliver AI solutions. It announced a Series E funding round in 2021.

## Strengths

- **Offering (product) strategy:** Dataiku's platform is an end-to-end offering with both visual and programmatic interfaces. It is designed to empower users with different skills. Its projects and components are modular, transparent and reusable. Developers can build AI services through a variety of options offered by Dataiku extensions, hosted services and autoML. Customers can use trained models from technology partners. Dataiku also orchestrates more than 30 open-source tools.
- **Market understanding:** Dataiku is attractive to customers with multicloud strategies, especially those needing portability. Dataiku supports cloud services from AWS, Microsoft (Azure) and Google Cloud Platform. On each cloud, it provides a fully managed, fully featured setup that includes elastic AI, advanced security, R support and autohealing.
- **Customer experience:** Dataiku customers have praised its customer support. The company offers concrete SLAs for all customers at no additional cost (beyond licensing fees), based on classification of errors. It also provides customized support models to customers who need additional guidance.

## **Cautions**

- **Market responsiveness and track record:** Dataiku is known for its formidable data science and ML platform, but has yet to gain equal recognition from AI developers, despite developer-friendly features such as its integrated development environment (IDE), notebook and DevOps integrations.
- **Product or service:** There are functionality gaps in Dataiku's language and vision services. It does not offer text to speech, real-time language understanding or tools with which developers can customize the language models. There are also deficiencies in its video-processing and optical character recognition (OCR) capabilities. Customers can work around these gaps, however, with the help of Dataiku's code recipes.
- **Sales execution and pricing:** Dataiku needs to improve the clarity and flexibility of the pricing options for its enterprise AI platform to accommodate a wider variety of organizations and business models.

## Google

Google is a Leader in this Magic Quadrant. It offers language, vision and autoML services via Vertex AI on the Google Cloud Platform (GCP). Google's services focus on deep neural network (DNN) models. Google offers solutions for five industries, with more on its roadmap. It also offers horizontal solutions called Contact Center AI and Document AI, along with pretrained ML models that developers can customize. In 2021, Google registered strong growth in revenue, customer base and partner network. It is a leader in AI research and responsible AI, with more than 3,500 researchers having produced over 6,000 research papers.

## Strengths

- **Market understanding:** Google's AI and ML services are appreciated by the developer community. The release of Vertex AI has integrated its tools for building, deploying and managing AI and ML models. This integration helps to reduce the time to production for models built using Vertex AI. Specific offerings for developers include BigQuery ML, AutoML and ML APIs. In addition, the What-If Tool can be used by data scientists and developers to assess and debug ML models.
- **Innovation:** In the field of responsible AI, Google has well-defined ethics processes and can quickly address concerns about AI on a case-by-case basis. It has model cards that clearly explain the essential elements of an ML model, and fairness indicators that automatically assess bias in datasets and models. The company's AI principles focus on accountability and avoiding unfair bias. These principles guide Google Cloud's responsible AI efforts and how it consults and works with customers and partners.
- **Product strategy:** Google's architecture builds on its core AI services with Vertex AI Pipelines and Vertex Explainable AI. Its portfolio also includes vision, conversational AI, language and structured data, and optimization services. Google has built industry-specific solutions on top of this services layer, including solutions for retail, financial services, manufacturing, media and healthcare. Google's architecture is clear to, and understandable by, developers.

## Cautions

- **Offering strategy:** Google's research and product development efforts focus almost exclusively on neural networks, with little attention paid to symbolic AI. By contrast, several of Google's competitors are experimenting with the potential to combine deep learning with more mature symbolic AI approaches. While having excellent language capability overall, Google has somewhat limited language support for sentiment analysis and text analytics.

- **Business model:** Google does not fully support deployment of AI services in private clouds or on-premises. However, customers can create workarounds using edge deployment capabilities, Kubeflow and Google's AI Platform Pipelines offering.
- **Vertical/industry strategy:** Although Google has strong vertical market offerings, the number of industries these address is less than those addressed by the vertical market offerings of other vendors.

