

## ML Product Overview

Date published: 2020-07-16

Date modified: 2022-04-11

# CLOUDERA

# Legal Notice

© Cloudera Inc. 2024. All rights reserved.

The documentation is and contains Cloudera proprietary information protected by copyright and other intellectual property rights. No license under copyright or any other intellectual property right is granted herein.

Unless otherwise noted, scripts and sample code are licensed under the Apache License, Version 2.0.

Copyright information for Cloudera software may be found within the documentation accompanying each component in a particular release.

Cloudera software includes software from various open source or other third party projects, and may be released under the Apache Software License 2.0 (“ASLv2”), the Affero General Public License version 3 (AGPLv3), or other license terms. Other software included may be released under the terms of alternative open source licenses. Please review the license and notice files accompanying the software for additional licensing information.

Please visit the Cloudera software product page for more information on Cloudera software. For more information on Cloudera support services, please visit either the Support or Sales page. Feel free to contact us directly to discuss your specific needs.

Cloudera reserves the right to change any products at any time, and without notice. Cloudera assumes no responsibility nor liability arising from the use of products, except as expressly agreed to in writing by Cloudera.

Cloudera, Cloudera Altus, HUE, Impala, Cloudera Impala, and other Cloudera marks are registered or unregistered trademarks in the United States and other countries. All other trademarks are the property of their respective owners.

Disclaimer: EXCEPT AS EXPRESSLY PROVIDED IN A WRITTEN AGREEMENT WITH CLOUDERA, CLOUDERA DOES NOT MAKE NOR GIVE ANY REPRESENTATION, WARRANTY, NOR COVENANT OF ANY KIND, WHETHER EXPRESS OR IMPLIED, IN CONNECTION WITH CLOUDERA TECHNOLOGY OR RELATED SUPPORT PROVIDED IN CONNECTION THEREWITH. CLOUDERA DOES NOT WARRANT THAT CLOUDERA PRODUCTS NOR SOFTWARE WILL OPERATE UNINTERRUPTED NOR THAT IT WILL BE FREE FROM DEFECTS NOR ERRORS, THAT IT WILL PROTECT YOUR DATA FROM LOSS, CORRUPTION NOR UNAVAILABILITY, NOR THAT IT WILL MEET ALL OF CUSTOMER’S BUSINESS REQUIREMENTS. WITHOUT LIMITING THE FOREGOING, AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, CLOUDERA EXPRESSLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, QUALITY, NON-INFRINGEMENT, TITLE, AND FITNESS FOR A PARTICULAR PURPOSE AND ANY REPRESENTATION, WARRANTY, OR COVENANT BASED ON COURSE OF DEALING OR USAGE IN TRADE.

# Contents

<b>Cloudera Machine Learning overview.....</b>	<b>4</b>
AI applications.....	5
Exploratory Data Science.....	5
ML Ops.....	5
Core capabilities.....	6
Cloudera Machine Learning benefits.....	6
Key differences between Cloudera Machine Learning and Cloudera Data Science Workbench.....	7

## Cloudera Machine Learning overview

Machine learning has become one of the most critical capabilities for modern businesses to grow and stay competitive today. From automating internal processes to optimizing the design, creation, and marketing processes behind virtually every product consumed, ML models have permeated almost every aspect of our work and personal lives.

