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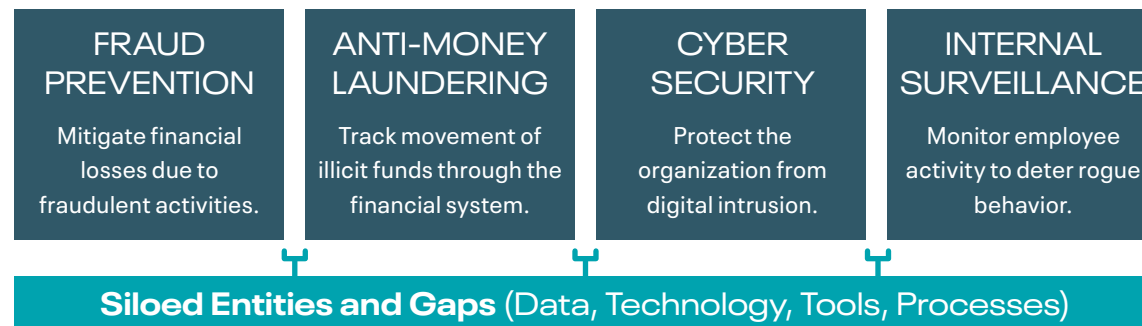
Fighting Financial Crime

TOP 5 DATA AND ANALYTICS APPROACHES

The Pervasive Nature of Financial Crime

Financial crime has become increasingly pervasive and permeates all levels of the financial services industry. Criminal networks are creative, connected, collaborative, and ready to exploit any opportunity inside or around the edges of business operations. The sophisticated techniques used by criminals to breach defenses, profit from stolen data, and launder illicit proceeds throughout the global banking system have led financial institutions to pursue new approaches to preventing and detecting such activities.

Preventing financial crime requires new, next-generation approaches that better leverage data and analytics to improve anti-crime specializations and plug the intelligence gaps that inevitably develop from the siloed nature of these efforts.

FRAUD PREVENTION	ANTI-MONEY LAUNDERING	CYBER SECURITY	INTERNAL SURVEILLANCE
Mitigate financial losses due to fraudulent activities.	Track movement of illicit funds through the financial system.	Protect the organization from digital intrusion.	Monitor employee activity to deter rogue behavior.

Siloed Entities and Gaps (Data, Technology, Tools, Processes)

When developing new approaches to protecting against financial crime, the challenge for financial institutions is multi-faceted. They must develop trust with consumers, showing that their data is secure, prove to regulators that they have active programs in place to mitigate risk, and demonstrate to shareholders that they can manage the financial and reputational risks that financial crime can present.

[1] Refinitiv, "Revealing the True Cost of Financial Crime," 2018.

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Global financial institutions have spent **$1.28 trillion** annually combating financial crime.[1]

The True Cost of Financial Crime

Given its pervasive nature, the current state of combating financial crime is one of high costs, many false positives, large losses, and little progress towards solving the problem.

Recent studies have surveyed the impact of financial crime on business, society, and people, highlighting the high cost and difficulty in overcoming it. A 2018 Refinitiv survey highlights the combined revenue lost to various types of financial crime, measured over 12 months:

- Bribery and corruption: $309 billion

- Money laundering: $267 billion

- Cybercrime: $241 billion

- Fraud: $239 billion

- Theft: $209 billion

- Slave labor and human trafficking: $188 billion[1]

In aggregate, the total loss from multiple types of crime adds up to $1.45 trillion despite the collective billions of dollars that are spent in an effort to prevent crimes like money laundering, fraud, theft, and corruption.

[1] Refinitiv, "Revealing the True Cost of Financial Crime," 2018.

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It is estimated that the combined revenue lost due to financial crime is

$1.45

trillion annually.

Challenges in Tackling Financial Crime

Despite the fact that more than 90% of companies are supportive of more initiatives to tackle financial crime, doing so is no easy feat.[2] The boundaries are disappearing between the physical world (people and things), the virtual world (electronic banking), and new points of entry like novel methods of payments through mobile and wearable devices.

At the same time, financial crime networks are more sophisticated than ever. They are well coordinated, creative, and technologically advanced. This increases the difficulties of even the most committed organizations to combat financial crime. In addition, regulatory agencies recognize the multi-faceted challenges of financial crime and expect financial institutions to take a proactive, innovative approach to disrupting it.

