eBook

Maximizing Data and Al Investments

How the Databricks Data Intelligence Platform Empowers Communication Providers

Unlock the full potential of your data through AI on the Data Intelligence Platform for Communications





Contents



Introduction

An Industry in Flux: Customer-Centric and Data-Driven

The communications industry is undergoing one of the most significant periods of growth (and change) in its 100+ year history. The dramatic increase in global traffic and the need for more network equipment are driving more complex and costly network management. Communications service provider (CSP) customers are also demanding higher-quality services and better customer experiences (CX), with data showing CSP customers are especially susceptible to churn when their needs are not met.

As a result, CSPs are looking to data and AI use cases to help reduce costs to serve and operate, develop and maintain great customer experiences, identify opportunities for revenue growth, and achieve scale with secure and reliable services.

To illustrate this, look no further than the explosion of digital technologies — such as 5G, IoT, edge computing and AI — which has ushered in a new era of big data. For example, according to Cisco's Visual Networking Index (VNI) Global Mobile Data Traffic Forecast, global mobile data traffic has grown to 77.5 exabytes per month. This growth is driven by the proliferation of mobile devices and the increasing demand for data-intensive applications. In addition, the number of connected IoT devices is skyrocketing. According to Statista, the number of connected IoT devices is expected to reach 31 billion by 2025, generating approximately 79.4 zettabytes of data annually. This data, while large and unwieldy, is critical to building a virtuous loop between network and customer. By bringing this data together, CSPs can better understand the factors that contribute to a positive or negative customer experience. 3

Supporting the Full CSP Lifecycle



To make this virtuous loop effective, the key is making sure that the right humans have access to the right data at the right moment in time. The need for a modern data analytics and AI platform has never been greater.

CHAPTER 2:

Communications Transformation Trends



Communications is in a state of change and today's most successful organizations are tapping into the power of data and AI to respond to these industry-defining shifts:

TREND #1 The Growth of Infrastructure and Need for Digitalization

Escalating demand for data and the rapid evolution of technology have fueled massive investments in infrastructure and digitalization, which are seen as table stakes to remain competitive in a highly dynamic market. In Ericsson's June 2023 Mobility Report, data shows mobile network traffic has almost doubled in two years.



Source: Ericcson traffic measurements (QI 2023). Note: Mobile network data traffic also includes traffic generated by Fixed Wireless Access services Data — Year-on-year growth

Global mobile network dat traffic and year-on-year growth (EB per month)



TREND #2 Building Reliable and Secure Services

Over the last decade, the shift to digital has drastically altered the way people consume and interact with information. Customers now expect instant access to content and services, regardless of their location or device. This unprecedented level of connectivity brings both opportunities and challenges for CSPs. With the rise of over-the-top (OTT) services and content providers, CSPs face the risk of becoming commoditized as mere infrastructure providers, losing touch with their customers and their unique value proposition.

At the same time, the cybersecurity landscape has become increasingly complex and treacherous. As technology advances, so do the threats posed by cybercriminals and state-sponsored actors. Fraud, data breaches, network vulnerabilities and privacy concerns have reached an all-time high, leaving CSPs tasked with not only delivering reliable services but also safeguarding the sensitive information and digital lives of their customers.

TREND #3 The Proliferation of Al

Communications has a long history with AI, from speech recognition and natural language processing (NLP) in the 1990s, to machine learning and data analytics in the 2000s. But recent advancements in machine learning and generative AI have helped the technology begin to revolutionize the way businesses interact with customers and optimize their operations.

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One of the most visible examples of this is in customer experience, where virtual assistants and chatbots have become commonplace. These AI-powered systems can engage with customers in real time, providing instant support, resolving queries and offering personalized recommendations. Additionally, AI is increasingly supporting organizations in making data-driven decisions about service offerings, pricing and targeted marketing campaigns. With predictive analytics supporting important initiatives such as churn prediction, teams can take proactive measures to retain valuable customers.

Another application is network optimization and management. CSPs are leveraging AI algorithms to analyze vast amounts of data collected from network elements and customer usage patterns. This enables proactive maintenance, congestion management and dynamic resource allocation, leading to enhanced network performance and reduced downtime.

