

# IDC MarketScape: Worldwide Machine Learning Operations Platforms 2024 Vendor Assessment

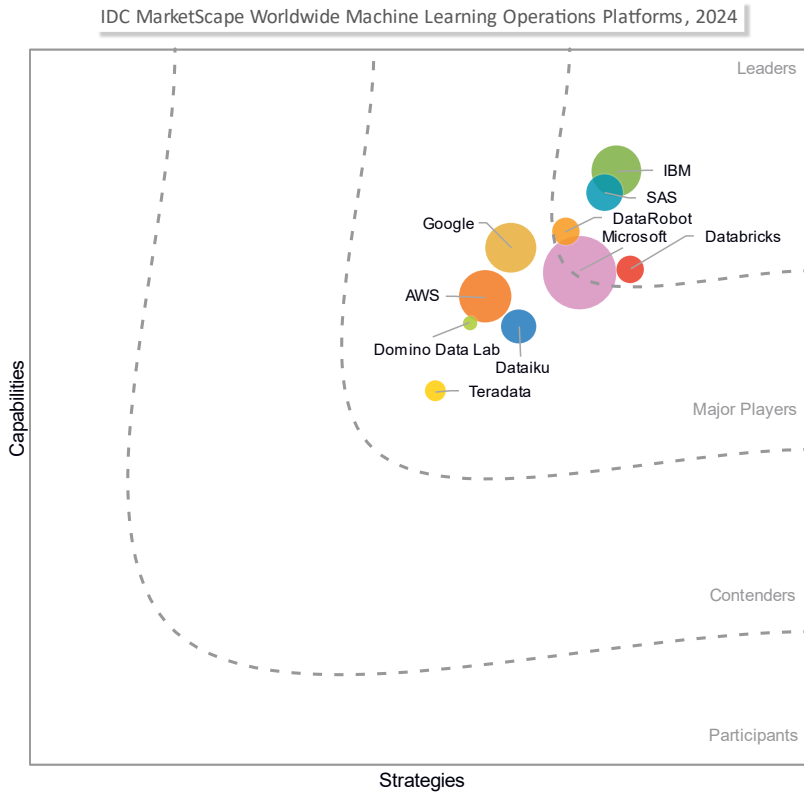
Kathy Lange

THIS IDC MARKETSCAPE EXCERPT FEATURES SAS AS A LEADER

## IDC MARKETSCAPE FIGURE

FIGURE 1

### IDC MarketScape Worldwide Machine Learning Operations Platforms Vendor Assessment



Source: IDC, 2024

Please see the Appendix for detailed methodology, market definition, and scoring criteria.

## IN THIS EXCERPT

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The content for this excerpt was taken directly from IDC MarketScape Worldwide Machine Learning Operations Platforms Vendor Assessment (Doc # US51573824). All or parts of the following sections are included in this excerpt: IDC Opinion, IDC MarketScape Vendor Inclusion Criteria, Essential Guidance, Vendor Summary Profile, Appendix and Learn More. Also included is Figure 1.

## IDC OPINION

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### Overview

Despite market uncertainties and economic challenges, artificial intelligence (AI) adoption continues to grow and expand across business functions, fueled partially by the excitement around generative AI (GenAI). AI has become a priority for organizations across all sectors. Technology buyers continue to invest heavily in traditional predictive and interpretive AI while experimenting with GenAI technology. As the AI market continues to grow, so do the concerns about implementing responsible AI practices. Responsible AI is the practice of designing, developing, and deploying AI in a way that ensures fairness, reliability and safety, privacy and security, inclusiveness, transparency, and accountability. There is a growing need for greater transparency and explainability of model results to promote confidence and trust in AI-based applications.