Similarly, customers and investors are putting competing pressures on financial institutions. On the one hand, customers demand that their bank delivers innovative, consumer-centric digital services while investors want the institution to generate profits that come with a larger customer base and more products. On the other hand, this can be at odds with taking a slower, conservative approach to risk mitigation. Stock valuation and revenue can be devastated by the reputational loss that comes as a result of financial crimes.

Lastly, the corporate culture of the institutions themselves can leave them vulnerable to financial crimes. Many are characterized by siloed job functions while new business approaches are becoming cross-functional. For example, a customer 360 mindset requires a holistic view across the organization. In a similar way, the approach to financial crime requires a holistic mindset.

[2] Refinitiv, "Revealing the True Cost of Financial Crime," 2018.
[3] McKinsey, "Fighting Back Against Synthetic Identity Fraud," January 2019.

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Despite tighter regulation and major investment, only

1%

of criminal proceeds are confiscated by authorities in the EU.[2]

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Synthetic identity fraud is nearly impossible to detect because the credit file looks identical to real people who have limited or no credit history.

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The largest synthetic identity ring detected so far racked up losses of

$200M

from 7,000 synthetic IDs and 25,000 credit cards.[3]

Top 5 Approaches to Fighting Financial Crime

Today's leading financial institutions are increasingly relying on data, analytics, machine learning, and AI technologies to capitalize on the information needed to combat financial crime—converting raw data into actionable insights. Here are the top five approaches that have the greatest impact when creating next-generation approaches to fighting financial crime.

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1. Real-time Data Ingestion and Analytics

The edges of financial networks could be a greenfield of crime opportunities. In January of 2019, it was reported that contactless fraud doubled in ten months.[4] Similarly, vulnerabilities in contactless card verification let hackers bypass payment limits.[5] As banking activities become integrated into everyday lives (also known as invisible banking), new varieties of crime patterns will undoubtedly emerge. Integrated machine learning with edge devices becomes crucial in tightening the loop between detecting and countering new fraud patterns.

Cloudera enables real-time data streaming and analytics with Cloudera DataFlow, a scalable, real-time streaming data platform that collects, curates, and analyzes data so financial institutions can gain key insights for immediate, actionable intelligence into the factors that contribute to financial crime. Furthermore, if they are part of an integrated environment for machine learning, the analytics models at the edge can be updated to respond to changing crime patterns.

[4] Independent, "'Contactless' Fraud Cases Double in 10 Months."
[5] SC Media, "Vulnerabilities in Contactless Card Verification Could Let Hackers Bypass Limits,"
  July 29, 2019.

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2. Machine Learning and Artificial Intelligence

Recent advances in machine learning and artificial intelligence play a key role in the fight against financial crime. Machine learning techniques used in simulation models help prepare the financial institution for potential fraud and can significantly improve existing financial crime detection systems. Artificial intelligence helps increase the effectiveness and efficiency of financial crime investigations and can help to reduce false positives by being more responsive to customer behavior than current deterministic business rules. This enables monitoring systems to redirect human efforts to high-value suspicious activities.

With Cloudera Data Science Workbench (CDSW), Cloudera equips data scientists with self-service access to any data anywhere, enabling them to quickly develop and prototype machine learning projects and easily deploy them where they are needed. The technology brings data science to the data and gives the data science team more freedom while improving the effectiveness of data to combat financial crime. The tool enables data sharing and creates reproducible research that can be used across business and financial crime risk mitigation teams.

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3. Converged, Integrated Activities

According to Refinitiv, the 94% of companies that support initiatives to tackle financial crime say that sharing intelligence is the most important factor in winning the war against financial crime.[6]

Eliminating functional silos is critical to establishing a horizontal and holistic approach to financial crime protection and prevention. Cloudera enables a converged approach to financial crime prevention with the Cloudera Data Hub. It provides a shared, scalable data store with built-in security, governance, and compliance that can be used by third-party platforms, analysts, data scientists, and businesses. Financial services organizations can run their existing best-of-breed financial crime solutions and applications on Cloudera while leveraging petabytes of high-fidelity data across organizational boundaries.

[6] Refinitiv, "Revealing the True Cost of Financial Crime," 2018.

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4. Data and Analytics Anywhere

As banking technologies become increasingly advanced and convenient for the end user, the opportunities for financial crime have grown. Understanding the network and its wider context is the first step to becoming more efficient and effective in the fight against financial criminal activity. This creates a need for data to be analyzed anywhere across the network, including various vulnerability points where financial crime might occur.

