CLOUDERA

Top Four Digital Transformation Pillars

Retail and Consumer Goods

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Retail and Consumer Goods Industry Challenges Offer Unprecedented Opportunities

As a 'retail renaissance' driven by rapidly changing customer expectations and new technologies to help improve operational efficiencies was underway—an unexpected global pandemic hit. Now, retailers face accelerating needs for better data and analytic capabilities in a precedent setting industry metamorphosis.

While some retail leaders may have been well on their way to digital transformation 'pre-pandemic', they, themselves, along with retail laggards have now been forced to accelerate strategic digital transformation initiatives in order to survive. As the pandemic's stress test of e-commerce, in-store insights, supply chain visibility and fulfillment capabilities have revealed shortcomings, and long-lasting consumer experiences—the stakes are higher than ever.

-14%

Projected decrease in US consumer spend at brick and mortar stores in 2020.

While some retail leaders may have been well on their way to digital transformation 'pre-pandemic', they, themselves, along with retail laggards have now been forced to accelerate strategic digital transformation initiatives in order to survive. As the pandemic's stress test of e-commerce, in-store insights, supply chain visibility and fulfillment capabilities have revealed shortcomings, and long-lasting consumer experiences—the stakes are higher than ever.

Accelerated digital transformation is now forcing retailers to consider enterprise data leverage and optimization across ALL lines of business— starting with consumer insights, and infusing these insights into the four strategic business pillars of Marketing, Merchandising, Supply Chain and Store Operations. Previously, technology within the retail and consumer goods industry primarily served to ensure transactions with customers were quick and efficient. Now, retailers and brands have an unprecedented opportunity to leverage data, analytics, technology, shared collaboration frameworks, and streaming data to improve customer experiences and operational efficiencies in much more meaningful ways.

The move powering retail's digital transformation is enabled by several factors including:

- The drastic reduction in the cost of sensors, computational power and stable connectivity
- The emergence of cutting-edge data analytics and machine learning capabilities
- The explosion of social channels
- The emergence of 5G

Digitalization, a key tenet of today's retailers, must be underpinned by data.

+18%

Projected increase in US consumer spend on e-commerce in 2020.

eMarketer

Industry Dynamics

62%
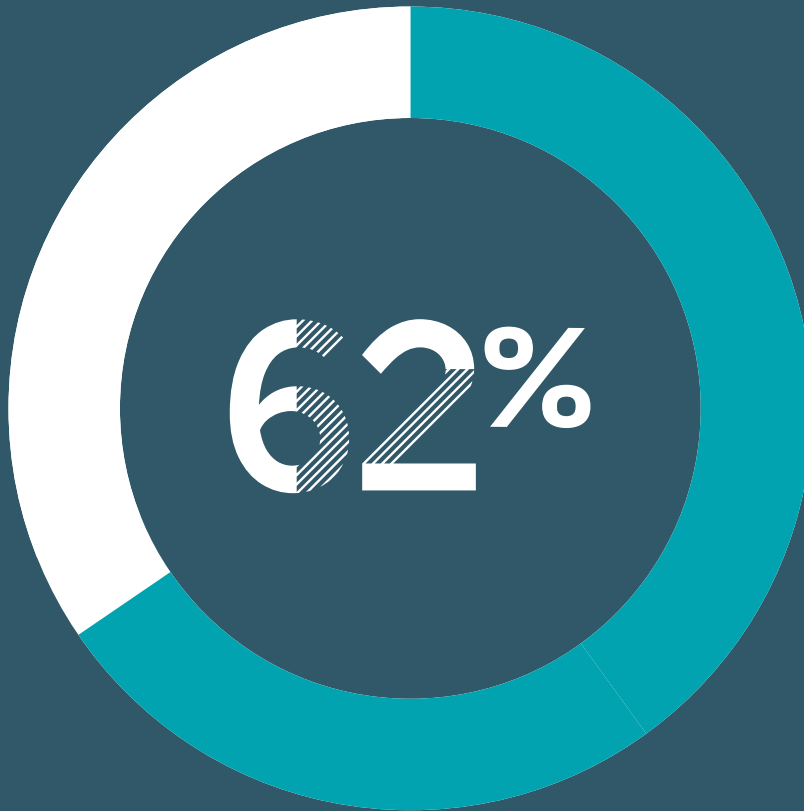
of retailers report that the use of information and analytics is creating a competitive advantage for their organizations.