The proliferation of AI in the communications industry is a testament to its transformative potential, enabling businesses to achieve greater efficiency, improved customer experiences and strategic insights. As AI technologies continue to advance, their impact on the industry will only grow, opening new opportunities and challenges for CSPs to capitalize on.

TREND #4 Monetizing IoT and M2M

As the number of connected devices continues to rise, businesses are realizing the potential to leverage the data generated by IoT and machine-to-machine (M2M) devices to create value-added services and solutions. This trend is fueled by several factors:

- Expanding IoT ecosystem: The IoT ecosystem is rapidly expanding, encompassing a wide range of industries, from smart homes and healthcare to agriculture and industrial applications. The diverse use cases and the massive volume of data generated by IoT devices provide fertile ground for CSPs to explore innovative ways to monetize this data.
- 2. Data insights and analytics: IoT and M2M devices generate a wealth of data that, when properly analyzed, can yield valuable insights for businesses. CSPs can offer data analytics services to their customers, providing actionable intelligence that helps optimize processes, improve efficiency and drive informed decision-making.



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- **3. Subscription-based services:** CSPs are identifying ways to monetize IoT and M2M devices by offering subscription-based services, charging customers for access to their networks and the additional value-added services they provide. From AT&T to Verizon, subscription models ensure a steady stream of revenue while accommodating various customer needs and budgets.
- 4. Cross-industry partnerships: CSPs are collaborating with other industries and companies in the IoT ecosystem to create comprehensive solutions that cater to specific market segments. For example, partnerships with healthcare providers can lead to remote patient monitoring services, creating new revenue opportunities.
- **5. Edge computing and data processing:** With the growth of IoT devices, there is an increasing need for edge computing capabilities. CSPs are starting to monetize edge computing services, processing data closer to the source, reducing latency and providing real-time insights to customers.

Ultimately, monetizing IoT and M2M devices allows CSPs to diversify their revenue streams beyond traditional communication services.

TREND #5 Increasing Competition and New Business Models

As the telecommunications landscape evolves, traditional revenue streams, such as voice and messaging, face challenges from over-the-top (OTT) services and alternative communication platforms. This intensifying competition has led to tighter profit margins for CSPs, urging organizations to explore new paths to sustain growth and profitability.

This has led to a number of high-profile mergers and acquisitions (M&A) in recent years: T-Mobile and Sprint, AT&T and Time Warner, Verizon and Yahoo, and Vodafone and Unitymedia, to name a few. While many M&A activities enable CSPs to gain access to new technologies, customer bases and regional markets – fostering economies of scale and enhancing competitive capabilities – not all have worked out. For example, Verizon divested from Yahoo in 2021, AT&T spun off their resulting WarnerMedia business unit to focus on their legacy telecom business, and Vodafone announced they were phasing out the Unitymedia brand, less than a year after acquiring the cable network operator from Liberty Global.

Additionally, organizations are increasingly considering ways to diversify their business models to remain agile and adaptive in the rapidly evolving industry. As we called out above, this may involve investing in adjacent markets like IoT, cloud services and digital solutions, leveraging existing infrastructure and customer relationships.

CHAPTER 3:

Barriers to Data-Driven Innovation

There's no shortage of data or the need for data-driven innovation. Yet, most communications organizations struggle to tap into the full potential of their data and AI. This has led to four common areas of transformation focus:

CSPs have common areas of transformation focus





CHALLENGE #1 Improving the Customer Experience

CSPs are investing in their customer experience (CX) alongside value-add products and services to improve their net promoter score (NPS) and increase average revenue per user (ARPU). But more importantly, they're trying to reduce customer churn.

There's a lot of flux in the communications market, so customer churn can depend on many factors — price, quality/availability of service, availability of desired products, and social proof/general perception of the brand, to name a few. Annual churn rates range from 30%–40% for carriers around the world, and estimates show the churn rate for American wireless carriers can reach as high as 57%, costing the industry billions of dollars a year. Further, data from Deloitte shows that the churn rate among OTT services — media offered directly to viewers via the internet, in this case on a mobile phone — grew from 35% in Q1 2019 to 41% in Q1 2020.