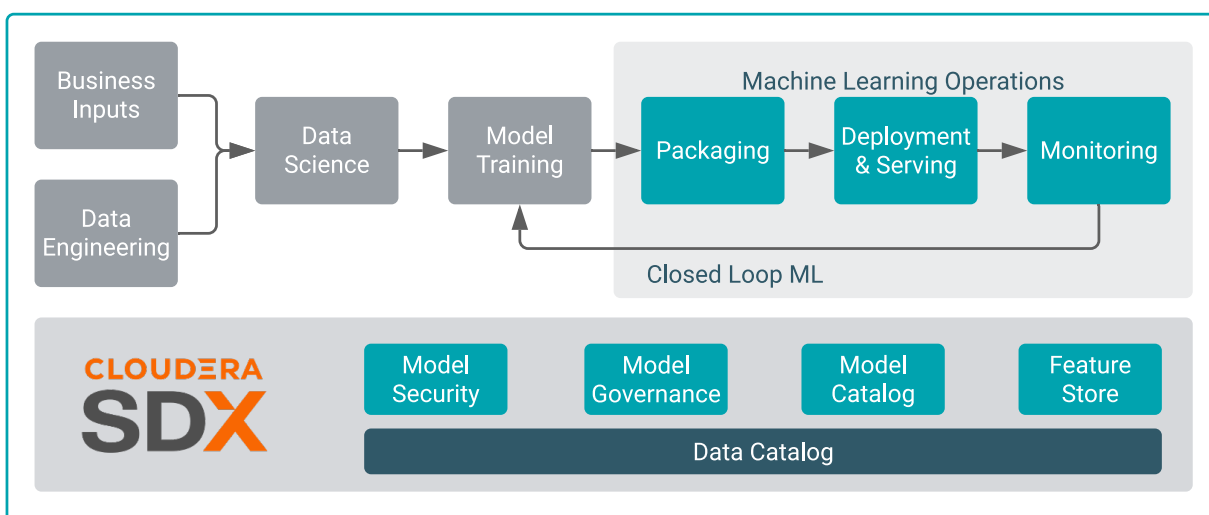
ML development is iterative and complex, made even harder because most ML tools aren't built for the entire machine learning lifecycle. Cloudera Machine Learning on Cloudera Data Platform accelerates time-to-value by enabling data scientists to collaborate in a single unified platform that is all inclusive for powering any AI use case. Purpose-built for agile experimentation and production ML workflows, Cloudera Machine Learning manages everything from data preparation to MLOps, to predictive reporting. Solve mission critical ML challenges along the entire lifecycle with greater speed and agility to discover opportunities which can mean the difference for your business.

Each ML workspace enables teams of data scientists to develop, test, train, and ultimately deploy machine learning models for building predictive applications all on the data under management within the enterprise data cloud. ML workspaces support fully-containerized execution of Python, R, Scala, and Spark workloads through flexible and extensible engines.

### Core Capabilities

Cloudera Machine Learning covers the end-to-end machine learning workflow, enabling fully isolated and containerized workloads - including Python, R, and Spark-on-Kubernetes - for scale-out data engineering and machine learning with seamless distributed dependency management.

- Sessions enable Data Scientists to directly leverage the CPU, memory, and GPU compute available across the workspace, while also being directly connected to the data in the data lake.
- Experiments enable Data Scientists to run multiple variations of model training workloads, tracking the results of each Experiment in order to train the best possible Model.
- Models can be deployed in a matter of clicks, removing any roadblocks to production. They are served as REST endpoints in a high availability manner, with automated lineage building and metric tracking for MLOps purposes.
- Jobs can be used to orchestrate an entire end-to-end automated pipeline, including monitoring for model drift and automatically kicking off model re-training and re-deployment as needed.
- Applications deliver interactive experiences for business users in a matter of clicks. Frameworks such as Flask and Shiny can be used in development of these Applications, while Cloudera Data Visualization is also available as a point-and-click interface for building these experiences.



## Benefits

Cloudera Machine Learning is built for the agility and power of cloud computing, but is not limited to any one provider or data source. It is a comprehensive platform to collaboratively build and deploy machine learning capabilities at scale.

Cloudera Machine Learning provides benefits for each type of user.

### Data Scientists

- Enable DS teams to collaborate and speed model development and delivery with transparent, secure, and governed workflows
- Expand AI use cases with automated ML pipelines and an integrated and complete production ML toolkit
- Empower faster decision making and trust with end-to-end visibility and auditability of data, processes, models, and dashboards

### IT

- Increase DS productivity with visibility, security, and governance of the complete ML lifecycle
- Eliminate silos, blindspots, and the need to move/duplicate data with a fully integrated platform across the data lifecycle.
- Accelerate AI with self-service access and containerized ML workspaces that remove the heavy lifting and get models to production faster

### Business Users

- Access interactive Applications built and deployed by DS teams.
- Be empowered with predictive insights to more intelligently make business decisions.