## H2O.ai

H2O.ai is a Niche Player in this Magic Quadrant. Its platform provides language, vision and autoML services that can run in cloud, on-premises, edge and hybrid environments. It has customers in most industries. The H2O AI Cloud grew tremendously in 2021. H2O.ai remains a thought leader in autoML across structured, time-series, image, video, audio, text and document data.

The company is a major open-source contributor, with 20,000 companies supporting H2O.ai's open-source offering and more than 1 million users. H2O.ai invests resources in AI for Good to solve global problems, such as conservation issues and natural disasters.

## Strengths

- **Market responsiveness and track record:** H2O.ai continues to innovate in relation to its CAIDS offerings. This is shown by its cutting-edge autoML features; MLOps for the deployment, management and governance of models; Hydrogen Torch for no-code deep learning model training; low-code Python AI application development framework; and explainable AI to help developers build and operationalize AI solutions faster.
- **Market understanding:** H2O.ai's focus on AI democratization aligns well with the demands of the growing number of AI developers. H2O.ai co-creates AI products with its customers and community by bringing to bear its technology, AI expertise, go-to-market support, training and enablement, while customers contribute their domain acumen and data. For example, H2O.ai has co-created an AI Feature Store with AT&T, and fintech apps with the Commonwealth Bank of Australia. Additionally, H2O.ai has prioritized vertical solutions for healthcare and financial services and for business operations and customer service.

- **Sales strategy and partnerships:** H2O.ai has been aggressively revamping its sales approach. It has introduced a consumption pricing model, whereby customers consume cloud AI units that can be applied to any H2O AI Cloud service. Developers can sign up for the free tier and begin using the H2O AI Cloud platform directly from its website. H2O.ai is also expanding its partnerships, including with global, regional and vertical system integrators, cloud partners and technology providers.

## **Cautions**

- **Customer experience:** The experiences of H2O.ai's paying customers and some open-source users appear to differ. Most paying customers appreciate the fast and competent responses they receive. They also have access to top data science talent called "Kaggle grandmasters." However, some H2O.ai open-source users have reported issues. To maintain its good reputation, H2O.ai needs to manage the experience it provides for open-source users.
- **Operations:** H2O.ai has resource constraints that affect its ability to cover global operations, especially in regions where its presence is growing. The company is vague about its distributed operations and metrics. Additionally, although H2O.ai's community support and self-service work well for users competent in ML, most developers need additional guidance.
- **Product or service:** Speech to text is available only through a custom recipe, and it needs additional work to export the model for use within other applications, including other NLU tools. Also, although H2O.ai implements hundreds of custom recipes for the H2O Driverless AI platform to provide additional capabilities and education for developers, many other AI vendors now also take a recipe-based approach.

## **IBM**

IBM is a Leader in this Magic Quadrant. Its services span all segments of the CAIDS market. Its operations are global, and it has customers across all industries. IBM has consolidated its AI offering under the Watson brand, and refined its requirements for products and services to clarify Watson's positioning. IBM has also strengthened the integration between its industry-leading research division and its product organizations to ensure that IBM innovations are added to products in a timely fashion. IBM has a strong presence in vertical markets and is a leader in responsible and trustworthy AI. It leads with a true hybrid cloud strategy that appeals to most customers.

## **Strengths**

- **Product or service:** IBM's language services are especially strong. Developers can integrate IBM Watson Assistant, Watson Natural Language Understanding and Watson Discovery to streamline discovery and creation of intents and entities. This can facilitate creation of custom virtual agents. IBM's vision services are also highly competitive, especially its video content analysis capabilities. Additionally, IBM's ML services perform well and have strong bias detection capabilities.
- **Market understanding:** IBM has a robust portfolio of CAIDS that target a wide range of customer needs. IBM has consolidated its AI products, services and brand management activities into one organization. The company has focused on delivering strong solutions for developers. Its tools are developer-friendly, providing both low-code and coded development assets that enable developers to build solutions rapidly.
- **Overall viability:** IBM's robust geographic strategy and vertical market focus position the company to continue offering a strong portfolio for developers across a wide range of use cases and solutions. IBM's breadth of understanding, coupled with its consolidated AI strategy and focus on hybrid cloud solutions, gives it an advantage when addressing the developer market.