Analytics: The Real-world Use of Big Data in Retail, IBM
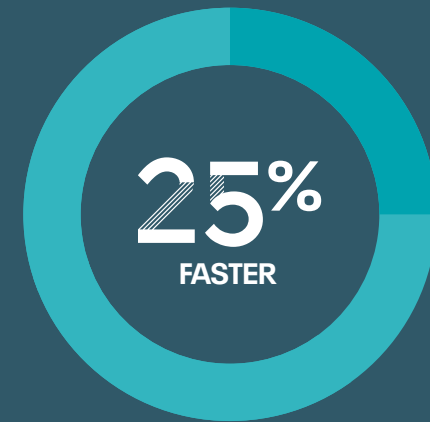
25% FASTER

Digital supply chains respond 25% faster due to real-time information.

BCG

73%
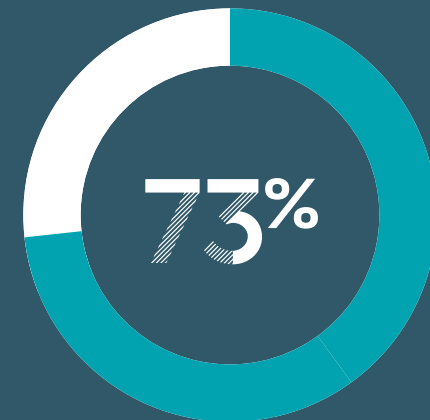
of US consumers have changed stores, brands, or the way they shop due to COVID.

Gartner

$1.1т

Annual cost to retailers due to out-of-stocks.

IHL Group

Top Four Digital Transformation Pillars of Retail

Data Floods Retail from Many Sources—and the 'Water' is Rising

Data is both retail's strength and challenge. Retailers and brands have been proficient in acquiring data from various legacy systems, but face significant challenges with ingesting, analyzing, and acting on a 'flood' of new, multi-structured and often external data sources in real time.

To innovate, remain competitive, and differentiate themselves, retailers and brands must fundamentally re-look at their 'enterprise' approach to how they collect, manage, and drive intelligence from all data.

There are four digital transformation pillars in retail that can drive significant value for companies embracing data analytics as a strategic differentiator. Though digital maturity itself is a journey, early and ongoing investments in an enterprise data and innovative analytics approach are driving benefits that are rapidly separating "leaders" from the pack. Retailers and brands today are enabling both mission-critical and innovative use cases focused on four strategic pillars—personalized interactions, customer centric merchandising, supply chain agility and reimagining stores.

The Four Pillars

Data is Transforming Business Capabilities

1 PERSONALIZED INTERACTIONS

2 CUSTOMER CENTRIC MERCHANDISING

3 SUPPLY CHAIN AGILITY

4 REIMAGINING STORES

Pillar 1: Personalized Interactions

Retailers are leveraging customer profiles producing higher customer engagement results and reduced marketing costs by delivering targeted, relevant, contextual content and recommendations.

Leaders are moving to "segments of one," defined as tracking and understanding individual behaviors across all touchpoints using the data to customize offers, products or services to the individual customer.

To fully execute personalized interactions, retailers are accessing both structured and unstructured data from website click-streams, email and SMS opens and responses, in-store point of sale systems and past purchase behavior. The resulting business capabilities include:

- **Customer Identification**—Develop processes to identify customers and visitors across channels (store, web, mobile, social, paid search, etc.)

- **Real-time Personalization**—Improve relevance and conversion with real time product, content, and offer personalization

- **Site Layout/Navigation**—Incorporate customer insights into product layout, search capabilities, like items and real time personalized recommendations and checkout options

- **Customer Insights**—Develop a deep understanding of customers and their behavior to enable operational improvements and inform interactions

- **Integrated Customer Data**—Identify customers and build a robust view of customers across channels and touchpoints

- **Personalized Interactions**—Increase conversion and customer engagement with deeper personalization and targeting

- **Marketing Attribution & Spend Effectiveness**—Tag interactions that drive desired behaviors while evaluating media spend to allocate dollars to most productive efforts

To enable these business capabilities requires an enterprise data platform to process streaming data at high volume and high scale, to manage and monitor diverse edge applications and provide data scientists with tools to build, test, refine and deploy predictive machine learning models.