Organizations continue to struggle to industrialize traditional AI/machine learning (ML) applications. Many still have fewer than 10 models in production, and machine learning operations (MLOps) tools and best practices are still nascent. There are many inhibitors to realizing the rewards of AI investments — including infrastructure and organizational, operational, and business challenges. Businesses face a sprawling data estate with multiple data stacks and brittle MLOps processes. The governance of AI/ML data, models, and applications with comprehensive documentation, monitoring, and mitigation strategies is imperative for safe and effective scaling. Couple the challenges of traditional AI/ML with new struggles with the emerging role of generative AI in their overall AI portfolio. AI/ML implementation challenges remain in the areas of data, skills, manual processes, governance, trust, and orchestration to increase model velocity and trust.

The deployment challenges and the manual efforts required underscore the need for improved automation and CI/CD practices to improve efficiency. AI life-cycle software technology suppliers must continue to implement capabilities to reduce complexity for users to build and manage AI applications.

## **What Is Machine Learning Operations?**

MLOps uses technology and processes to streamline and automate the entire machine-learning life cycle and focuses on tools, architectural principles, and best practices to operationalize the AI/ML life cycle. The key capabilities include managing and automating ML data and pipelines, ML code, and ML models from data ingestion through model deployment, tracking, and monitoring. It uses the same principles as DevOps applied to machine learning processes. It also includes monitoring of data and concept drift.

MLOps stitches together different stages of the ML pipeline through automation. MLOps not only enables collaboration between data scientists and IT operators but also enables stronger collaboration between data scientists themselves for better model reuse. With MLOps tools and processes, IT operators can deploy, monitor, and troubleshoot models in production and trigger feedback loops back to the data scientists. Through automation and collaboration, MLOps also enables continuous delivery of machine learning models, thereby accelerating the pace of innovation.

MLOps platforms enable scalable ML pipelines to manage, track, and monitor multiple models simultaneously. MLOps platforms can also identify issues and trigger workflows to rebuild or retrain models or change data sets in case of model drift. Through these capabilities, end-to-end automation, and stronger collaboration between different personas, MLOps platforms can help accelerate model velocity.