## **Cautions**

- **Sales strategy:** IBM's sales strategy is somewhat confusing for developers. One of its preferred partners is its IBM Consulting arm. In some cases, this arm may be seen as being in direct competition with independent development firms. Additionally, IBM's reputation in the CAIDS market is sometimes influenced by the strength of the solutions that IBM Consulting builds and deploys – and implementations of these solutions have had mixed results.
- **Market responsiveness:** Although IBM's overall offering is generally comprehensive and competitive, it is lacking in some areas, such as image labeling and image generation. Additionally, IBM lacks crowdsourcing capabilities and synthetic data creation, which are valuable in selected use cases. IBM's offering is also missing some feature-engineering and model-building capabilities. Lastly, IBM does not offer automated building of image and video content analysis models.
- **Sales execution and pricing:** Some customers have stated that IBM's pricing is excessive, with high transaction costs over the course of a project. IBM says it is working to address this.

## Microsoft

Microsoft is a Leader in this Magic Quadrant. Its Azure AI platform has a comprehensive offering for all three use cases: language, vision and autoML. Microsoft's operations are global, and it has customers across all industries. Its services can be consumed by professional developers via APIs and SDKs, and by citizen developers via Microsoft Power Platform. Microsoft leads the industry in terms of enterprise-quality properties, such as integration, scalability, performance, security, privacy, transparency, explainability and responsible use of AI.

### Strengths

- **Business model:** Microsoft differentiates its AI developer services by making it easy for both professional programmers and citizen developers to use ML, language and vision services in their applications. Microsoft's internal use of CAIDS across its product lines provides a distinct advantage, enabling it to improve quality and time to market faster than its competitors.
- **Sales execution:** Microsoft competes with the nimbler vendors in this market by offering its AutoML features for free and charging for compute and storage. To serve customers with a high volume of AI workloads, Microsoft is introducing a "commitment tier." This option (currently in public preview) will offer a lower per-unit price but require a constant-use commitment. Microsoft also invests heavily in sales engineering. Its AI solution architects, also known as AI rangers, are dedicated to making proofs of concept successful and deployable.
- **Market responsiveness and track record:** Microsoft has democratized AI development by making it easy for fusion teams to consume AI safely and responsibly. The company draws on and contributes to many projects in the open-source community. It continuously improved its services in 2021, with more than 30 launches, including major feature releases. Additionally, Microsoft is encouraging developers to commit to its marketplace by reducing commissions to 3% (down from the industry average of 20%).

### Cautions

- **Geographic strategy:** Microsoft offers its full portfolio of services in the Americas, but does not offer all these services elsewhere. Potential customers should determine whether Microsoft offers and supports the services they need in their region.

- **Customer experience:** Customer sentiment for Microsoft is lower than that for other Leaders in this Magic Quadrant. Potential customers should insist on a strong commitment to service from Microsoft beyond the initial sale.
- **Product or service:** To continue offering a solid product, Microsoft needs to keep up with its competitors in terms of targeting new hardware platforms and accelerators. It must also deliver innovations in feature engineering, such as mixed-modal feature generation. Its lack of synthetic image generation is another limitation.

## Oracle

Oracle is a Visionary in this Magic Quadrant. Oracle is broadening its portfolio of AI services beyond Oracle Digital Assistant and its other applications to provide autoML, language and vision services. Its operations are global, and it has customers across all industries. Oracle has consolidated its AI portfolio under a newly formed team (including personnel new to the Oracle organization) and has an aggressive plan to expand its offerings. Oracle's strengths lie primarily in its language-focused conversational AI platform and its NLU and text analytics. Some of its autoML services are also competitive.

## Strengths

- **Product strategy:** Oracle has strong NLU capabilities, its NLU product being among its most mature offerings. The company also has good autoML capabilities. Additionally, it has a well-defined roadmap for expanding and improving its CAIDS portfolio.
- **Marketing strategy:** Oracle has a strong developer outreach program and a strong following among the developer community, both of which provide opportunities to expand its offerings in this market. The company has the resources to successfully market the AI services it is developing.
- **Market understanding:** Oracle's market vision promises to deliver a strong portfolio of CAIDS services, and it has a very aggressive timeline for this delivery. It has begun to address the evolving needs of the market with a new organizational structure and a promising strategy to deliver these services.