With a platform built on open source technology, Cloudera supports and facilitates open-source advances to ensure the latest technologies and methods are adopted and safely applied to production. This helps financial institutions modernize and adapt to changing threats and innovatively optimize their infrastructure to unlock value from any data anywhere—on premises or across hybrid and multiple public clouds.

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5. Unified Security, Governance, and Compliance

Data security, governance, and compliance play a crucial role for financial institutions, even in the course of their everyday business. For financial crime initiatives, poor data quality and complex data security and governance lead to reduced productivity and expose the institution to multiple risks and regulatory compliance issues. For financial crime protection to be effective, the institution must have the right levels of data security and governance in place. By the same token, the organization's subject matter experts also need to be able to use the data.

Cloudera simplifies data privacy and compliance across diverse enterprise data with a common security model to control data anywhere whether on-premise, in the public cloud, in a private cloud, or in hybrid cloud environments.

Cloudera SDX is the security and governance fabric that binds the enterprise data cloud. SDX enables data and metadata security and governance policies to be set once and automatically enforced across data analytics in hybrid and multi-clouds. Unlike standalone analytics software solutions or cloud services, Cloudera Data Platform with SDX delivers powerful, enterprise-wide controls over data and metadata, anywhere, for ultimate infrastructure and business flexibility.

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Data-driven Financial Crime Prevention and Protection with Cloudera

Given the complexity and variety of financial and sensitive customer data, many financial institutions are reinventing their data management strategy—transitioning to a platform that is optimized for the scale and complexity of the data that the industry demands. The platform allows financial institutions to take advantage of the benefits of the hybrid cloud, while still leveraging their existing on-premise infrastructure.

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The diagram below illustrates what a platform like this would look like:

1. Any type of data (streaming from the edge, batch, structured, and unstructured) can be ingested and processed in real-time using Cloudera DataFlow (CDF).

2. The Cloudera Data Hub provides a shared, scalable, data store with built-in security, governance, and compliance that can be used by third-party platforms, analysts, data scientists, and businesses.

3. Financial services organizations can run their existing best-of-breed financial crime solutions and applications on Cloudera while leveraging petabytes of high-fidelity data across organizational boundaries.

4. Machine learning models are developed and tested natively and deployed back to the edge using Cloudera Data Science Workbench.
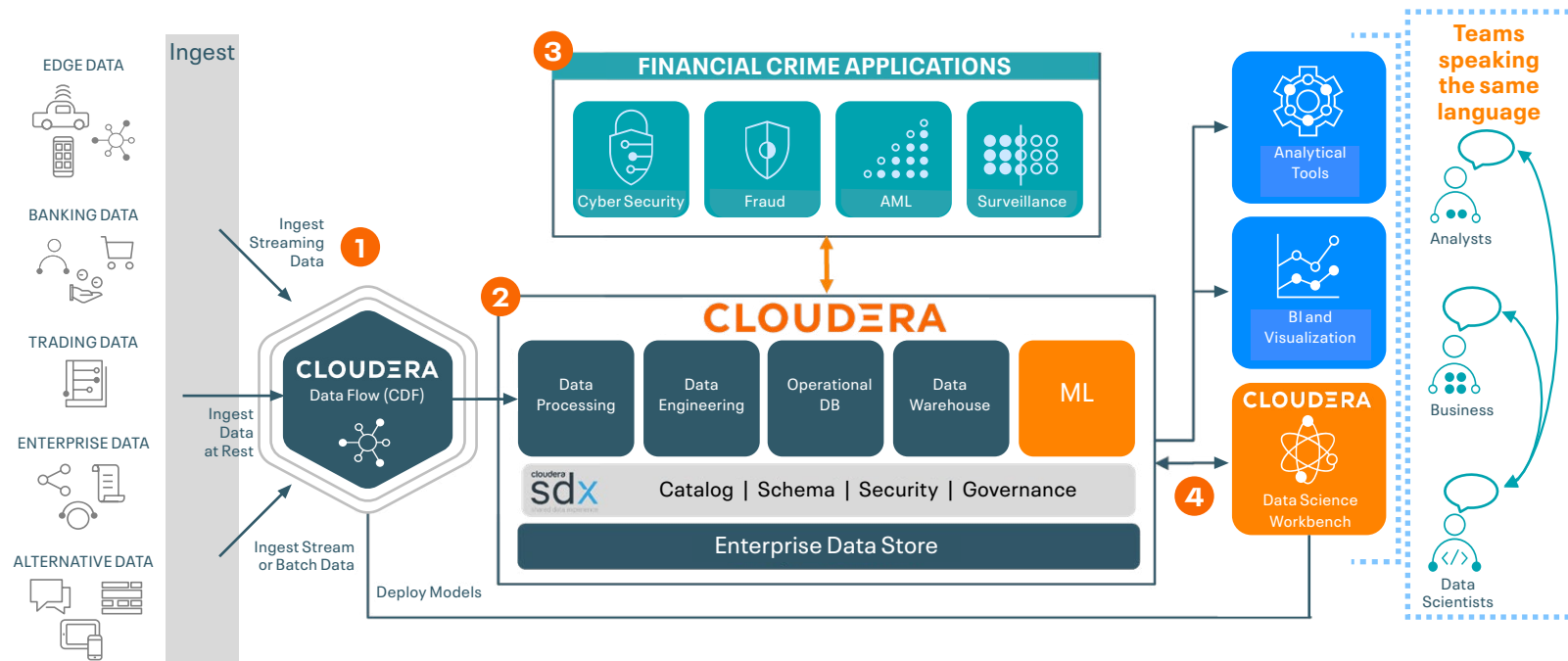
The platform provides the flexibility to run a variety of analytical workloads—including data warehouses, operational databases, data science, and machine learning. It also provides the opportunity for organizations to integrate with unique crime detection and prevention capabilities provided by cutting-edge FinTech firms and integration with leading BI and visualization tools.