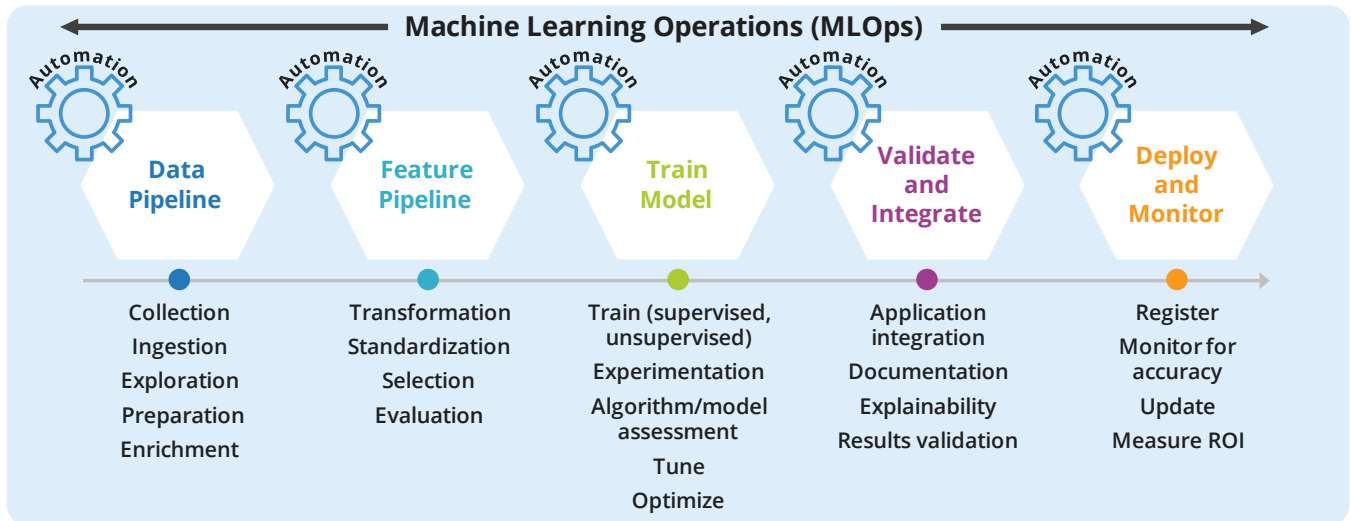
## **MLOps Broader Scope**

In the evolving landscape of machine learning operations, the industry is witnessing a significant shift toward a more holistic approach that encompasses the entire AI/ML life cycle. This broader definition of MLOps emphasizes the importance of automation across all stages of AI/ML development, from initial design to deployment and beyond. This approach contrasts with earlier perspectives that focused primarily on post-deployment phases of the AI/ML life cycle (see Figure 2).

**FIGURE 2**

## MLOps for the Traditional AI/ML Life Cycle

The AI/ML life cycle is a conceptual framework for model development through deployment.



Source: IDC, 2024

MLOps platforms must facilitate a more inclusive environment where both coders and non-coders can efficiently utilize shared resources, leading to optimized resource management and cost-effectiveness. This democratization of access not only improves project outcomes but also fosters a more collaborative and unified team dynamic, treating all contributors equally and valuing their input.

These developments promise to make AI more efficient, accessible, and impactful across various domains. As organizations continue to navigate the complexities of AI/ML implementation, embracing these innovations will be key to unlocking the full potential of artificial intelligence and machine learning.

A pivotal and rapidly evolving aspect of the MLOps evolution is AI-assisted capabilities and integration of GenAI within the traditional AI/ML life cycle. GenAI provides an opportunity to significantly enhance the AI/ML life cycle with new capabilities for automating and streamlining critical steps within the life cycle, including data and feature pipelines, model training, validation and integration, and model deployment and monitoring, all through a natural language interface. Copilots are poised to help a broad range of users with a diverse set of activities, drastically improving speed and efficiency, accelerating time to value, and addressing the organizational talent gap.

The shift toward a comprehensive MLOps framework, coupled with the integration of semantic technologies and collaborative platforms, marks a critical advancement in the

field of AI/ML. These developments promise to make AI more efficient, accessible, and impactful across various domains. As organizations continue to navigate the complexities of AI/ML implementation, embracing these innovations will be key to unlocking the full potential of artificial intelligence and machine learning.

The ideal AI platform of the future will be a unified AI platform that makes it easier to support an organization's entire AI portfolio and combine GenAI, predictive/prescriptive AI, plus other emerging types of AI, for the development of powerful, integrated AI solutions, including both standalone and embedded in enterprise apps. The unified AI platform will also be integrated and will interoperate with many other platforms in the enterprise, including the data platform, governance platforms, the software development life cycle, and both proprietary and open source tools.

## **IDC MARKETSCAPE VENDOR INCLUSION CRITERIA**

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The inclusion criteria are as follows:

- The offering must be a cloud-native (microservices-based and multi-container) offering, commercially available for use as a single product or a suite of services and for purchase by customers for at least one year as of January 1, 2024.
- The offering must be able to automate critical capabilities within AI life-cycle steps (data pipeline, feature pipeline, model training, validation and integration, model deployment, and monitoring), including fully automated model monitoring.
- The offering must be offered and available worldwide with balanced geographic penetration, with a disparity between primary and secondary geographies of no more than 40%.
- The offering must support cross-industry/general-purpose machine learning applications.
- The offering must have at least 50 commercial customers that used this product as of the calendar year 2023.
- The offering must have at least \$20 million in software/services revenue in the calendar year 2023.
- The primary offering must be based on the vendor's intellectual property (IP) but may include open source components.