## Cautions

- **Market responsiveness and record:** Oracle has expressed an intention to become a stronger player in the AI services market before, but has been slow to deliver a competitive offering. Its current CAIDS effort supports this intention with ample resources and a restructured organization, but correct execution will be key.



- **Product or service:** Although Oracle offers competitive AI services, there are many gaps in its offerings. To compete in the CAIDS market, Oracle must quickly expand beyond its limited range of AI services.
- **Geographic strategy:** Although Oracle has broad geographic coverage, it has limited language support for its CAIDS, except for NLU. Oracle has some translation capabilities, but must significantly enhance its other services to compete with other vendors.

## Prevision.io

Prevision.io is a Niche Player in this Magic Quadrant. Its platform focuses on helping data scientists and software engineers develop, operate, maintain and manage ML models using autoML services. The company's operations are mostly in EMEA and North America. Its clients tend to be midsize and large enterprises in the banking, finance, insurance, and energy and utilities sectors. Prevision.io is investing in improving its text to speech, speech to text, translation and generation capabilities within its language services portfolio. For its vision service offering, it is enhancing its video content analysis and labeling capabilities. For its autoML services, it is investing in model compliance and autolabeling features.

## Strengths

- **Overall viability:** Prevision.io's revenue grew by 60% year over year in 2021, with a strong sales pipeline. The number of active users on the Prevision.io platform also increased significantly. Additionally, the company made solid progress with its partnership strategy, but is not yet profitable.
- **Vertical/industry strategy:** Prevision.io's platform has gained strong traction in the banking, finance and insurance sectors. The company is partnering with industry specialists to develop autoML events that prevent fraud and improve recovery. It is also winning more new customers in the energy and utilities sector and in the healthcare and transportation industries.
- **Sales strategy:** Prevision.io has a solid sales pipeline, which it plans to strengthen further by expanding its direct salesforce, investing in its indirect channel strategy and focusing on industry-specific sales.

## Cautions

- **Product or service:** Prevision.io has a full-featured autoML offering, but its language and vision services are among the least capable offered by vendors in this Magic Quadrant. Customers will need to depend on other vendors for language and vision capabilities to complement Prevision.io's autoML platform.
- **Geographic strategy:** Prevision.io's resources and customers are primarily located in EMEA and North America. Most are in France and the U.S. Customers should ensure that Prevision.io offers its platform in their country and can provide the level of support they need.
- **Marketing execution:** Prevision.io's marketing efforts focus on data scientists, though its platform and product roadmap for 2022 includes features useful to both data scientists and software engineers. Customers should look beyond the company's marketing and test the platform to discover its engineering features.

## Tencent

Tencent is a Challenger in this Magic Quadrant. Best known as the world's largest gaming company and for its WeChat and QQ messaging, social media and mobile payment applications, Tencent offers CAIDS for vision, language and autoML use cases. Tencent launched its AI Lab in 2016 and opened an AI research center in Seattle, Washington, U.S. in 2017. Its innovation, implemented solutions, consumer platforms and array of multimedia data enable Tencent to develop advanced, scalable capabilities. Tencent has offices in 11 countries, and more than 1,170 employees working on CAIDS services. Its operations and customers are mostly in China, but about 10% of its customers are in other Asia/Pacific countries and the U.S.

## Strengths

- **Innovation:** Tencent's YouTu Lab is one of the leading AI research centers focused on vision services and deep learning. Tencent draws on its extensive AI resources for gaming, vision and other services to experiment with and perfect its capabilities. Its image recognition function enables end users to identify the specific brand, name, model or style of a product in an image and to generate the product's price and an overview. Tencent also has a strong portfolio of computer vision services, including video services (such as facial recognition, human body analysis and sentiment analysis), image manipulation and analysis, and robust OCR.