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Integrating with Innovation

Key to staying on top of the latest innovations in combating financial crime is the ability to integrate with the organizations that provide the innovation. Below is a small sample of innovative partners in the Cloudera ecosystem who have implemented cutting-edge financial crime solutions that use the Cloudera platform.

CLOUD=RA

Simudyne

Simudyne provides fraud simulation using agent-based model (ABM) machine learning techniques to generate synthetic transaction data. This data simulates potential fraud scenarios in a cost-effective, GDPR-compliant virtual environment to significantly improve financial crime detection systems. Simudyne identifies future fraud typologies from millions of simulations that can be used to dynamically train new machine learning algorithms for enhanced fraud identification.

See: Solutions Gallery > Computational Simulation.

riskCanvas
a **genpact** company

riskCanvas provides a complete, end-to-end, purpose-built, scalable, and adaptable AML and financial crime solution for big data. It encapsulates customer due diligence, transaction monitoring, and investigation management capabilities integrated with enforcement agencies.

See: Solutions Gallery > Next Generation Financial Crimes with riskCanvas.

accenture

Accenture transforms BSA/AML operations and improves collaboration by providing an AML utility to participants with access to a leading stack of analytic technology. This transforms the BSA/AML operating paradigm by leveraging data science to improve program efficiency and connect the dots between key stakeholders.

See: Solutions Gallery > Accenture/Cloudera Alliance Overview

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Financial Crime Analytics in Action

Today, a number of financial institutions across the globe use the Cloudera Data Platform to drive cybersecurity protection initiatives, guard against money laundering, prevent fraud, and conduct internal surveillance—all with a holistic approach to financial crime prevention and protection that has data and analytics at its core.

CLOUD=RA

Case Study: MasterCard
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New Revenue Streams with an Advanced Anti-fraud Solution

Before working with Cloudera, MasterCard found that the search capabilities of its fraud prevention platform did not satisfy the increasingly complex customer queries on hundreds of millions of fraudulent businesses.

The company worked with Cloudera to gain dynamic scalability and improved performance. This allowed MasterCard to accelerate searches, enrich searching capabilities, and increase search accuracy of high-risk merchants. As a result, the company increased annual searches by a factor of five, and can now conduct **25 times** more searches per customer. Ultimately, the ease of use and dramatically improved search accuracy enable MasterCard to offer its solution to non-traditional customers like online marketplaces.

[Read the full MasterCard story.](#)

mastercard.

5X

increase in number of searches supported annually.

25X

increase in searches per customer daily.

Increased revenue through new market expansion.