## AI applications

Analytical Applications provide a place to host long running applications within a CML project.

While CML offers a place for Data Scientists to perform advanced analytics and models into production, Analytical Applications provides a place to host long running applications within a CML project. This opens up a larger group of users to the insights discovered in CML. Applications can be built with a variety of frameworks like Flask and Streamlit. They run within their own isolated compute instance which keeps them from timing out and they take advantage of ML Runtimes. Applications are accessible to users through the web. Applications can be for a variety of use cases like hosting interactive data visualizations or providing a UI frontend for a deployed model in CML.

## Exploratory Data Science

CML enables data practitioners to discover, query, and easily visualize their data sets all within a single user interface.

The beginning of every data science project begins with finding and understanding the data you need. CML brings all the tools you need for exploratory data analysis together in a single UI so that data practitioners don't have to jump between applications, and IT doesn't have to support multiple tools. CML provides users with a view of available data assets that they can connect to, a sql editor to query those data sources, and an easy-to-use drag-and-drop visualization tool to understand your data and communicate insights.

## ML Ops

CML enables users to deploy machine learning and other models into production.

CML enables users to deploy machine learning and other models into production, either as a batch process through the Jobs functionality, or as near-real-time REST APIs using the Models functionality. In addition, CML provides a number of features to help maintain, monitor and govern these models in production. The Model Governance feature

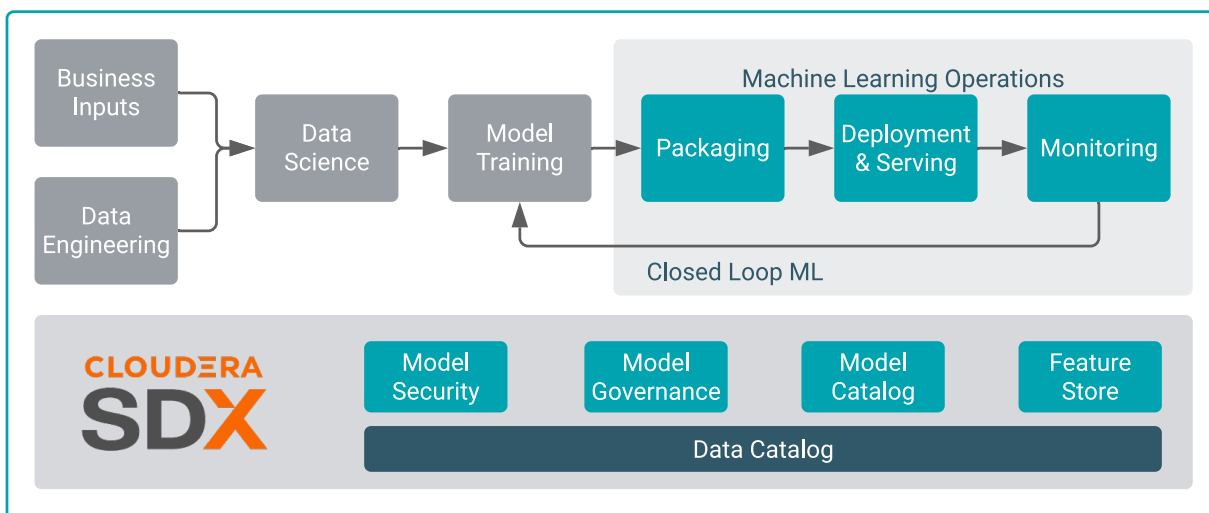
ensures that every deployed Model is tracked in the Cloudera Data Catalog, and allows the user to specify which data tables were used to train the model in order to provide model-data lineage. Deployed Models have a built-in dashboard for monitoring technical metrics relating to deployed CML Models, such as request throughput, latency, and resource consumption. Additionally, users can track arbitrary business metrics relating to each inference event, and match the results with delayed metrics from a data warehouse or other source using an automatically generated UUID. By analyzing these metrics, the user can assess the model for aggregated metrics such as accuracy on an ongoing basis.

