Google Cloud

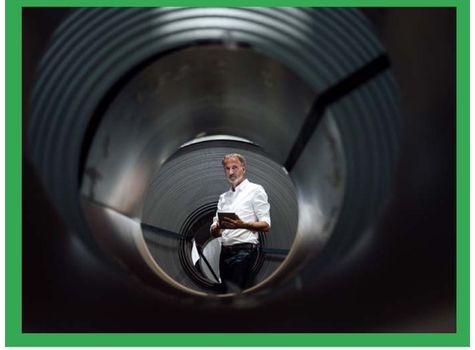
2023 Data and AI Trends Report

Five trends amounting to an interconnected data strategy

You'll find some common denominators across the trends, including the overarching need for greater unification and flexibility. You'll also learn why these trends depend on each other for success.

01

Show data silos the door



02

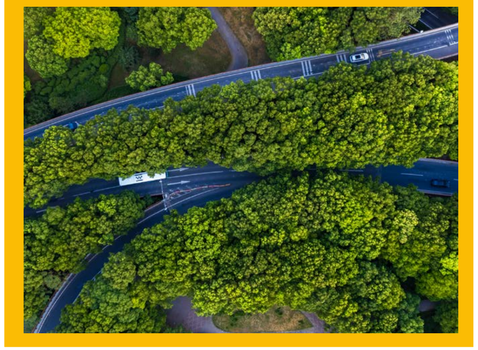
Usher in the age of the open data ecosystem

03

Embrace the AI tipping point

04

Infuse insights everywhere



05

Get to know your unknown data

You're contributing to the fastest progression of innovation—and are managing more change—than any generation before you.

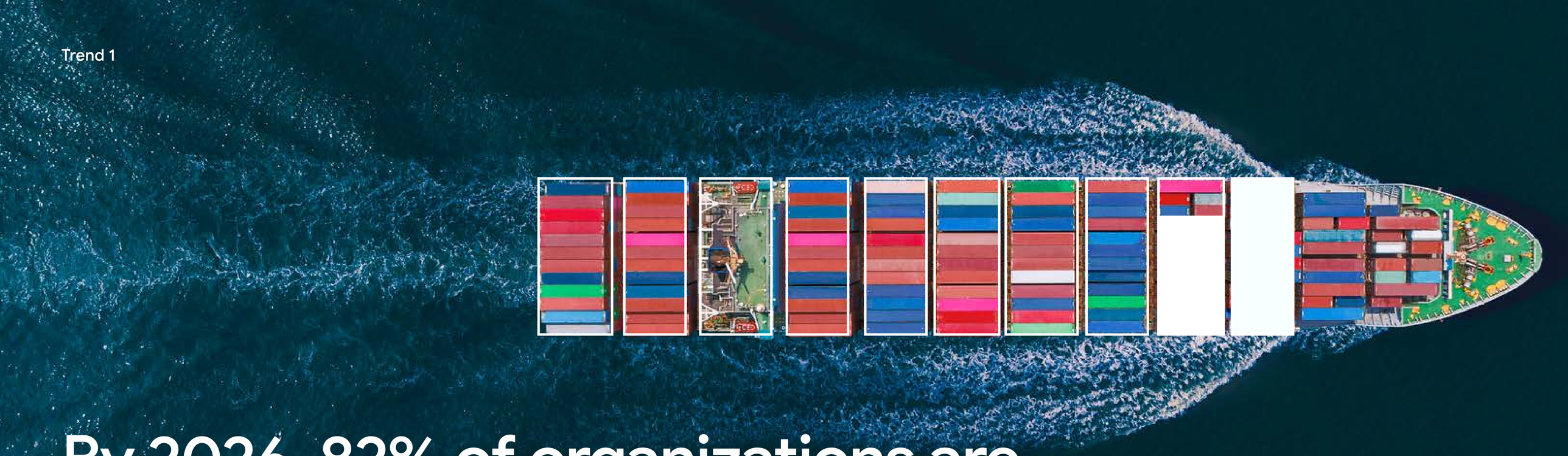
As you look at the five data and AI trends in this report, the way they are evolving and how global organizations are contributing to them could surprise you.

That's because our challenges today are different than they were a year ago. Consumer demand, market conditions, and new AI and machine learning technologies have evolved. So has our perspective. We're all managing increased data complexity, looking for new patterns, creating new models, making data available to the right people and applications at the right time, and keeping track of every byte in a way that meets requirements.

To identify the current data and AI trends, we partnered with IDC on multiple studies involving global organizations across industries. We then asked Google thought leaders to weigh in on the research and reveal what's most important for organizations' data and AI strategies.