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Case Study: Western Union

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Clamping Down on Fraud with Machine Learning

For Western Union, a key challenge centered around new digital money transfer services which required a variety of new and more sophisticated authentication techniques. With Cloudera, the company used predictive analysis in real time on structured and unstructured data sets in the same store. The solution includes support for collections of machine learning models to analyze complex sets of variables from which to determine the reliability and risk of individual users.

This enables Western Union to drive compliance in a way that also drives better conversions from their customers. And the company achieved a dramatically **reduced fraud rate** that is significantly below the industry standard.

[Read the full Western Union story.](#)

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WESTERN UNION \\WU℠

60X

faster data loading

"One of the factors driving transformation for Western Union right now is the massive amount of transactional information that we accumulate as we serve our customers. We've built an enterprise data hub on Cloudera to drive actionable insights that help the company create products and services that are relevant to our customers and help differentiate Western Union in a competitive marketplace."

-Sanjay Saraf
CTO and Senior Vice President, Western Union

Case Study: Santander UK

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Implementing a Single Data Platform to Combat Financial Crime

Like many financial institutions, Santander UK had a large number of legacy data warehouses spread across its many business units. The company found that comprehensive customer insights were impossible due to "multiple versions of the truth" resulting from inconsistent data sources and processes.

With Cloudera, Santander implemented a single data platform that supports all workloads including self-service analytics, operational analytics, and data science. As a result, the company improved the customer experience with greater personalization and relevancy drawn from more than **40 million** customer records, streaming transaction data, and ten years of historical data. In addition, the company found 95 new proactive control alerts which protect 3.7 million individual customers from poor outcomes due to financial crimes.

Read the full Santander UK story.

CLOUDERA

◊ Santander

Protected

3.7M

customers from poor outcomes from financial crimes with 95 new proactive control alerts.

"We've gained significant value from Cloudera, including new opportunities to engage with our customers and cost savings of more than US$7 million, new revenue, and risk reduction for our shareholders."

**-Antonio Alvarez
Director, Data Innovation, Santander UK**

Case Study: Bank Danamon

Understand Behavior to Generate Revenue and Fight Crime

While it continues to deliver innovative and consumer-centric digital services, Bank Danamon needs to protect both the bank and its customers from financial crime. By gaining a holistic view of customer behavior, the bank can offer the right products to the right customers but also respond immediately to suspicious activity patterns.

Initially challenged by data silos, the bank deployed Cloudera's modern data management platform, Cloudera Enterprise, to integrate data from **50 different systems** and enable machine learning applications. Bank Danamon now has the insights to interact with customers in a meaningful way. Using machine learning on aggregated behavior and transaction data in real time has helped identify new patterns of fraud, reduce fraud events by 30%, and deepen customer relationships.

Read the full Bank Danamon story.

Danamon

Reduced fraud by

30%

"A key focus for our digital transformation at Danamon is to improve customer service while eliminating fraud risks and compliance cost. Big data technology has enabled us to better manage customer data, while enhancing data protection and managing compliance."

**-Mary Bernadette James
CIO, Bank Danamon**

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The Enterprise Data Cloud

Enabling these use cases requires the ability to ingest, process, store, and analyze any type of data, including structured and unstructured, whether it lives at the edge, in the data center, public cloud, or a hybrid cloud. With the ability to analyze data at rest, data in motion, and streaming data, financial services institutions can use machine learning, advanced analytics, and AI technologies to identify patterns, detect anomalies, and predict potential outcomes for their business.