## **ADVICE FOR TECHNOLOGY BUYERS**

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Critical business issues that lead to AI/ML project failure include organizational challenges, operational challenges, and business challenges. When considering the

purchase of an MLOps software platform, buyers should evaluate several key factors to ensure they select the best solution for their needs. Some critical considerations are:

- **Organizational needs and objectives.** Having a clear understanding of organizational business needs and objectives is a foundational step in ensuring that the solution aligns with strategic goals and operational requirements. MLOps requires collaboration between multiple personas with a mismatch of expertise and skills. Different users within the AI/ML life-cycle team will have varying needs based on their roles and responsibilities. Understanding user requirements is critical for ensuring the right MLOps software platform choice. Evaluate MLOps platform capabilities that support an integrated multidisciplinary skill set that fits with your current level of maturity and can support a growing maturity level as the organization evolves.
- **Operational needs.** Manual processes and a lack of standard tools between model training and serving environments significantly impact speed, efficiency, and model velocity. Evaluate MLOps platform capabilities for a standardized but flexible set of MLOps tools that support workflows, keeping modularity for future technology in mind without requiring large redesigns. Evaluate automation and AI-assisted capabilities that can augment critical AI/ML processes.
- **Business needs.** Many AI projects fail due to poorly understood business cases and output that isn't actionable. Take a measured approach to technology adoption through prioritization of AI/ML use cases. Ensuring a solid data foundation is a critical criterion for a use case evaluation. Select AI/ML use cases with a lens on the balance of achievability and ROI. Evaluate MLOps vendors and offerings for experience with your use cases and a track record of success in helping organizations apply the technology to specific business problems, providing tools, templates, best practices, or services to realize the measurable business value from its AI investments.

MLOps platforms continue to rapidly deliver new features and ecosystem integrations. Stay informed on the latest product development plans and releases that include AI-assisted and embedded GenAI features that will accelerate the AI/ML life cycle, drive efficiency, and optimize existing AI/ML investments.

## VENDOR SUMMARY PROFILE

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This section briefly explains IDC's key observations resulting in a vendor's position in the IDC MarketScape. While every vendor is evaluated against each of the criteria outlined in the Appendix, the description here provides a summary of each vendor's strengths and challenges.

## SAS

After a thorough evaluation of SAS' strategies and capabilities, IDC has positioned the company in the Leaders category in this 2024 IDC MarketScape for worldwide machine learning operations platforms.

SAS is an AI and machine learning software vendor. Its core AI and machine learning product is SAS Viya. The product is a cloud-based AI platform that provides an integrated environment that supports the entire AI/ML life cycle including business intelligence, data management, machine learning, and model management. SAS Viya provides a comprehensive platform designed to support MLOps across the entire analytics life cycle and cater to a wide range of analytic user profiles with no-code/low-code and coding interfaces.

SAS Viya supports a breadth of analytics disciplines including machine learning, forecasting, text analytics, and operations research in a single platform, with proprietary, performance-tuned algorithms, native data connectors, and integration with open source tools and frameworks. SAS Viya also supports both batch and real-time inferencing applications with integrated decision rules.

In addition:

- **Responsible AI:** SAS continues to add features and services to its comprehensive set of AI governance capabilities. It introduced workflows based on the National Institute of Standards and Technology's AI Risk Management Framework and most recently announced support for model cards and AI governance services to help organizations implement responsible AI policies:
  - **Data management tools:** SAS Viya offers a comprehensive suite of tools to support data privacy and governance, including data lineage, data masking, automated PII identification and redaction services, data loss prevention, and encryption tools.
  - **Synthetic data generation:** SAS Data Maker provides a low-code/no-code tool for tabular synthetic data generation. SAS Studio also supports synthetic data generation.
  - **Tools for bias detection and mitigation:** SAS Viya includes bias detection techniques to identify and adjust data for several different types of bias and PII that can be leveraged within the data cleansing workflow for mitigation.
  - **Centralized repository for model governance:** SAS Viya tracks model versions and model performance in a centralized, enterprisewide, and searchable repository for SAS, Python, and R open source models.
  - **Explainability features:** SAS Viya provides tools to explain machine learning predictions, including feature importance, partial dependence plots,

individual conditional expectation plots, local interpretable model-agnostic explanations, and Kernel Shapley values, to help users understand the model's results during the model development phase.