91%

of consumers are more likely to shop with brands that recognize, remember, and provide relevant offers and recommendations.

Accenture Interactive, 2020

Pillar 2: Customer-Centric Merchandising

Moving from a product to a customer-centric merchandising strategy requires a deeper understanding of customer tastes and preferences.

Granular product attribution and retail execution information shared between trading partners is critically important for both to better respond through localized assortments, tailored promotions, dynamic pricing, and product development (national brands and private labels) that are more reflective of emerging trends, and an ever-changing, diverse consumer base. The resulting business capabilities include:

• **Consolidated Product & Sales Data**—Build an enterprise view of product, sales and inventory across all locations, channels

• **Price and Promotion Optimization**—Change prices dynamically automating business processes and considering both competitive pricing and predictive customer response models

• **Customer Driven Assortments**—Tailor assortments to align product mix by location or channels to provide what your customer wants to buy

• **Product Development**—Identify consumer trends to create distinctive products and optimize the category and brand portfolio to meet consumer demand, providing competitive differentiation

Both data-in-motion and data-at-rest are leveraged to drive customer centric merchandising. Streaming data from in-store sensors, streaming video, and sensors are leveraged along with historical archives of consumer purchase behavior, inventory stock levels, weather predictions, point of sale information, and competitive pricing, as examples.

68%

of consumer decisions are made at the shelf.

Yet, of the $174B in annual CPG retail trade spend, only 17% ($300M) is spent at the shelf.

Symphony / IRI, 2019

Pillar 3: Supply Chain Agility

In today's retail environment, retailers realize that building demand forecasts simply based upon historical transaction, promo, and pricing data alone is not good enough. Data today has a shelf life much like produce and needs to be updated in real time to be relevant. Integrating new data sources is now required to improve in-stocks, over-stocks.

Including new data sources like demand signals (e.g. weather, social commentary, competitor pricing, local event calendars, shipping and returns policies, and demand transfer dynamics) not only improves forecast accuracy, but greatly enhances inventory visibility, reduces out-of-stocks, and improves today's customer fulfillment expectations.

Today's supply chain now includes Direct-To-Consumer, Micro-Fulfillment Centers and In-Store pickup options. Encompassing internal product flows which are controlled, but also influencers that are semi-controlled, provide new challenges, but also more insight into business capabilities delivered through an enterprise data platform approach:

- **Inventory Visibility**—Actively update sales and inventory to enable near real-time inventory availability across channels
- **Flexible Fulfillment**—Provide enhanced convenience and customer service with buy anywhere, return anywhere and fulfill from anywhere capabilities
- **Website Operations**—Analyze website operations to improve efficiencies in order fulfillment service levels, optimize delivery options offered
- **Consolidated Inventory & Sales Data**— Build an enterprise view of sales and inventory across all channels

$371B

Inventory 'balancing' opportunity

2% average revenue increase (improving in-stocks)and an average 15% inventory reduction due to combined returns for retailers leveraging big data and IoT to improve forecast accuracy and demand driven supply chains.

Gartner, IDC, ISM

Pillar 4: Reimagining Stores

With more than 78% of global retail sales projected to still occur in-store by 2023, traditional retailers are increasingly realizing that the brick and mortar footprint is a competitive differentiator.

Physical stores now serve as micro-fulfillment centers—enabling better pricing and convenience to consumers than digital pure-plays through BOPIS (buy online, pick-up in store) or curbside delivery— driving down overall cost-to-serve. In-store customer insights and engagement opportunities are now possible using sensors, video, and beacons to measure and respond in real-time to shopper behavior using these new data sources to capture and measure geo-location, traffic, dwell times, and conversion metrics. And for merchants, the ability to capture shelf, rack, table, and bin inventory levels preventing out-of-stocks (lost sales), monitor merchandising (display, pricing, promo, POG) compliance and share these new insights with trading partners, brings an entirely new data monetization opportunity that traditional retailers have been missing out on for years. Opportunities including:

- **Personalized Interactions**—Increase conversion and customer engagement with deeper personalization and targeting

- **Loss Prevention**—Leverage streaming data to enable real-time response to potential fraud, fresh food shrink and predictive maintenance capabilities

- **Workforce Enablement**—Arm associates with knowledge, insights, exception-based alerts and service opportunities

- **In-Stocks & Fulfillment**—Provide metrics, alerts to manage out-of-stocks, and the store pickup and shipping process

The potential for Store Operations is almost as big as one's imagination. No longer is a store a waiting room for products wanting to be purchased, brick and mortar has gone on the offense to be a key part of digital transformation.