An Enterprise Data Cloud empowers financial services institutions to get clear and actionable insights from complex data anywhere, from the edge to AI , leveraging open source and open standards. It provides the flexibility to run modern analytic workloads anywhere, regardless of where the data resides. It offers the ability to move those workloads to different cloud environments—public or private—to avoid lock-in. And it has the agility, elasticity, and ease of use of public clouds and a common security and governance framework to enable data privacy and regulatory compliance by design.
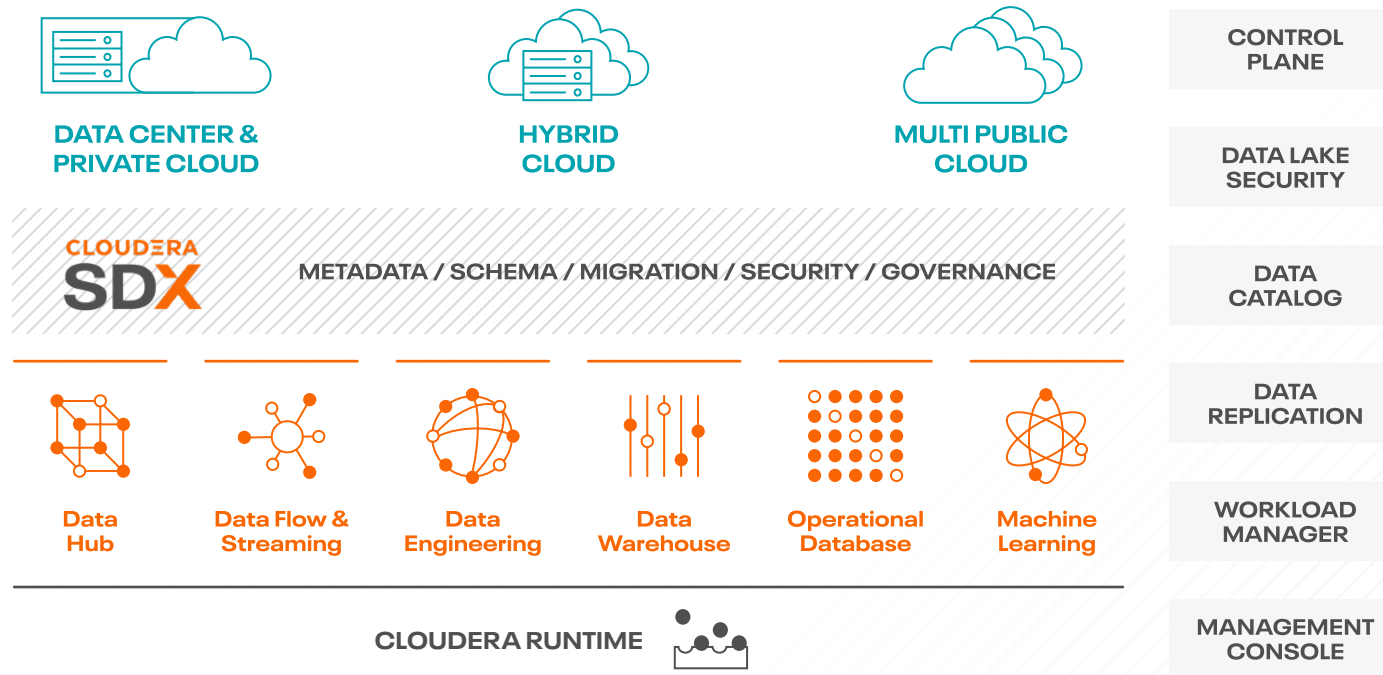
Any Cloud

EDGE 2AI

Multi-Function

CLOUDERA SDX

Secure & Governed

Open

CLOUDERA

The Cloudera Data Platform

DATA CENTER & PRIVATE CLOUD

HYBRID CLOUD

MULTI PUBLIC CLOUD

CONTROL PLANE
DATA LAKE SECURITY
DATA CATALOG
DATA REPLICATION
WORKLOAD MANAGER
MANAGEMENT CONSOLE

CLOUDERA SDX METADATA / SCHEMA / MIGRATION / SECURITY / GOVERNANCE

Data Hub

Data Flow & Streaming

Data Engineering

Data Warehouse

Operational Database

Machine Learning

CLOUDERA RUNTIME

The Cloudera Data Platform (CDP) delivers the industry's first enterprise data cloud. Providing powerful self-service analytics across hybrid and multi-cloud environments, the CDP offers sophisticated, granular security and governance policies that IT and data leaders demand.

The CDP offers data warehouse and machine learning services, a data hub service for building custom business applications, and a unified control plane to manage infrastructure, data, and analytic workloads across hybrid and multi-cloud environments. This includes consistent data security, governance, and control with SDX to safeguard data privacy, ensure regulatory compliance, and prevent cybersecurity threats. It all lives on an open source foundation that avoids vendor lock-in and accelerates enterprise innovation.

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Get an exclusive look at the new Cloudera Data Platform and learn more about how Cloudera is transforming financial services.

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About Cloudera

At Cloudera, we believe that data can make what is impossible today, possible tomorrow. We empower people to transform complex data into clear and actionable insights. Cloudera delivers an enterprise data cloud for any data, anywhere, from the Edge to AI. Powered by the relentless innovation of the open source community, Cloudera advances digital transformation for the world's largest enterprises. Learn more at Cloudera.com.

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