

IBM Z Systems Machine Learning (ML) optimizes interactions with customers, anticipates risk and improves operations. Uses historical data to train predictive models to anticipate future behavior. When combined with your enterprise data, by running ML on IBM Z where enterprise data originates, the models and the analytics will be more accurate and lead to better insights. IBM ML is combined with open source—so clients don't need to standardize on any single technology or tooling. The **Cognitive Assistant for Data Scientists (CADS)**, makes it easier for a data scientist to identify the right algorithm and create the right model. The **Hyper Parameter Optimization (HPO)**, helps the data scientist select the best parameters to optimize the predictive capabilities of the model. The **Pipeline User Interface (PIU)**, provides an automated graphical user interface wizard—*all of which makes it much easier for a data scientist to create, train and deploy a model in a few days with one click.*

Flexibility to Deploy on Premise. Benefiting from analytics advancement like IBM ML for z/OS and DB2. IBM Machine Learning on z/OS can run on a zEC12, z13, z13s or z14 and enables clients to access data in place and combine that data with other sources of information, such as structured and unstructured data from other systems and build models to predict customer behavior to drive the most optimal business outcomes.

Market	IT Challenge Questions	Use Cases
<ul style="list-style-type: none"> ▪ Machine Learning patents grew at a 34% CAGR between 2013 and 2017, 3rd-fastest growing category of all patents. Forecasted spend on AI and ML growth from \$12B in 2017 to \$57.6B by 2021.¹ ▪ Industries. Invested over \$12.5B, AI systems are establishing themselves as a core component toward industry growth. This figure has nearly doubled from the year before.² ▪ AI Experiments in 2018. Now, in 2019 businesses have a broader understanding of the benefits and opportunities of these time-saving applications 2019 will be a viable tech AI adoption optimized through Machine Learning, Deep Learning (ML/DL) and Natural Language Processing (NLP).² ▪ Tech Trends. Augmented Analytics and AI-powered Tools, two of the top 10 for 2019.³ 	<ul style="list-style-type: none"> ▪ Are you currently dissatisfied with the limited insights you are extracting from your business data? ▪ Are you having difficulty assessing costs and training for Machine Learning or Artificial Intelligence? ▪ Do you experience limitations with SQL or Microsoft Excel spreadsheets to search and compile your data sets? ▪ Do you require behavioral models and scoring to drive high impact decisions at the point of transaction? 	<ul style="list-style-type: none"> ▪ IBM Z Systems clients looking for an agile, highly secure, on-premise approach to integrate transactional processes with analytics and fraud detection. ▪ Client business areas, e.g. customer care that up-sell & cross-sell, supply chain managers and operations, transport platforms, anti-fraud; security, privacy and governance-top priorities. ▪ Clients in HR Analytics for forecasting, talent, acquiring, relocations, retention, skill set and predictive modeling. ▪ Healthcare clinical trial med compliance, early anomaly detections, optimizing dosage, eliminating risks related to correct meds, quality and dosage.

Why Choose Machine Learning for z/OS?

- **Functionality and Agility in Machine Learning.** Clients can now use an easy visual way to pick & choose data sets & transform data via generated SQL in ML, leverage existing QMF objects, have highly secure and governed access to many data sources (including Spark, Hadoop and web services).
- **On-premise Machine Learning Solution.** Machine Learning on IBM Z is on-premise, residing on the platform where the data originates *and* where the transactions are processed. This significantly reduces cost, complexity and latency.
- **Complementing IBM Z Machine Learning for z/OS.** DB2 Analytics Accelerator provides storage for multiple data formats, and greatly enhances overall analytics performance.

Sources: 1) CloudTech, "A roundup of machine learning forecasts and market estimates for 2018", March, 1, 2018.
 2) OSP Labs, "Top Voices Of The Industry Talks About The Rise Of Artificial Intelligence In 2019", 2019.
 3) Gartner, News. "Gartner Top 10 Strategic Technology Trends for 2019", Oct. 15, 2019.

Microsoft Cortana Intelligence Suite[®] includes HDInsight[™]. A managed version of the Hadoop big data platform, includes a variety of software for processing and storing data with automated provisioning of clusters via PowerShell. Data can be held externally using services, e.g. Azure Data Lake Store[™], offering storage via Hadoop Distributed File System (HDFS). As a cloud infrastructure provider, Microsoft is positioned to compete against both OLTP databases and analytical data warehouses with SQL Server; also against Hadoop appliances, NoSQL databases and ML systems with its Azure-based analytics offerings, including ML for predictive analytics with a Python-enabled ML studio, distributed NoSQL database, Cosmos DB and an Azure implementation of data preparation solution Databricks.

Overview



Microsoft Machine Learning Training. Organizations that don't want to do any of the work training ML models use Azure Cognitive Services[™], which offers a suite of on-demand web services, e.g. speech, vision, natural language and knowledge processing that can be built into applications and bots; (most services are billed per 1,000 API calls).

Competitor Weaknesses



- No on-premises Azure ML Offering. The Microsoft inability to run on-premises is a severe limitation that significantly reduces market adoption.
- Microsoft ML is cloud-based only, whereas IBM Z offers on-premises so clients who require to keep their data local for security or governance or privacy reasons and take advantage of their Z investment can do so.
- Microsoft Azure has listed numerous limitations, data modules space limits and constraints regarding their subscription service and unexpected costs on their website. Azure Machine Learning SDK installation failures on Databricks when more packages are installed. Azure Resource Groups are per-region accessible by subscription and are not per-subscription like the service management quotas as well as SQL limitations. Predictive Model Markup Language (PMML) is not supported. Clients use custom R and Python code to define a module, thus, some coding is required. ²

Key Takeaways



- **IBM is #1 in Market Share for Worldwide Cognitive/AI Software Platforms.**
- **IBM is strongly committed to ML/DL and open-source technologies.** Microsoft's Azure Machine Learning Studio is drag-and-drop data preparation, model evaluation, Cortana Intelligence Suite is a data-analytics platform to build ML applications. IBM Watson Studio supports both data scientists and newcomers to ML with tools to train, build and execute models.
- **IBM Z Machine Learning Dashboard.** Provides a web administration dashboard for managing Jupyter kernels and Kubernetes services, nodes and pods. The dashboard includes a health check across all models in the enterprise, offering insight into overall model performance and a view of those that need to be retrained.
- Whether you're considering an O/S upgrade, platform change or acquiring a new IBM Z machine, IBM Z Machine Learning Service & Support can help plan, install, configure, migrate and test your new environment.

Visit our customer access portal for IBM Z Machine Learning for z/OS for updates, installations, news, software downloads and technical support for Apache Spark, Linux on IBM Z and more. [Link to Customer Access Portal.](#)