01

Show data silos the door



By 2026, 82% of organizations are looking to ensure that all capabilities supporting the full data and AI workflow are tightly integrated in their cloud data platform.[1]

Show data silos the door

A unified data cloud provides a platform that supports every stage of the data lifecycle. Databases, data warehouses, data lakes, streaming, BI, AI, and ML all reside on a common infrastructure that is pre-configured to work together seamlessly.

01 **More efficient data usage and accessibility**

02 **Accelerate decision making and development cycles**

03 **Improve customer experience**

Andi Gutmans

GM and VP of Engineering for Databases, Google Cloud

By 2026, 7 PB of data will be generated per second globally. At the same time,

only 10% of the data

generated each year is original, while the remaining 90% is replicated.[2]

Organizations are realizing that their siloed data storage and warehouse strategies can't keep up with modern demands. With the amount of data that devices and applications generate every day, it doesn't surprise me. They need a better way to store, manage, analyze, and govern all this data, while also cutting down on the extra work, costs, and conflicting insights caused by silos and redundant systems.

The skills of developers, IT administrators, security analysts, and business teams are best used developing innovative applications and bringing services to market faster, not chasing after data. These contributors must know what data exists and where it lives and be able to easily access and analyze up to date data. With a unified data cloud, this all becomes possible.

For me, one of the biggest takeaways about this trend is that a unified data cloud enables the integration of data and insights into digital experiences and workflows. And as a result, users can have the right information, exactly when they need it, to reach the best possible outcomes.

How industries are taking advantage of a unified data cloud

Retail

More retailers are bringing all their data into one platform to get the customer insights they need to deliver a unique, personal experience across all consumer touchpoints, increasing customer loyalty and conversion rates across all channels.

Manufacturing

Manufacturers are bridging connectivity among disparate machines and systems with a unified data platform, making their data easier to use – which strengthens their connections with suppliers and lets them act quickly to prevent shipping delays.

Financial Services

Retail banking and insurance firms are using privacy and customer-centric data solutions to enable better personalization, more effective marketing analytics, and customized direct-to-customer experiences.

Trend 1

What can your organization achieve with a unified data cloud?

When operational and analytical systems are decoupled, organizations struggle to piece together different solutions to build intelligent, data-driven applications. To meet customer expectations and deliver “always on” digital experiences, operational and analytical systems need to work together on the same data in near real time.

> “As we expand, we’ll build new algorithms that process real-time datasets in regional languages and accurately predict what content users want to see. Google Cloud gives us an infrastructure optimized to handle such compute-intensive workloads for current and future growth.”
>
> —**Bhanu Singh**,
> Co-founder and Chief Technology Office, ShareChat

Americas

Equifax broke down 80-plus data silos into a seamless data fabric, giving them the ability to respond faster to customer and regulatory needs.

Europe

Delivery Hero integrates data into a unified data platform for cost savings and better customer experiences.

Asia

ShareChat simplifies management and prepares the company for growth with a unified, optimized infrastructure.

02

Usher in the age of the open data ecosystem

78% of executive management believe that using external data is a critical competency for their enterprise.[3]

Trend 2

Usher in the age of the open data ecosystem

To protect technology choice and reuse code and standards-based services, more organizations are adopting open source software and open APIs.

01 **Integrate data with your technologies of choice while avoiding lock-in**

02 **Increase ROI of existing investments**

03 **Faster development cycles**

Gerrit Kazmaier

VP and GM, Data & Analytics,
Google Cloud

> Unlocking that data by building an
>
> **open, multicloud data ecosystem**
>
> is the most important aspect to emerging AI adoption strategies.”

Increasing requirements for data ecosystem flexibility are taking conversations about open standards, data integration, and technology choice to new levels. Organizations recognize that their data is at the heart of digital innovation, and it’s the key to unlocking AI. The challenge is that data is being generated at far greater rates than ever before, and it’s being trapped within the new silos of different point solution formats and closed clouds.

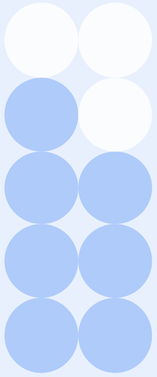
Unlocking that data by building an open, multicloud data ecosystem can improve everything. This can lead to faster time to market, and improved return on investment. More importantly, it can make your organization more competitive. Imagine, all your employees, customers, and partners taking part of your data ecosystem as contributors rather than bystanders.

Organizations want the freedom to create a data cloud that includes all formats of data from any source or cloud. They want to use the technologies that work best for their specific needs—and to increase the pace of innovation without having to worry about technology silos and debts. This is ultimately about unlocking the power of data and AI for all companies out there.”