- **Model monitoring tools:** SAS Viya detects model drift and provides alerts for models in production, automatically generating performance monitoring charts and reports specific to the model type.
- **Model and/or services cards:** In 3Q24, SAS delivered support for autogenerated model cards for registered SAS and open source models.
- **Security and access controls:** SAS Viya provides a robust set of security and access controls for data, model, user, and network security.
- **GenAI integration:** SAS Viya Copilot assists users in tasks for code generation, code explanation, and automatically adding comments to code with a natural language interface. SAS Data Maker generates tabular synthetic data through a graphical user interface to augment data to build and test predictive models. Both SAS Viya Copilot and SAS Data Maker are currently in Private Preview. SAS Viya workflows and decision flows can integrate foundation models via APIs, enabling users to integrate generative AI alongside traditional analytics techniques. SAS has also introduced generative AI capabilities into its Customer Intelligence 360 solution for marketers.
- **Integrated AI and GenAI platform:** SAS is not a foundation model provider, nor does it support the adaption or governance of existing foundation models through training, fine-tuning, evaluation, or monitoring.
- **Interfaces for coders and non-coders:** SAS interfaces are multimodal for programmers and nonprogrammers, and users can code in SAS, Python, and R. Users can build visualizations, clean data, build features, train, deploy, and monitor models without writing code. Visual interfaces can be augmented with code blocks to enhance flexibility for specific tasks.

Quick facts about SAS include:

- **Year founded:** 1976
- **Headquarters:** SAS is headquartered in Cary, North Carolina, the United States, and is privately owned.
- **Total number of employees:** 12,000
- **Funding:** Owner funded (SAS is planning an IPO in 2025.)
- **Deployment options:** SAS Viya can be deployed on premises on all public clouds, hosted by SAS or remote managed by SAS.
- **Pricing model:** SAS Viya pricing is a subscription fee and usage based for the consumption of computing resources.



- **Related products/services:** In addition to its core AI and machine learning software with integrated decision management, SAS provides industry-specific solutions built on the SAS Viya platform. SAS also offers related services including professional services, benchmarking, and automated operations.

## Strengths

- **Performance and scalability:** SAS Viya's strength in performance and scalability is rooted in its in-memory architecture, parallel processing capabilities, efficient access to data sources, and breadth of deployment options including real time. In addition, Viya's cloud-native design allows it to scale horizontally and vertically, enabling the software to handle large data sets and complex analytics tasks efficiently.
- **AI governance:** SAS provides a comprehensive solution for enabling responsible and transparent AI practices throughout the model life cycle. SAS Viya offers advanced data privacy features, including automatic tagging of sensitive data and tools for anonymization and masking. It also provides essential capabilities like data profiling, lineage tracking, and a centralized model repository for effective AI governance and management.
- **Automation:** SAS Viya provides many automated features to streamline workflow across the entire life cycle, including semantic data type classification, automatic output statistics and visualizations, automated data splitting, AutoML, hyperparameter tuning, and automated explanation capabilities.

## Challenges

- **Market perception:** SAS is often viewed as a legacy provider of analytics and machine learning, with more modern alternatives available in the market. To overcome this perception, SAS must emphasize its ongoing commitment to rapidly delivering high-quality solutions that provide tangible value to customers. It must showcase its ability to consistently meet evolving market needs and attract forward-thinking enterprises seeking comprehensive features and expert guidance.
- **Pricing:** SAS continues to be challenged by open source and/or low-cost options for machine learning operations, and some companies are migrating to those platforms away from higher-cost products like SAS. Customer feedback indicated that the software could be expensive for medium-sized businesses and large deployments.
- **GenAI life-cycle adoption:** SAS has been a well-established partner for helping its customers deliver groundbreaking AI/ML-based solutions; however, its support for adapting and fine-tuning foundation models is lagging. Its reluctance

to embrace the generative AI life cycle may leave the company playing catch-up with buyers that seek a unified AI and GenAI platform.