- **Sales strategy:** Tencent has used its analytics and operations presence within consumer businesses to develop one of the broadest partner ecosystems in the CAIDS market. Tencent has a strong partnership program for service providers and other software platforms. In addition, it partners with its existing customers of various sizes in different industries, many of which are accessible to developers from its WeChat and gaming ecosystems. As a result, Tencent has access to a wide array of domain expertise and technical services.
- **Sales execution and pricing:** Tencent's CAIDS revenue grew significantly in 2021, with accelerated growth in its computer vision sales. Tencent's well-established channels and expansive partner ecosystem help boost its sales performance.

## Cautions

- **Geographic strategy:** Tencent's vision service covers multiple countries, but, with regard to its language and autoML services, Tencent focuses on expanding within China. This focus is reflected not only in Tencent's go-to-market strategy but also in its limited language support. For example, its sentiment and text analytics services are available only in Chinese.
- **Offering (product) strategy:** Tencent launched the Qianfan Plan in 2020 to offer various marketplaces for its technology. However, the depth and breadth of its offering is still comparatively weak, and it has yet to gain traction with AI developers.
- **Product or service:** Tencent enhanced its autoML capabilities in 2021, but they are still relatively limited, compared with those of its vision offerings, and continue to lag behind most of its competitors' capabilities. Also, Tencent provides no natural language generation capabilities. This might reduce the competitiveness of its language services in future.

## 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

- **Dataiku:** Dataiku has expanded its product focus beyond data scientists to offer AI capabilities for developers. As a result, it qualifies for inclusion in this year's Magic Quadrant.

## Dropped

- **Salesforce:** Salesforce has changed its AI strategy to focus on delivering embedded capabilities in its own applications and platform. Due to this shift, it has discontinued its CAIDS offering.

## Inclusion and Exclusion Criteria

To qualify for inclusion in this Magic Quadrant, each vendor had to:

- Demonstrate a go-to-market strategy for CAIDS.
- Offer a functional set of autoML services that can create functioning ML models (as outlined below).

### Automated Machine Learning (autoML) Services

These services enable people without significant ML or data science skills to customize services or build purpose-specific ML. In using autoML services, developers can create custom models or supplemental models to be used in conjunction with existing general services.

Types of autoML services include:

- **Automated data preparation:** This type of service can prepare datasets for use in training the models. It can cleanse and augment datasets from raw data provided by the enterprise, and can include data visualization.
- **Automated bias detection:** This type of service analyzes datasets used to train AI and ML models for potential bias. This bias can take the form of unbalanced samples due to oversampling, inclusion of data that is specifically prohibited by regulatory constraints, and other sources of potential bias in model output.

- **Feature engineering:** This type of service adds metadata to a dataset that is submitted to the provider. This augmentation can be done via the use of crowdsourcing capabilities or via ML models that evaluate the data and add metadata to the submitted dataset in an automated manner. The feature may also allow for automated detection and classification of features and the generation of new features from existing ones.
- **Automated model building:** This type of service requires users to provide datasets that can be used to train the models. In addition to raw data, users must provide datasets that include metadata tags with the attributes they want the models to be trained to identify. They must also identify the variables that they want the models to predict. This type of service analyzes the data and evaluates and recommends (or selects) algorithms that can be used to build and optimize the models, based on the best results. The service automatically optimizes the performance and accuracy of models by tuning their hyperparameters. It may also blend algorithms to optimize model performance.
- **Model management:** This type of service provides analytics and, in some cases, allows for corpus management for data used to train models, so as to ensure that models continue to perform optimally. It may provide automated training of the models by creating training, validation and testing datasets. The service may also select optimal hyperparameter values.
- **Model deployment:** This type of service may offer model factory (or orchestration) functionality to automate the building of ML pipelines, including model training, deployment, monitoring and management of models in production. It may also provide for packaging and provisioning of the infrastructure for the models created, such as Kubernetes containers. It should also automate the creation of APIs needed to access the models.
- **Explainability:** This type of service provides data science professionals and other professionals with an explanation of the workings of models, such as parameters and parameter weightings for a given model output and the algorithm methodology employed by a model.
- **Interpretability:** This type of service offers users of a model and people affected by the output of that model an explanation of how the model derived its output, in a manner that is understandable by general users.
- **MLOps:** This type of service monitors models in production environments and creates reports on model performance.