Opening systems to allow for data movement and multicloud analytics

70%

more data leaders than data laggards say it's important for data clouds to be based on open protocols.[4]



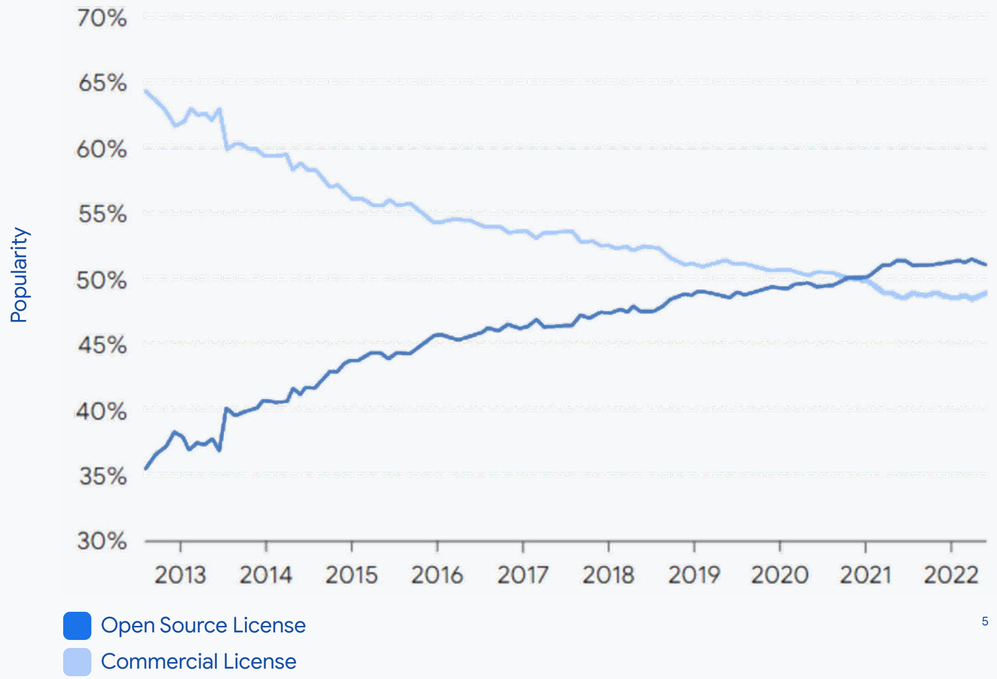
Traditionally, organizations deployed individual systems and tools to resolve specific problems. As a result, many organizations now store data across multiple platforms and public clouds. Often, this data ends up being siloed, making it hard to get insights across all of the data.

The adoption of open standards and open architectures helps companies avoid lock-in and silos by protecting the freedom to move data between platforms as needed to support workflows, insights, and data monetization. For example, data stored in any SQL-based relational database such as PostgreSQL can be easily moved and shared with any other SQL-based database. Systems with open APIs that conform with the REST architectural design make it easy for companies to consume and share data from internal and external sources. At the same time, the use of open standards and open architectures also enables organizations to minimize data movement and egress fees by analyzing data where it lives.

Trend 2

Open to open source

Research shows that open source adoption is increasing, while the use of licensed enterprise software is decreasing.



[5]

Open source software is playing a key role in data ecosystems:

- Organizations are speeding up development and lowering costs by using pre-built, pre-tested open source services and applications such as PostgreSQL, Kafka, TensorFlow, PyTorch, Presto, JanusGraph, and Apache projects. For example, organizations are building their data lakehouse using open source technologies, storing data in open formats like Apache Parquet with processing engines like Apache Spark, and using open frameworks like Apache Iceberg and Delta.
- Cloud providers' open-source-as-a-service offerings give companies the freedom to adopt open source software while enjoying the backing and expertise of dedicated engineering resources.

"Reuse is a foundational engineering principle for improving productivity. Open ecosystems go back to that principle by using open standards and open source technologies to make data, code, and applications discoverable and portable but also protected by one consistent security layer."

—**Firat Tekiner**,
Senior Product Manager,
Google Cloud

Highlights

70+% of new apps will be developed on open source databases

80% of enterprises will be multicloud open source is critical for flexibility

"Cloudification" of open source databases with fully managed services is considerably growing in market size.

Trend 2

Open for more data

Organizations are making use of the publicly available datasets such as weather, trend, and location data to extract valuable insights and develop revenue generating applications. And today, 75 percent of organizations are using location data across a broad range of business functions and processes,[7] such as supply chain, public transportation, and personalized customer experiences.

Not only are public datasets available on demand but they're also free of administration and maintenance costs, and vetted by the community for accuracy. Teams can also further expedite data pipeline development when they can access public data sets via open standards-based APIs and follow consistent standards for consumption and ingestion.