## Core capabilities

This section details the core capabilities for Cloudera Machine Learning.

Cloudera Machine Learning covers the end-to-end machine learning workflow, enabling fully isolated and containerized workloads - including Python, R, and Spark-on-Kubernetes - for scale-out data engineering and machine learning with seamless distributed dependency management.

- Sessions enable Data Scientists to directly leverage the CPU, memory, and GPU compute available across the workspace, while also being directly connected to the data in the data lake.
- Experiments enable Data Scientists to run multiple variations of model training workloads, tracking the results of each Experiment in order to train the best possible Model.
- Models can be deployed in a matter of clicks, removing any roadblocks to production. They are served as REST endpoints in a high availability manner, with automated lineage building and metric tracking for MLOps purposes.
- Jobs can be used to orchestrate an entire end-to-end automated pipeline, including monitoring for model drift and automatically kicking off model re-training and re-deployment as needed.
- Applications deliver interactive experiences for business users in a matter of clicks. Frameworks such as Flask and Shiny can be used in development of these Applications, while Cloudera Data Visualization is also available as a point-and-click interface for building these experiences.



## Cloudera Machine Learning benefits

This section details the Cloudera Machine Learning benefits for each type of user.

Cloudera Machine Learning is built for the agility and power of cloud computing, but is not limited to any one provider or data source. It is a comprehensive platform to collaboratively build and deploy machine learning capabilities at scale.

Cloudera Machine Learning provides benefits for each type of user.

#### Data Scientists

- Enable DS teams to collaborate and speed model development and delivery with transparent, secure, and governed workflows
- Expand AI use cases with automated ML pipelines and an integrated and complete production ML toolkit
- Empower faster decision making and trust with end-to-end visibility and auditability of data, processes, models, and dashboards

#### IT

- Increase DS productivity with visibility, security, and governance of the complete ML lifecycle
- Eliminate silos, blindspots, and the need to move/duplicate data with a fully integrated platform across the data lifecycle.
- Accelerate AI with self-service access and containerized ML workspaces that remove the heavy lifting and get models to production faster

#### Business Users

- Access interactive Applications built and deployed by DS teams.
- Be empowered with predictive insights to more intelligently make business decisions.

## Key differences between Cloudera Machine Learning and Cloudera Data Science Workbench

This topic highlights some key differences between Cloudera Data Science Workbench and its cloud-native counterpart, Cloudera Machine Learning.

How is Cloudera Machine Learning (CML) related to Cloudera Data Science Workbench (CDSW)?

CML expands the end-to-end workflow of Cloudera Data Science Workbench (CDSW) with cloud-native benefits like rapid provisioning, elastic autoscaling, distributed dependency isolation, and distributed GPU training.

It can run its own native distributed computing workloads without requiring a separate CDH cluster for scale-out compute. It is designed to run on CDP in existing Kubernetes environments, reducing operational costs for some customers while delivering multi-cloud portability. On Public Cloud, managed cloud Kubernetes services include EKS, AKS, or GKE, and on Private Cloud, they include Red Hat OpenShift or ECS (Embedded Container Service).

Both products help data engineers and data science teams be more productive on shared data and compute, with strong security and governance. They share extensive code.

There is one primary difference:

- CDSW extends an existing CDH cluster, by running on gateway nodes and pushing distributed compute workloads to the cluster. CDSW requires and supports a single CDH cluster for its distributed compute, including Apache Spark.
- In contrast, CML is self-contained and manages its own distributed compute, natively running workloads - including but not limited to Apache Spark - in containers on Kubernetes.

Note: It can still connect to an existing cluster to leverage its distributed compute, data, or metadata (SDX).