Vendors may also offer any of the language services and vision services listed below.

## Language Services

These services include:

- **Natural language processing:** This type of service offers functions such as tokenization, point of sale (POS) tagging, stemming, term frequency-inverse document frequency (TF-IDF), and other such text-processing functions.
- **Speech to text or automatic speech recognition (ASR):** This type of service is a subset of computational linguistics that takes analog input and converts it into text output. This text output can be the final product, or it can be entered into an NLU model, so that metadata can be extracted. Many computing devices, such as PCs and smartphones, have some built-in ASR capability.
- **Natural language understanding (NLU):** This type of service is a subset of natural language processing (NLP) that deals with machine comprehension. It takes textual input and extracts metadata from it. Extracting metadata is relatively straightforward, but being able to understand the intent of the person entering the text is challenging and often requires supplemental models.
- **Natural language generation (NLG):** This type of service creates natural language from machine representations, such as concepts, datasets or minimal descriptions in a knowledge base or logical form (such as a return form that generates a letter to a customer). The body of text that is delivered in natural language can be thought of as a translation of data into language.
- **Text to speech:** This type of service converts textual input into analog output or speech.
- **Translation:** This type of service takes text input from a source language and converts it into a target language as output. This is a very challenging task, as it is not just a matter of translating individual words into corresponding words in another language. Differences in language structure make accurate translation very challenging to achieve.
- **Sentiment analysis (emotion AI):** This type of service analyzes words, typically entered into a conversational or social model, for positive, negative or neutral sentiment. It may be supplemented by other services that analyze the tone of analog inputs.

- **Text analytics:** This type of service analyzes unstructured text using algorithms to extract elements — such as concepts, topics and keyword attributes — and add these as metadata.

## Vision Services

These services include:

- **Image recognition:** This type of service normally identifies what objects or people are contained in an image. Some implementations can also identify attributes of elements of an image, such as colors and patterns. This type of service is commonly used to identify whether people or items of interest are in an image and to add metadata to classify or tag images.
- **Video content analysis:** This type of service normally combines image recognition with ASR to identify people and animate and inanimate objects in a video, as well as to create a transcript of the associated audio. Some services also track people's direction across multiple frames of video.
- **Machine learning (ML)-enabled optical character recognition (OCR):** This type of service converts electronic images of typed, handwritten or printed text, or text in images or video, into machine-encoded text and adds metadata to the content. Additionally, this type of service uses ML to classify the information in a given field, based on the content of that field.
- **Image labeling:** This type of service enables users to submit image datasets and have them labeled.

Additionally, to qualify for inclusion in this Magic Quadrant, each vendor had to:

Have generated at least \$20 million in revenue from its CAIDS offerings in 2021.

Or:

Have at least 75 current paying enterprise customers for its CAIDS offerings.

We excluded any vendor that:

- Did not include autoML services in its CAIDS offering.

- Offered CAIDS only as part of a professional services contract, where the services are used exclusively by the vendor's consultants.
- Offered services that were not native services created and delivered by the vendor. As such, models built by customers using the vendor's platform were not considered.

## Honorable Mention

**Tazi:** Tazi has an innovative platform that offers continuous unsupervised retraining of models “on the fly,” depending on the data that comes into them and their recognized drift. The platform's adaptive ML engine retrains models incrementally on an ongoing basis, based on the changing data stream. Tazi did not satisfy the criteria for inclusion in this Magic Quadrant because of the recent date on which it launched its platform and its nascent position in the U.S. market during the period we evaluated. Tazi is, however, growing strongly and may merit examination by readers of this Magic Quadrant.