78%

of executive management believe that using external data is a critical competency for their enterprise.[6]

"Looker fits well with our multicloud philosophy because we can choose our preferred database and leverage integrations to make our data accessible and actionable. Overall, Google is making a lot of progress in multicloud, which allows you to not have to think about the vendor and just adopt what you need to do the job well."

—**Dave Johnson**,
VP of Informatics, Data Science, and AI at Moderna

Americas

Moderna finds new ways to help people with mRNA by leveraging and integrating the best technologies available.

Europe

Swisscom increases visits by 25 percent by integrating geo targeting, responsiveness, and website data

Asia

Tokopedia runs their ecommerce platform on Kubernetes to improve experience and keep shoppers coming back.

03

Embrace the AI tipping point

By 2025, at least 90% of new enterprise application releases will include embedded AI functionality.[8]

Embrace the AI tipping point

AI-powered experiences are now embedded into everyday life. This ubiquity is creating demand for easier ways that more people can work with AI and ML.

01 **See patterns and insights in any amount of data**

02 **Solve problems at scale with accuracy**

03 **Democratize access to ML and AI**

June Yang

VP, Cloud AI and Industry Solutions
Google Cloud

...data scientists, analysts, developers, and other ML creators...all want

a single interface

where they can get their tools, their data, and their insights all through a single, unified portal."

"We've reached the AI tipping point. Whether people realize it or not, we're already using applications powered by AI— every day. Social media platforms, voice assistants, and driving services are easy examples. Organizations are adopting AI and ML tools and technologies because with them, they can pull out so much more information from the data they have and solve real-world problems with scale and accuracy.

Unification is the most important aspect to emerging AI adoption strategies. Even as early as a year ago, companies were thinking about and managing their data clouds and their AI clouds as separate entities. But as we're seeing in other trends, this separation or siloed strategy creates obstacles.

Today, data scientists, analysts, developers, and other ML creators are all working together. And they all want a single interface where they can get their tools, their data, and their insights all through a single, unified portal."

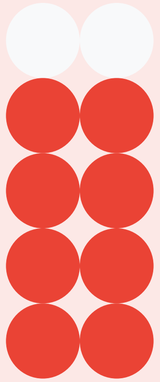
Trend 3

Overcoming the ML skills gap

Because most companies don't have the data science staff they need to meet their AI/ML goals, more organizations are empowering "citizen data scientists" to develop ML models using pre-trained models or low-code training methods. And 81 percent of organizations state that having more citizen data scientists would substantially improve their ability to apply advanced analytics to more projects.[9]

80%

of organizations say that having embedded support for AI/ML model execution makes them more likely to choose a particular data cloud platform.[10]



Organizations across industries that have made AI/ML more accessible to more staff are advancing the way they operate. For instance, retailers lean into AI/ML to:

- Serve personalized recommendations to their shoppers
- Ensure product availability by forecasting demand
- Give special attention to customers that need it with churn forecasting

Financial services and insurance companies use AI/ML to:

- Gain advanced fraud detection capabilities
- Classify and translate documents
- Analyze transactions and detect anomalies

Telecommunications organizations deploy AI/ML to:

- Automate their contact centers with virtual agents that mitigate common caller concerns
- Preserve live agents' time for complicated or urgent matters
- Monitor cell towers automatically
- Identify useful data trends and predictions

Tips for AI/ML adoption

- Even if you know data science well, it doesn't mean you want to start everything from scratch. Use templates, models, and other ready-to-use assets that allow for customization and take care of 80 percent of the work, so you can focus your efforts.
- Model tracing is critical to understand including when it was trained, who trained it, and where the data came from.
- You don't need to build a rocket ship, you just need to build a model that does a task better than what you're doing already.
- Tackle small, quick-win projects. Using ML to improve search click-through rates by 3 or 4 percent may not sound like a sexy number but in reality, that little project could mean millions of dollars in additional revenue.
- Successful AI solutions build reliability and stability into the model at the outset.

"One of the cool things we're playing with is recommendations. How do I make sure you got the right sheets and right towels, if you're buying a comforter for your bed. With the power that we're enabling Google Cloud, we're going to help with these recommendations."

—**Lauren Miller**,
Chief Information Officer,
Macy's

Americas

Macy's delivers tailor-made recommendations and search results to customers with machine learning.

Europe

Lufthansa cuts Co2 emissions by an estimated 7,400 tons per year with predictive intelligence.

Asia

Jardine Restaurant Group sees a 30 percent increase in average order value with AI-powered menu recommendations.