## **Consider SAS When**

SAS' broad MLOps portfolio of capabilities within the Viya platform, expansive global customer base, ecosystem of partners, and flexibility of deployment options on any cloud computing infrastructure or on premises make SAS a vendor worth considering for existing SAS customers and large enterprise customers in any industry. SAS also provides experienced industry-domain technical staff, professional services, and extensive education to assist with operationalizing AI/ML applications in the enterprise.

## **APPENDIX**

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### **Reading an IDC MarketScape Graph**

For the purposes of this analysis, IDC divided potential key measures for success into two primary categories: capabilities and strategies.

Positioning on the y-axis reflects the vendor's current capabilities and menu of services and how well aligned the vendor is to customer needs. The capabilities category focuses on the capabilities of the company and product today, here and now. Under this category, IDC analysts will look at how well a vendor is building/delivering capabilities that enable it to execute its chosen strategy in the market.

Positioning on the x-axis, or strategies axis, indicates how well the vendor's future strategy aligns with what customers will require in three to five years. The strategies category focuses on high-level decisions and underlying assumptions about offerings, customer segments, and business and go-to-market plans for the next three to five years.

The size of the individual vendor markers in the IDC MarketScape represents the market share of each individual vendor within the specific market segment being assessed.

### **IDC MarketScape Methodology**

IDC MarketScape criteria selection, weightings, and vendor scores represent well-researched IDC judgment about the market and specific vendors. IDC analysts tailor the range of standard characteristics by which vendors are measured through structured discussions, surveys, and interviews with market leaders, participants and end users. Market weightings are based on user interviews, buyer surveys, and the input of IDC experts in each market. IDC analysts base individual vendor scores, and ultimately vendor positions on the IDC MarketScape, on detailed surveys and interviews with the

vendors, publicly available information, and end-user experiences in an effort to provide an accurate and consistent assessment of each vendor's characteristics, behavior, and capability.

## Market Definition

MLOps tools and technology streamline and automate the entire machine learning life cycle. The key capabilities include managing and automating ML data and pipelines, ML code, and ML models from data ingestion through model deployment, tracking, and monitoring. It uses the same principles as DevOps applied to machine learning processes.

## LEARN MORE

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### Related Research

- *The Unified AI Platform, 2024: Integrating and Interoperating with Other Enterprise Systems* (IDC #US52254024, September 2024)
- *Worldwide AI Life-Cycle Software Forecast, 2024–2028* (IDC #US52382024, July 2024)
- *Market Analysis Perspective: Worldwide AI Life-Cycle Software, 2024* (IDC #US51534724, July 2024)
- *Generative AI Augmenting the Traditional AI and Machine Learning Life Cycle* (IDC #US52383124, July 2024)
- *IDC MarketScape: Worldwide Machine Learning Operations Platforms 2022 Vendor Assessment* (IDC #US48325822, December 2022)

### Synopsis

This IDC study evaluates vendors that offer MLOps technologies and capabilities. As the AI market continues to grow, so do concerns about implementing responsible AI practices. There is a growing need for greater transparency and explainability of model results to promote confidence and trust in AI-based applications. While AI governance is a top priority, organizations continue to struggle to industrialize traditional AI/ML applications. AI platform vendors continue to add features that streamline and automate the AI life cycle for faster time to value, enable more users, and promote collaboration.

"MLOps adoption is growing as tools, technology, and best practices become more widely available," said Kathy Lange, research director, AI Software at IDC. "AI platform suppliers are increasingly embedding responsible AI practices and generative AI into their offerings to automate the AI life cycle and broaden the software's accessibility and

transparency. This shift will fuel the market's growth while promoting trust in AI and strengthening the synergy between traditional and generative AI."

## ABOUT IDC

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International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets. With more than 1,300 analysts worldwide, IDC offers global, regional, and local expertise on technology, IT benchmarking and sourcing, and industry opportunities and trends in over 110 countries. IDC's analysis and insight helps IT professionals, business executives, and the investment community to make fact-based technology decisions and to achieve their key business objectives. Founded in 1964, IDC is a wholly owned subsidiary of International Data Group (IDG, Inc.).

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