To fully leverage the concept of reimagined stores, an enterprise data platform must be handle all aspects of data discussed in the earlier pillars— legacy systems, multi-structured and streaming to fully realize the vision.

78%

of retail sales will still occur in-store in 2023.

Statista

Analytics in Action, Exemplar Retail Case Studies

17 **of the top 20 retailers across the globe** rely on the Cloudera data management and analytics platform to drive retail digital transformation, enabling personalized interactions, customer centric merchandising, improving supply chain agility and the reimagining of stores.

CLOUDERA

Accelerating Customer Insight, Relevance

A leading global drug store chain specializing in filling prescriptions, health and wellness products, health information, and photo services sought to improve their digital personalization capabilities with their customers. Considering that they fill 900M prescriptions, and process over 1.2B customer digital interactions annually, this was truly a 'big data' opportunity.

With a wealth of opportunity in digitally interacting with their customers, this global retail drug store chain set out to improve their precision of personalized targeted email offers and improve the timeliness (desired to move the email sent closer to the last interaction with the business).

This retail drug store chain was **experiencing a lag of 3 to 5 days** between the last interaction and attempting to deliver personalized offers due to sluggish analytic workload performance and high costs associated with their legacy data platform.

In order to improve business capabilities and customer relevance, they turned to Cloudera to establish a modern data architecture capable of handling massive customer segmentation model workloads.

This new platform leveraged 365 days of customer purchase history, including in-store POS and digital data across all loyalty customers that produced category affinity scores, individual customer preferences **and reduced the time of insight (and action) from 3 to 5 days to less than 3 hours.**

The Cloudera Data Platform allowed integration of all data across the enterprise from a variety of data inputs, rapid analytic model iteration updates with built-in governance and security—producing value to customers with **relevant and timely** content, recommendations and offers.

By enabling the digital marketing team with rapid time to market, with a scalable, performant and cost-effective data platform— these insights were also propagated across all lines of business.

In addition, the modernization program (anchored by Cloudera) attracted new IT talent, refreshing and upskilling for future innovation and growth.

<3HRS

A global retail drug store chain reduced time of insight (and action) from 3 to 5 days, to less than 3 hours.

Location-Based In-Store Merchandising

Product placement within apparel and department stores is well documented in positively affecting upsell and conversion.

One leading US department store retailer known for their clothing, accessories, and jewelry **was receiving sales data that was not specific enough to suggest actionable changes to the lay-out of their brick and mortar stores to maximize product sales.**

The online side of the house had the advantage as it could compare what shoppers view with what they buy, but the retailer lacked this insight from their brick and mortar stores.

This retailer leveraged Cloudera enterprise data management solutions that provided micro-data on shopper location enabling in-store analysis, similar to the insight gleaned from the online portion of their business.

The business leveraged IoT data that captured in-store location data from shoppers that have the mobile app on their smartphones.

Data then streamed from Cloudera DataFlow to the Cloudera Data Platform providing:

- **Intra-day insight on the flow of customers and traffic throughout their stores**
- **Identification of merchandising 'hot and cold' spots**
- **Enabled real-time, location based (proximity) marketing capabilities**

Early results demonstrated a **40% conversion lift using real-time delivery of personalized offers.**

This data was further leveraged to redesign and optimize product placements within stores.

The key to success was their ability to stream real-time data using Cloudera Data Flow from multiple sensors and seamlessly integrate this new data into the retailers Cloudera Data Platform, where cleansing, further analysis, and advanced analytics could be run producing further value for the retailer.

40%

A leading North American department store saw a 40% conversion lift using real-time delivery of personalized offers.

A 'Last Mile' Commitment

Retail supply chains are a recognized and proven source of ROI when data analytics are leveraged to improve forecast accuracy and product availability.