An organization's ability to deliver 1:1 personalization at scale goes a long way to meeting customers where they're at, effectively mitigating churn. Unfortunately, legacy technologies are complex to manage and costly to scale for today's massive volumes of customer data. Al and personalization at scale are impossible when you have fragmented views of an audience, lack real-time capabilities and struggle to make the leap from descriptive to predictive analytics.

CHALLENGE #2 Reducing the Cost to Serve/Operate

Complexity has driven increased costs across the board, which presents a twofold challenge. On the one hand, the rapid pace of innovation requires constant upgrades and investments in new technologies. This results in higher initial capital expenditures and ongoing operational costs as CSPs strive to remain at the forefront of technological advancements. On the other hand, legacy systems and outdated infrastructure can also be cost-intensive to maintain and integrate with newer technologies. The need for seamless interoperability between legacy and modern systems demands substantial resources, driving up operational expenses.

Additionally, the demand for seamless, high-quality customer experiences introduces cost pressures. As customers expect personalized, real-time services, CSPs must invest in sophisticated customer relationship management (CRM) systems, data analytics tools and AI-driven automation to provide tailored solutions. These investments, while enhancing customer satisfaction, can strain budgets, especially if not carefully managed. Moreover, the necessity of robust cybersecurity measures to safeguard sensitive data against increasing cyber threats contributes to the escalating operational costs, requiring continuous investments in cybersecurity tools, personnel training and risk mitigation strategies.

As infrastructure scales, so does the cost to serve and operate it. To combat this, organizations need a data strategy on a unified platform to perform intelligent network optimization and predictive maintenance, deploy robotic process automation, and push compute and AI to edge networks to reduce spend, save network bandwidth, and generate incremental revenue.

CHALLENGE #3 Identifying New Revenue Sources

As traditional revenue streams such as voice and messaging face increased competition from OTT services and evolving customer preferences, organizations need to consider how diversification can mitigate risk. To address this challenge, CSPs must strategically leverage data and AI-driven insights to uncover untapped opportunities, anticipate market trends and create innovative services that resonate with their customer base.

Here, data emerges as a valuable asset. With no shortage of customer data, network performance metrics, and usage patterns, organizations can leverage advanced analytics and AI to extract actionable insights that help teams better understand customer behavior, preferences and pain points. This data-driven approach empowers teams to outmaneuver competition in an increasingly dynamic environment.

Furthermore, AI plays a pivotal role in identifying revenue opportunities by enabling predictive modeling and scenario analysis. CSPs can leverage AI algorithms to forecast market trends, predict demand patterns and simulate the impact of different business strategies. This empowers them to make informed decisions on where to invest resources and which new revenue avenues to explore. For instance, AI can help CSPs analyze customer usage data to create targeted upselling and cross-selling strategies, enhancing customer retention and increasing revenue streams. In summary, the challenge of identifying new revenue sources prompts CSPs to evolve from being solely connectivity providers to becoming data-driven solution creators.

CHALLENGE #4 Achieving Scale and Security

Striking a delicate balance between achieving profitable scale and ensuring robust security has become a multifaceted challenge. As CSPs scale their networks and invest in cutting-edge technologies, they are met with the imperative to safeguard these investments against an increasingly sophisticated array of cyber threats. Simultaneously, the pressure to generate revenue while maintaining operational efficiency requires harnessing data and AI to optimize network performance, enhance customer experiences and streamline operations.

To address this challenge, CSPs need to harness the full value of their data and AI investments in two parallel motions — one driving profitable scalability and the other to fortify security measures. Data-driven insights enable CSPs to predict network congestion, allocate resources efficiently, and optimize bandwidth usage, thereby achieving cost-effective scale without compromising quality of service. Meanwhile, CSPs can employ AI to identify and mitigate threats in real time, leveraging machine learning algorithms to detect anomalies and potential vulnerabilities. By analyzing network traffic patterns and user behaviors, AI can swiftly detect and respond to malicious activities, protecting both the network infrastructure and customer data.