04

Infuse insights everywhere

75% of organizations will demand new decision support features unavailable in their legacy BI software in the coming years.[11]

Infuse insights everywhere

Improving decisions, customer services, product development, and revenue by rethinking BI and analytics strategies and applications.

01 **Improve decision making**

02 **Fast development of new revenue streams**

03 **Improve customer acquisition and retention**

Trend 4

Kate Wright

Senior Director, Product Management
Google Cloud

Over the past 18 months, as a result of investment in data, analytics, and AI/ML:

73%

improved delivery of actionable information to all users in the flow of work[12]

74%

increased their use of process automation[13]

78%

improved the quality of decisions across their organization[14]

Spending on data and analytics technologies is forecasted to reach

$200B

worldwide in 2026.[15]

"Despite years of significant investment in data and analytics, BI has struggled to gain widespread adoption in organizations. One reason stems from a lack of trust in the reports and the tools themselves. Traditional reports often deliver inconsistent or inaccurate data because they're created using stale data copies, siloed tools, and non-standard calculations. Another reason for slow BI adoption is that the output is often a shared dashboard that provides general metrics rather than clear, actionable take-aways, tailored for specific users.

In order to accelerate adoption, organizations are changing their expectations for BI, including traditional dashboard modalities. They're exploring different solutions to deliver context-rich data experiences that give users the information they need, when and where they need it. This pertains to all users—not just the data savvy data analysts who know SQL. Organizations are equipping business decision-makers with the tools they need to incorporate required insights into their everyday workflows.

As organizations rethink BI and engage with multiple solutions, they'll need to make sure they're drawing from consistent data metrics and definitions in real time to ensure one version of truth. Additionally, instead of measuring BI's ROI by the amount of times someone has logged into a dashboard, it will be important to measure the outcomes of improved decision making such as increased revenue, optimized supply chains, and innovative product development."

More than just KPIs

BI is on the move. Forward-looking organizations are leaving the traditional, dashboard-focused model behind in favor of adopting an action-focused BI paradigm where insights are served to more people in more environments to support more types of workflows than ever before.

Organizations are using BI and analytics to identify underlying trends but also data anomalies and underlying business issues. These insights do not necessarily have to involve ML or AI. However, it's important to note that 87 percent of organizations find it important for BI and analytics software to support the development and deployment of predictive models.[16] In these use cases, BI and analytics feed data into models to deliver instant insights to users, even in dynamic, milliseconds-count environments such as digital ad bidding.

Other use cases such as embedding BI into enterprise applications, which is critical for 87 percent of organizations, help reach more personas. This is important because 79 percent of organizations want to reach a broader internal audience and 66 percent want to reach more external users with built-in BI and analytics capabilities in their enterprise applications.[17]

Embedding analytics into customer-facing applications also improves service levels and creates new revenue streams. Organizations are creating deeply personalized omnichannel experiences with data, optimizing inventory and product placement decisions, and increasing the visibility and efficiency of their supply chains—all supported by a modern business intelligence platform.

79% of organizations want to reach a broader internal audience and **66%** want to reach more external users with built-in BI and analytics capabilities in their enterprise applications.[17]

Trend 4

Tip: Build consistent trusted metrics via a semantic layer

Semantic layers sit on top of your data, and control what data users can see. They also define the data and map relationships to related data. To reduce complexity, serve up consistent insights to all your users, and enable greater data exploration, create a consistent semantic layer for people to interact with, rather than just raw data. To improve efficiency, people only need to see the data that's relevant to them, and they need to know that it's accurate and up to date.

"The big advantage of Looker is its data modeling layer, LookML, which serves as a single source of truth for the whole company. That's really important if you have a large team of analysts working across different business areas."

—**Edward Kent**,
Principal Developer, Data Engineering,
Auto Trader

Americas

Flashpoint gives customers real-time insights into security threats with embedded analytics.

Europe

Auto Trader satisfies data-hungry employees and customers with scalable, trusted, self-service data access.

Asia

Mitsubishi Heavy Industries shares IoT data analysis across the organization to achieve better customer experiences and higher lifetime value.