Evaluation Criteria

Ability to Execute

Table 1: Ability to Execute Evaluation Criteria

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

Source: Gartner (May 2022)

## Completeness of Vision

**Table 2: Completeness of Vision Evaluation Criteria**

<i>Evaluation Criteria</i> ↓	<i>Weighting</i> ↓
Market Understanding	Medium
Marketing Strategy	Medium
Sales Strategy	Medium
Offering (Product) Strategy	High
Business Model	Medium
Vertical/Industry Strategy	Medium
Innovation	High
Geographic Strategy	Medium

Source: Gartner (May 2022)

## Quadrant Descriptions

### Leaders

Leaders have robust offerings in all three key service areas: autoML, language and vision. Their CAIDS offerings are accessible via APIs and do not require developers to have data science expertise. Leaders also provide supporting capabilities to enhance their core services, including automated bias detection and mitigation, feature engineering, NLP, image labeling, MLOps, and AI that is explainable and interpretable. Leaders serve multiple regions and support multiple languages.

## Challengers

Challengers are typically large businesses with substantial assets. Challengers have the resources to invest in developing their CAIDS services, but may offer a limited portfolio of services, due to their focus on other priorities. Challengers may operate regionally or globally. They may even dominate in one region.

## Visionaries

Visionaries are most commonly aspirational when it comes to the CAIDS market. They have the resources to compete in this market, but have yet to deliver a competitive portfolio of services. Visionaries often have a subset of the overall services needed in the market, and intend to expand their services to compete with Leaders.

## Niche Players

Niche Players typically focus on a narrower range of AI services than Leaders and Challengers. They are often smaller businesses that have limited resources to invest in their services. Niche Players have limited reach and visibility outside their home region.

## Context

In this Magic Quadrant, we evaluate CAIDS vendors that provide autoML services. These vendors may also provide language service and vision services that augment their autoML services. We exclude vendors that do not offer autoML services, because most software engineering leaders need tools that enable their developers to create or customize ML models. Most development teams do not build ML models themselves and will need to rely on autoML services and in-house models built by data scientists.

There are also many custom AI and ML services that focus on specific use cases — too many to discuss in this Magic Quadrant. However, many of these services may appeal to development teams, as they are designed to build models that address a predefined need.

AutoML services are essential for building a fully integrated MLOps pipeline, where developers do not have to assemble individual tools and figure out how to make them work together. This automated pipeline can improve developers' productivity, enabling them to rapidly deliver new and enhanced application functionality.

As developers become more familiar with AI and ML models and the functionality they can add to applications, they will increasingly take on some or all of the responsibilities of ModelOps:

- They will be responsible for monitoring and managing ML models in the applications where they are deployed.
- They will extract information from (or add metadata to) unstructured text or data assets.
- They will use autoML services to build ML models that suggest next best actions, forecast prospects' propensity to purchase or automate decision making for business workflows.

As more developers use CAIDS to build ML models, collaboration between developers and data scientists will become increasingly important. As these two disciplines become more interconnected, software engineering leaders must clearly delineate developers' responsibilities from data scientists' responsibilities. By creating and communicating this distinction, they will help reduce duplication of effort between the DevOps and ModelOps pipelines, thus enabling closer collaboration between the two teams. Software engineering leaders must also help their developers learn the skills required to support ModelOps.

Vendors and customers alike are seeking more than just performance and accuracy from ML models. In addition to these functional requirements, CAIDS vendors are focused on improving their models' explainability, transparency and bias detection and mitigation features. Software engineering leaders must educate themselves and other stakeholders about these features. When selecting autoML services, they should prioritize vendors that excel at providing explainable, transparent models with built-in bias detection and compensatory mechanisms.

## Market Overview

Organizations are increasingly using sophisticated AI technologies to solve complex problems. By 2025, the market for AI software will reach almost \$134.8 billion. The rate of growth in the AI software market will increase from 14.4% in 2021 to reach 31.1% in 2025, considerably outpacing overall software market growth (see [Forecast Analysis: Artificial Intelligence Software, Worldwide](#)).

The rise of AI and ML presents a challenge for software engineering leaders, as few developers are data science experts. The DevOps cycle for AI models (also known as ModelOps) is not overseen by a mature practice in most software engineering teams. In the 2021 Gartner 2021 Application Innovation Implementation Survey, more than 75% of IT leaders indicated that fewer than 25% of their organization's software engineers were trained in ML.