By employing data-driven insights to optimize network scalability and by leveraging AI to fortify cybersecurity measures, CSPs can more effectively scale network infrastructure while safeguarding their investments.

CHAPTER 4:

Unlocking Innovation With the Data Intelligence Platform for Communications

For organizations interested in data-driven transformation, there is a path forward — introducing the Databricks Data Intelligence Platform for Communications

The Databricks Data Intelligence Platform for Communications is the enterprise data platform for CSPs, because it was designed to meet the dynamic needs of the communications ecosystem at scale — while delivering enterprise-grade security and intelligently reducing costs to operate. The Data Intelligence Platform for Communications is built AI-first, and is the only platform to combine all your data and all your AI seamlessly. This enables you to leverage cutting-edge AI across your entire organization at an operational speed and efficiency never before possible.



Building on this foundation are Solution Accelerators for foundational analytics and AI use cases. These solutions are developed by Databricks and our ecosystem of partners to accelerate the delivery of data and AI projects and provide measurable outcomes.



CHAPTER 5: Platform Benefits



"Databricks has helped Comcast scale to processing billions of transactions and terabytes of data every day."

- Jan Neumann VP Machine Learning COMCAST

Create More Meaningful Customer Engagements

Built in the cloud and designed for high performance, the Data Intelligence Platform for Communications empowers organizations with a single, unified view of your customers, empowering teams to deliver 1:1 personalized experiences at scale. For example, **Comcast** uses Databricks to build performant data pipelines that ingest billions of interactions across more than 60M devices. These pipelines then help the team easily manage the lifecycle of hundreds of ML models to create their highly innovative, unique and award-winning viewer experience using voice recognition and machine learning.

The Data Intelligence Platform for Communications enables CSPs to have a relationship with customers on their terms: understanding sentiment across channels, personalizing recommendations — all with dynamic engagements that improve customer experience, increase profitability and reduce churn.

Differentiated capabilities:

- Leading Gen AI and LLM-ready capabilities: Create scalable and cost-effective marketing content using LMMs that is hyper-personalized for your audience alongside engaging virtual assistants, trained on your data, that improve the customer experience, increase NPS and reduce churn.
- One unified hub for all communications data: Unlock insights across your entire data estate; from network data, equipment management, customer management data and more, to ensure best-in-class consumer and network experience. All using an open source data format that prevents vendor lock-in.
- A platform designed for streaming workloads: Databricks can process real-time streaming data using structured streaming capabilities. This allows your organization to gain insights from streaming data sources (IoTs and M2Ms) and dynamically respond to events as they happen.
- Solution Accelerators for ingestion and curation: Databricks, in collaboration with partners such as Accenture, offers a collection of notebook templates designed to simplify the implementation of core data and AI use cases, including personalization and real-time recommendations.



"Databricks lakehouse has helped us deliver a lean supply chain that supports the best possible wireless service to our communities."

- Ellen Sulcs Director, Data Engineering & Development **T Mobile**

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Drive Data and Network Optimization

The Databricks Data Intelligence Platform simplifies internal operations and reduces the cost to serve and operate at scale. For example, **T-Mobile** leverages Databricks across their organization to more accurately determine construction readiness, ensure timely procurement of cell-site equipment, and identify fraud and waste of network materials. In addition, they've seen a 250% increase in analytics process reliability and a 75% reduction in data latency. With the Data Intelligence Platform serving as the backbone of their data infrastructure, T-Mobile has transformed their business to better support their customers and deliver on the promise of providing the best value and the best network alongside the best experiences.

With data and AI on the same unified platform, teams can perform intelligent network optimization and predictive maintenance, deploy robotic process automation, and push compute and AI to edge networks to reduce spend, save network bandwidth, and generate incremental revenue.