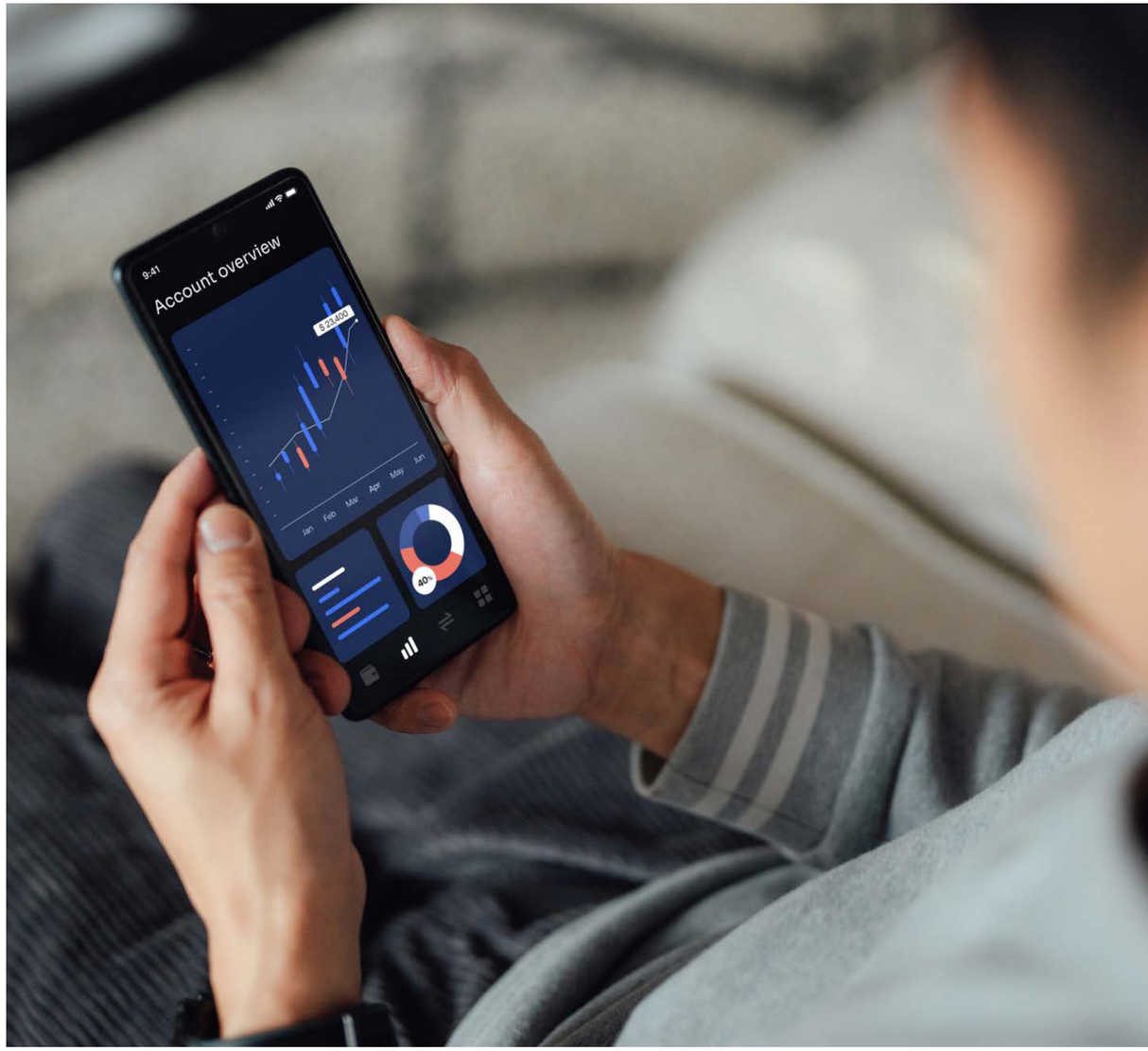
05

Get to know your unknown data

Today, 77 percent of organizations are looking to improve their ability to classify data and enforce data security and privacy controls.[18]

Get to know your unknown data

Organizations are looking to uncover and mitigate regulatory and compliance risks caused by their unknown data.



01 **Improve productivity and collaboration**

02 **Increase trust with your customers**

03 **Reduce risk of compliance breaches and fines**

Anton Chuvakin

Senior Staff Security Consultant
Google Cloud

> “Unstructured data from chat applications or log files can cause significant headaches for organizations, especially if they unexpectedly contain sensitive data like PII.”

“Data is valuable. It’s a big part of what makes companies competitive. But as companies amass volumes of structured and unstructured data from more channels supporting customers, partners, suppliers, and employees, many are unaware of the level of risk all this data brings.

If you don’t know what data you have, you cannot secure it. You also don’t know what security risks you are incurring, or what security measures you need to take.

If you create a table in a database that has personally identifiable information (PII) like patient data, you should know what kind of data will be in it, how to secure it, and how to keep it compliant. But modern enterprises are collecting and copying large amounts of data, especially unstructured data, from many sources, and they are finding that it’s impossible to manually find, scan, and classify every data set for risk.

Unstructured data from chat applications or log files can cause significant headaches for organizations, especially if they unexpectedly contain sensitive data like PII. An example of this is customer support transcripts, because you never know what information people will submit. When someone chats with customer support, they could type, “I didn’t get my medications. Here’s my name, the medications I need, and my social security number.” That sensitive PII data is now in one of your databases which may not be appropriately secured and classified.