Gartner, IDC and ISM have reported that incorporating big data helps improve demand forecasts, building supply chain agility that can provide a **2% average revenue increase and a 15% average inventory reduction simultaneously.**

A leading European supermarket data science team saw an opportunity to reduce 'last mile' delivery costs, while trying to keep the customer fulfillment promise at all costs. Existing route optimization tools were not reflective of the true drive times for deliveries and pre-built demand forecast models (intra-day orders) were leading to further inefficiencies. Additionally, fleet maintenance costs were excessive due to unplanned downtime and the need for additional vehicles needed to anticipate the unplanned vehicle downtime.

This retailer leveraged Cloudera to build an analytics solution for fulfillment delivery that allowed for advanced analytic modeling, A/B testing, and optimization by improved data access of omnichannel orders, logistics, and delivery capacity. Working with the incumbent point solution provider, this retailer brought the analytic modeling and IP in-house, improving delivery order demand forecast accuracy and route optimization. Through this collaborative effort, they also reduced point solution costs, improved analytic agility, and established an approach to use with other legacy business applications. This retailer also implemented a follow-on use case of predictive analytics for maintenance, improving uptime of their delivery fleet.

The following illustrative, measurable business impacts were realized:

- **Improved intra-day online order fulfilment demand forecast accuracy by 3%**
- **Improved customer delivery capacity, service with shortened delivery windows**
- **Reduced number of vehicles / drivers by 140 (@ $150k cost per) = $21m**

$21M

A leading European supermarket reduced number of vehicles/ drivers by 140, saving 21 million dollars.

Real-Time Pulse on In-Store Product Freshness, Waste

Supermarkets discard an estimated 43 billion pounds of food every year, according to a recent study.

Retail grocers are committed to doing better, but **food waste is still a massive problem and it is so pervasive that only one supermarket chain earned a B on the food waste "report card" recently issued by the Center for Biological Diversity.** Just a handful of chains earned Cs, while the rest of the country's most recognizable grocery stores scored Ds or Fs.

The leading mass merchant—that scored highest in rankings—recognized a need to improve cold storage temperature fluctuations on grocery products, understanding that both high and low temperature variations could lead to excessive shrink (waste).

This company leverages streaming data from thousands of real time cold storage sensors across their vast network of brick and mortar stores by using Cloudera DataFlow to ingest and aggregate data from these temperature sensors with individual location and on-hand inventory data to monitor and respond for perishable food products such as produce, dairy, and meat.

Predictive analytics allowed the retailer to proactively respond not only to product life cycle impacts, but also the potential risk of cold storage equipment downtime. Automating the closed-loop communications process using pre-built business rules and alerts gave individual maintenance teams and store department managers actionable instructions to ensure product freshness, reduce waste and address potential equipment failures.