Differentiated capabilities:

- Highly scalable Spark Structured Streaming: Unlock streaming simplicity with Delta Live Tables (DLT). DLT empowers enterprises to construct a secure, agile and cost-efficient real-time pipeline for streaming use cases. By harnessing real-time signals and AI, telco companies can effectively build streaming analytics, e.g., safeguarding millions of wireless customers against fraud.
- Performance at scale: With Apache Spark[™] and Delta Lake the leading open source engines for largescale data processing and data management — under the hood, the Data Intelligence Platform delivers massive scale and speed. And because it's optimized with performance features like indexing and caching, Databricks customers have seen ETL workloads execute 48x faster.
- Predictive modeling at scale: Anticipate future customer demands and network requirements by deploying generative AI models and LLMs that analyze historical data, industry news and social media.
- Dynamically optimize resource allocation: Tap the full potential of Gen AI and LLMs to optimize
 network resource allocation dynamically and identify areas for optimization. These insights can guide
 decisions on infrastructure upgrades, deployment strategies, and traffic management techniques. With
 Databricks' AI capabilities, your organization can make better data-driven decisions from AI models
 trained and built using your own data.



"Databricks has provided a unified platform that brings together data and AI to deliver predictive solutions that help to protect our customers and our business by stopping fraud before it happens."

- Kate Hopkins Vice President

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Get More Productivity Out of Your People and Your Data

Whether your employees are creating data assets or consuming them, ensuring they have the right data at the right time is critical to success. For example, AT&T trusts the Databricks Data Intelligence Platform to protect more than 182 million customers from fraud and to increase operational efficiencies, benefiting both customers and the business. As a result, AT&T has seen an 80% decrease in fraud attacks, saving tens of millions of dollars in associated costs.

With Databricks, CSPs can increase impact and decrease the time to value of their data assets, ultimately enabling data and AI to become central to every part of their business. And by enabling data teams across engineering, analytics and AI to work together, Databricks frees up employees to self-serve and focus on high-impact customer scenarios — from in-store and online operations to customer support cases.

Differentiated capabilities:

- Leverage Gen Al and LLMs to do more with fewer resources: Reduce the resource requirements of your organization by streamlining data access for nontechnical users via Databricks Assistant. Enhance the network platform by automating issue diagnosis using LLMs, empowering field engineers for efficient operations. And elevate your user experience with Databricks Enterprise Q&A Bot, enabling intuitive LLM-powered natural language interaction for information retrieval. Key use cases for driving organizational efficiency include Predictive Maintenance, Network Knowledge, Content/Data Sharing, and Customer Service Automation.
- Real-time data ingestion: The Data Intelligence Platform allows for true real-time stream ingestion of data and even analytics on streaming data. Data warehouses require the extraction, transformation, loading, and then additional extraction from the data warehouse to perform any analytics.
- Simple and unified data governance: Unity Catalog provides a unified governance and sharing model for all data, analytics and AI use cases. Helping your organization adhere to industry standards and regulations.
- Simplified streaming and batch architecture: The Data Intelligence Platform event-driven architecture provides a method of ingesting and processing batch and streaming data that's simpler to develop and manage than legacy approaches, such as lambda architectures. This architecture handles the change data capture and provides ACID compliance to transactions.



Build Tomorrow's Products and Network, Today

From network planning to new product innovation, communications organizations need to develop the most desirable network and products so their customers don't look elsewhere. Dish Network taps Databricks to build fully managed, serverless cloud infrastructure designed for speed, cost control and elasticity, resulting in a 50% reduction in processing times on top of a 35% infrastructure cost savings.

With Databricks, CSPs can make more informed decisions around construction readiness, while decreasing the time to market for new solutions that enhance performance and improve product engagement. By analyzing customer behavior and insights, as well as product telemetry (streaming, RFID, computer vision), and leveraging that data to drive product decisions, CSPs can build for tomorrow, today.