Trend 5

Make sure your data is discoverable

Gaining visibility into all your data is the most critical first step in data risk management. This includes understanding all of your data ingestion pipelines and storage silos.

Trend 5

Classify your data

Once you know where your data is, you need to classify all of it. Accuracy is key. Because there's often no way to do this manually, organizations are augmenting current skills and resources using machine learning and business automation tools. As we learned in trend four, 90 percent of companies are also using BI and analytics to detect anomalies in data.[19] Using anomaly detection in this way could flag any data types that don't conform with the purpose of a table or file store.

73%

of organizations moved closer to having a common language around all data assets or artifacts[20]

72%

increased trust in data, information, and insight[21]

Trend 5

Implement consistent controls

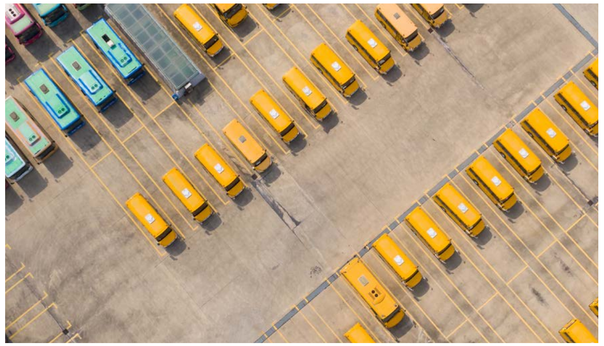
Once you have discoverable data that's also classified, you can implement automated controls that help reduce risk as data is stored and shared. For example, if you suspect that customers will be providing sensitive data like PII when they interact with a customer service representative, you can configure an automated process that automatically takes steps like:

- Redacting the customer's PII before the transaction information is stored in your system
- Storing all of the transaction data but tokenizing the PII if the transaction data ever leaves the system where it's stored
- Storing all of the transaction data but blocking it from being moved to certain states or regions

Trend 5

Proactive risk management in action

Retailers are protecting personally identifiable information and other sensitive data that unexpectedly show up customer support lines and in product reviews on websites.



Manufacturing and logistics companies are meeting sovereignty demands and exercising control over where data resides, as well as understanding and mitigating risks from IoT data generated by sensors in factories and on vehicles.

Financial Services and insurance organizations are running proactive risk reports and protecting PII and other sensitive customer data, including information exchanged on customer support calls.

Trend 5

Emerging changes in this trend

Because data security is such a complex issue, more companies are taking a collaborative approach. By 2025, growth in data marketplaces, data privacy regulations, and data sovereignty concerns will lead 60 percent of G2000 organizations to include chief data officers, along with chief information security officers, and chief legal officers to join data risk management committees.[22]

By 2027

66%

of large enterprises will make major investments in data control plane technologies that can measure the risk inherent in data and reduce risk through security and screening.[23]

"At first, we didn't want to place all of our data in the cloud for automated cleansing, structuring, and flow. However, as we navigated the process, we realized Cloud DLP and Cloud Key Management would help us navigate local country policies around data privacy. As we began to realize the potential of Google Cloud, we put a larger portion of our data into the service and ran a larger number of integrations."

—**Amar Catic**,
Sales Strategy Manager, Swisscom

Americas

Ambra Health establishes an open source medical imaging data set that meets global security and privacy regulations to enhance global researchers' collaboration and deep learning, and improve patient care.

Europe

Scotiabank moves its PII to the cloud using a strategy that constrains access, and carefully and selectively allows reidentification by bank applications.

Asia

Sunway Group classifies and protects sensitive data from over 10 sources to keep "green cities" running smoothly.

Technologies to consider

You can choose from a vast landscape of technologies to incorporate these trends into your business strategies. Google's Data Cloud can help with your planning, as can many Google Cloud technology partners:

- **Aiven:** A fully managed, open source cloud data platform that helped logistics company Swift expand its delivery and order fulfillment services
- **C3AI, Elastic, Plato Alto Networks:** A broad ecosystem of specialized technology solutions that can help you go from data chaos to clarity
- **CockroachDB:** A distributed SQL database that helps scheduling app Booksy build resilient architecture to keep up with global customer demands
- **Confluent:** Data streaming services used by Cargo Signal to optimize IoT sensor data pipelines and provide logistics enrichment services to all supply chain stakeholders
- **Collibra:** Unified governance and unified views of data across multicloud storage
- **Collibra, Confluent, Fivetran, Databricks, Informatica, Tableau:** Embracing a Complete Cloud Data Platform on Google Cloud
- **Databricks:** Data lakehouse architecture and AI company that improves Reckitt's marketing ROI with AI
- **Datametica:** Data migration tools used by a healthcare insurer to seamlessly migrate a critical data warehouse to Google Cloud
- **Elastic:** Observability solution that gives retailer Auchan France a clearer view of data without maintaining infrastructure, freeing time to focus on strategic analytics
- **Fivetran:** Save Nando's 80% of time by automating ELT & data integration workflows_
- **MongoDB:** An open source database used by Google Cloud and Forbes for data-driven insights
- **NVIDIA:** Accelerator-optimized solutions that help Cash App speed up a core ML workflow by 66 percent
- **Qlik:** A data integration platform that establishes real-time data replication between SAP and BigQuery
- **Quantiphi:** Cloud-based machine learning services used by John Hopkins University BIOS Division to help brain injury patients
- **SAP:** ERP software provides critical data services in ATA's sustainable utilities model that support millions of customers
- **Striim:** Continuous, real-time data movement to Google Cloud
- **ThoughtSpot:** A search and AI-driven analytics platform for use by business people

Ready to take your next steps?

We've talked a lot about the changing landscape of data and AI, and how organizations use both to:

- Break down data silos
- Take advantage of all that an open data ecosystem has to offer
- Expand AI adoption by empowering citizen data scientists
- Become more insights-driven by rethinking BI and analytics
- Proactively manage data risks

To learn more about how Google Cloud can help you stay current and competitive, please contact us.

Talk to an expert

Appendix

IDC's methodology for this research

IDC conducted a study, underwritten by Google, of over 800 global organizations to understand these three questions:

- What are the biggest challenges organizations are facing in using their data?
- What benefits are companies getting today using data and AI cloud solutions?
- Where are companies going next with data and AI solutions?

This report also includes additional data points from other IDC syndicated studies and data products such as:

01 Future of Intelligence Survey

02 Future Enterprise Resiliency and Spending Survey

03 IDC Global DataSphere

04 IDC Business Intelligence and Analytics Survey

05 IDC Data Trust Survey

06 IDC Data as a Service Survey

Footnotes

1 Unified Data Cloud for Simplicity and Intelligence to Drive Better Business Outcomes, IDC Doc #US48822522, a White Paper sponsored by Google, March 2022.

2 Revelations in IDC's Global DataSphere, 2022, IDC #US49643822, September 2022.

3 Sourcing and Utilizing External Data, 2022: Data Buyer Profiles and Preferences, IDC Doc #US47715422 , May, 2022.

4 Unified Data Cloud for Simplicity and Intelligence to Drive Better Business Outcomes, IDC Doc #US48822522, a White Paper sponsored by Google, March 2022.

5 State of the Open-Source DBMS Market, Gartner

6 Sourcing and Utilizing External Data, 2022: Data Buyer Profiles and Preferences, IDC Doc #US47715422 , May, 2022.

7 Sourcing and Utilizing External Data, 2022: Data Buyer Profiles and Preferences, IDC Doc #US47715422 , May, 2022.

8 IDC FutureScape: Worldwide Artificial Intelligence 2020 Top 10 Predictions

9 Self-Service Analytics in the Age of Machine Learning, IDC Doc #US48733822, May 2022.

10 Unified Data Cloud for Simplicity and Intelligence to Drive Better Business Outcomes, IDC Doc #US48822522, a White Paper sponsored by Google, March 2022.

11 Business Intelligence and Analytics Survey, IDC, 2022.

12 Synthesizing Information for Enterprise Intelligence: Overcoming Information Overload, IDC Doc #US48464421, December 2021.

13 Synthesizing Information for Enterprise Intelligence: Overcoming Information Overload, IDC Doc #US48464421, December 2021.

14 Synthesizing Information for Enterprise Intelligence: Overcoming Information Overload, IDC Doc #US48464421, December 2021.

15 Worldwide Big Data and Analytics Spending Guide, August 2022.

16 Self-Service Analytics in the Age of Machine Learning, IDC Doc #US48733822, May 2022.

17 Staying in the Flow with Embedded Analytics, IDC Doc #US49375922, June 2022.

18 How Much Do We Trust or Not Trust Data?: Key Findings from IDC's 2022 Data Trust Survey, IDC Doc#US46382820, February 2022.

19 Self-Service Analytics in the Age of Machine Learning, IDC Doc #US48733822, May 2022.

20 Synthesizing Information for Enterprise Intelligence: Overcoming Information Overload, IDC Doc #US48464421, December 2021.

21 Ibid.

22 IDC FutureScape: Worldwide Data and Content Technologies 2023 Predictions, IDC Doc #US48733222, October 2022.

23 Ibid.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