Although ModelOps practices are maturing, most software engineering teams still need AI capabilities that do not demand advanced ML skills. For this reason, cloud AI developer services (CAIDS) are essential tools for software engineering teams. A recent Gartner Research Circle survey ([Survey Analysis: AI Adoption Spans Software Engineering and Organizational Boundaries](#)) shows that 43% of enterprises make moderate to extensive use of AI and ML models in their applications. This points to the importance of CAIDS services for application developers.

## CAIDS Enable Developers to Build Next-Generation Applications

We predict that, by 2025, 70% of new, internally developed applications will incorporate AI- or ML-based models. CAIDS provide developers with the autoML capabilities they need to create and customize ML models for their applications. These ML models can classify information, predict trends, assess risks, automate processes and improve a business across all functional areas and workflows.

Software engineering teams are using ML models to build compelling applications by adding to, or otherwise enhancing, the functionality of existing applications and by creating entirely new types of applications.

## CAIDS Vendors Are Expanding and Improving Their Services

CAIDS vendors are expanding their portfolios of AI developer services across three key use cases: autoML, language and vision:

- **AutoML:** Smaller vendors continue to lead the innovation of AutoML capabilities, but large vendors are catching up. Vendors and customers are seeking more than just performance and accuracy from ML models. They are increasingly focused on the explainability, transparency and bias mitigation features of the models. Vendors are beginning to deliver these capabilities, while also providing the features developers need to rapidly develop, deploy and maintain models in production environments.
- **Language:** Vendors are developing massive language models that can deliver an expanded range of high-quality language service capabilities. The major cloud vendors are using their immense computing infrastructure to enable development of their proprietary language models. Despite being at a disadvantage in language services, smaller vendors are using open-source software, data and ML models to compete.

- **Vision:** Nearly every CAIDS vendor has improved its vision capabilities. In particular, Chinese vendors have vastly improved theirs, compared with 2021, driven by the prolific use of computer vision in China.

Software engineering leaders can benefit from the simplicity of using a single CAIDS vendor that provides autoML, language and vision services. This approach can improve the developer experience and streamline their workflow by enabling them to move fluidly between services. Using multiple vendors is not out of the question, however. Smaller vendors that specialize in AutoML could provide services and capabilities that align closely with developer use cases, and they could offer the greatest value.

## Evidence

### Gartner 2021 Application Innovation Implementation Survey

This survey was conducted online from 20 July through 12 August 2021 to help us understand adoption of application innovations in support of newly acquired or custom-built applications and software. The survey focused on the deployment of digital twins, the role of software engineering leaders in digital twin software engineering, and the use of AI in application development. In total, 111 IT and business leaders who were members of Gartner's Research Circle participated.\* Seventy-five were from Gartner's IT Leaders Research Circle — a Gartner-managed panel — and 36 were from an external sample. Members from North America (41%), EMEA (41%), Asia/Pacific (10%) and Latin America (9%) responded to the survey.

*Disclaimer: Results of this survey do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.*

## 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.

## Document Revision History

[Magic Quadrant for Cloud AI Developer Services - 24 February 2021](#)

[Magic Quadrant for Cloud AI Developer Services - 24 February 2020](#)

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## Recommended by the Authors

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

[How Markets and Vendors Are Evaluated in Gartner Magic Quadrants](#)

[Survey Analysis: AI Adoption Spans Software Engineering and Organizational Boundaries](#)



[Quick Answer: How Will Artificial Intelligence and Machine Learning Expand Software Engineering Leaders' Responsibilities?](#)

[Cool Vendors in Conversational and NLT Widen Use Cases, Domain Knowledge and Dialect Support](#)

[Applying AI — Techniques and Infrastructure](#)

[Case Study: Driving Speed to Value With AI/ML \(Kaiser Permanente\)](#)

[Case Study: Make AI Models Credible, Not Explainable \(Unity Health Toronto\)](#)

[Case Study: Monitoring the Business Value of AI Models in Production \(Georgia Pacific\)](#)

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