The resulting application of streaming data and advanced analytics is expected to be a major contributor to help curb enterprise product waste and shrinkage of **over 500 million dollars in annual business impact.**
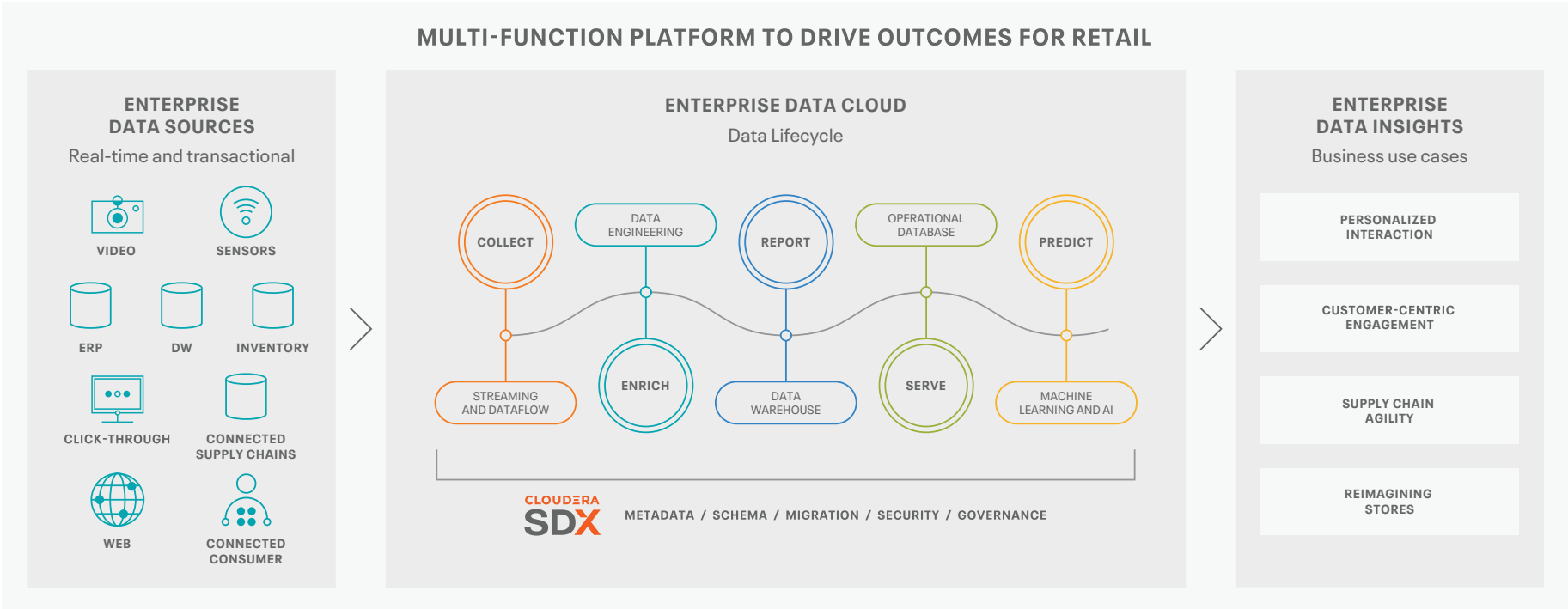
>$500M

A global mass merchant is projected to realize over 500 million dollars in annual business impact from streaming data and advanced analytics.

Enterprise Data Lifecycle for Retail

Today, leading retail organizations worldwide are adopting an enterprise data cloud strategy using the open source-based Cloudera Data Platform to manage the end-to-end data lifecycle. From collecting data from multiple sources, to storing, processing, analyzing, serving and predicting to drive actionable insights and use cases, the platform handles both data-in-motion and data-at-rest.

MULTI-FUNCTION PLATFORM TO DRIVE OUTCOMES FOR RETAIL

ENTERPRISE DATA SOURCES
Real-time and transactional

- VIDEO
- SENSORS
- ERP
- DW
- INVENTORY
- CLICK-THROUGH
- CONNECTED SUPPLY CHAINS
- WEB
- CONNECTED CONSUMER

ENTERPRISE DATA CLOUD
Data Lifecycle

- COLLECT
- DATA ENGINEERING
- REPORT
- OPERATIONAL DATABASE
- PREDICT
- STREAMING AND DATAFLOW
- ENRICH
- DATA WAREHOUSE
- SERVE
- MACHINE LEARNING AND AI

CLOUDERA SDX
METADATA / SCHEMA / MIGRATION / SECURITY / GOVERNANCE

ENTERPRISE DATA INSIGHTS
Business use cases

- PERSONALIZED INTERACTION
- CUSTOMER-CENTRIC ENGAGEMENT
- SUPPLY CHAIN AGILITY
- REIMAGINING STORES

Drive Insights and Business Outcomes

The Cloudera Data Platform enables retailers and consumer goods companies to maintain their momentum and accelerate digital transformation by leveraging data from any source whether on-premise, cloud, or hybrid platforms—powered by open-source technology.

Cloudera delivers the data lifecycle solution through Cloudera Data Platform, from retail's edge to AI.

Why Cloudera

Hybrid and Multi-Cloud
Run analytics on any cloud, easily and securely moving data and metadata between on-premises file systems and cloud object stores.

Analytics From Edge To AI
Apply real-time stream processing, data warehousing, data science and iterative machine learning across shared data, securely, at scale on data anywhere.

Security and Governance
Use a common security model, role and attribute-based access policies and sophisticated schema, lineage and provenance controls on any cloud.

100% Open
Open source, open compute, open storage, open architecture and open clouds. Open for developers, partners and open for business. No lock-in. Ever.

Learn More

Get an exclusive look at Cloudera Data Platform and learn more about how Cloudera is transforming retail.

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 | US: +1 888 789 1488 | Outside the US: +1 650 362 0488

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