Differentiated capabilities:

- Collaborative data science and machine learning: The Data Intelligence Platform provides an interactive notebook environment that enables cross-functional teams — including data scientists, engineers and business analysts — to collaborate on data products with a wide range of analytics and ML capabilities, including support for multiple languages (R, Python, SQL and Scala) and popular ML libraries.
- Cost efficiency with simplified management: Databricks' serverless compute empowers your organization with streamlined operations that ensure data privacy, responsiveness and cost-savings in managing data-intensive tasks. This includes centralizing resources, rapid provisioning, tailored environments for SQL warehouses and ML, and much more.
- Publish powerful dashboards: Make insights consumable with interactive visualizations and publish as
 dashboards to teams in the field be it in-store, in customer support or on the job site so they can
 stay abreast of the latest insights.
- Easily manage the ML lifecycle: Manage the complete ML lifecycle from model development through deployment with Managed MLflow, an open source platform developed by Databricks to help streamline machine learning. Centralize models and features in the registry to help teams collaborate, iterate and reuse existing work.

CHAPTER 6:

Industry-Specific Solution Accelerators

Databricks and our ecosystem of partners have packaged Solution Accelerators to help organizations derive value from their Data Intelligence Platform projects faster. Learn more about Solution Accelerators.



Telco Network Analytics

Increase network reliability and reduce customer churn with robust data pipelines



Call Center Automation

Improve the customer experience while increasing the impact of your human resources



Customer Lifetime Value

Understand customer lifetime and estimate future spend



Customer Survivorship/Churn

Understand why churn is happening across channels and mitigate risk



Behavioral Segmentation

Advanced segmentation to target the right people with the right messages and advertising



Sales Forecasting and Ad Attribution

Leverage offline and alternative data to understand advertising effectiveness



Recommendation Engine

Create a personalized experience for your customers to drive engagement and monetization



Multi-Touch Attribution

Determine ad effectiveness and optimize channel spend and performance



Streaming Quality of Service

Measure platform stability and performance to prevent churn



HR Help Desk

Elevate your HR help desk with AI, providing personalized support, 24/7 availability and data-driven insights 18

CHAPTER 7:

Examples of Success on the Databricks Platform

Featured Customers

Communications organizations are unified around the goal of improving customer engagement while reducing costs to serve and operate at scale. The role of data and AI in delivering on that mission has never been more critical.

The Data Intelligence Platform for Communications is enabling organizations across the industry to collaborate and unlock data-driven innovation from personalization and call center automation, to network experience and beyond.



🚔 AT&T

AT&T trusts the Databricks Data Intelligence Platform to protect more than 182 million customers from fraud and to increase operational efficiencies, benefiting both customers and the business. As a result, AT&T has seen an 80% decrease in fraud attacks, saving tens of millions of dollars in associated costs.



COMCAST

Comcast uses the Databricks Data Intelligence Platform to build performant data pipelines for petabytes of data and easily manage the lifecycle of hundreds of models to create a highly innovative, unique and award-winning viewer experience using voice recognition and machine learning.



dish

Dish Network taps the Databricks Data Intelligence Platform to build fully managed, serverless cloud infrastructure designed for speed, cost control and elasticity, resulting in a 50% reduction in processing times on top of a 35% infrastructure cost savings.



OROGERS.

Rogers leverages the Databricks Data Intelligence Platform to improve network performance, streamline supply chain and optimize customer experiences. Their Delta Lake integration ingests PBs of data faster, reducing OPEX by 51%.



T Mobile

T-Mobile leverages the Databricks Data Intelligence Platform across their organization to more accurately determine construction readiness, ensure timely procurement of cell-site equipment, and identify fraud and waste of network materials. In addition, they've seen a 250% increase in analytics process reliability and a 75% reduction in data latency.

Databricks helps the biggest CSP brands build data-driven businesses



About Databricks

Databricks is the data and AI company. More than 10,000 organizations worldwide — including Comcast, Condé Nast, Grammarly and over 50% of the Fortune 500 — rely on the Databricks Data Intelligence Platform to unify and democratize data, analytics and AI. Databricks is headquartered in San Francisco, with offices around the globe, and was founded by the original creators of Lakehouse, Apache Spark[™], Delta Lake and MLflow. To learn more, follow Databricks on Twitter, LinkedIn and Facebook.

Get started with a free trial of Databricks and start building data applications today.

Sign up for a free trial

To learn more, visit us at Communications Industry Solution



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