snowflake®

5 WAYS DATA IS TRANSFORMING HEALTHCARE AND LIFE SCIENCES

Reimagining the future of data-driven health

CHAMPION GUIDES

TABLE OF CONTENTS

2 Introduction

3 Use Case #1: Delivering Quality Care Outcomes Through 360-Degree Patient Views

4 Use Case #2: Unlocking Deeper Health Insights with Snowflake Data Marketplace

5 Use Case #3: Driving Innovation with Large-Scale Genomic Analytics

6 Use Case #4: Catching the Next Wave of IoMT

7 Use Case #5: Building the Next Generation of Healthcare Applications

8 Conclusion

9 About Snowflake

INTRODUCTION

The volume of data in healthcare is projected to grow a whopping 36% annually over the next five years—faster than in any other major industry.[1] The opportunities this data will offer to patients, as well as to healthcare and life sciences companies, are limitless. It will enable healthcare providers to make more-accurate diagnoses faster, empower life sciences organizations to analyze and uncover new trends that can lead to groundbreaking cures, and allow companies to get ahead of future trends that may affect the patient population—and that's just the tip of the iceberg.

To leverage these opportunities, organizations need to ensure they have the technological infrastructure to manage the large volumes of data needed for analysis and decision-making. By implementing a cloud data platform such as Snowflake Cloud Data Platform, healthcare and life sciences organizations can realize new business use cases that can drive new revenue, improve patient outcomes and customer experiences, and power analytical products. They can also realize significant cost savings: McKinsey estimates that big data analytics can enable more than $300 billion in savings per year in U.S. healthcare alone.[2]

Read on to discover five ways data is transforming healthcare and life sciences and creating new opportunities for patients, consumers, and organizations.

[1] healthitanalytics.com/news/big-data-to-see-explosive-growth-challenging-healthcare-organizations
[2] mckinsey.com/industries/healthcare-systems-and-services/our-insights/the-big-data-revolution-in-us-health-care

USE CASE #1: DELIVERING QUALITY CARE OUTCOMES THROUGH 360-DEGREE PATIENT VIEWS

THE EVOLUTION OF HEALTHCARE DATA

The shift from fee-for-service to value-based care models has been a forcing function for modern, digitally enabled approaches to healthcare and patient data management. Clinicians and care teams, who traditionally gathered patient data in the form of written notes that were filed into patient charts, can now access patient health data quickly via centralized electronic health record (EHR) systems. The advent of mobile health data applications has given patients immediate access to their health information on demand.

But the usage of this information has not evolved past its management. Healthcare systems still struggle with pushing health insights to clinical teams at different points of care on time. In addition, upon logging in to their health portals, patients are greeted with transactional, two-dimensional information, which is usually narrated only by physician notes or system prompts for the next steps. Even though healthcare providers are collecting more patient data than ever, they have not adopted the analytical capabilities needed to fully distill and leverage the valuable insights trapped within it.

A NEW IT STRATEGY

The reason for this technological gap is the outdated legacy IT infrastructures healthcare providers still rely on. Although healthcare providers must now prioritize the delivery of excellent patient care, outcomes, and experiences; control rising costs; and maintain efficient operations, many of them have not decided to overhaul their IT strategy in favor of more-flexible, cloud-based technologies.

But by using a cloud data platform such as Snowflake as the integral processing engine for their back-office IT systems, healthcare organizations can develop a 360-degree patient view that can help them deliver better patient outcomes in a variety of ways. For example, it can enable them to unify large volumes of patient data from various sources, perform advanced path and graph analyses to understand patient journeys, and use behavior analytics to identify patient behavior trends and the impact of treatments. Similarly, for life sciences organizations or pharmaceutical companies conducting clinical trials, a single, comprehensive view of patients can be helpful to understand all the data that may affect an outcome or be used to identify a trend. And instead of finding transactional lists and appointment recaps in their health portals, patients can visualize their health data with the help of interactive, analytical dashboards.

IDENTIFYING HIGH-RISK PATIENTS

One example of how advanced analytics capabilities can help healthcare organizations is by identifying and managing patients at high risk of falling, which is known to increase the frequency and length of intensive-care visits and lead to higher mortality rates. By integrating patient data with hospital health records and staffing systems data, healthcare providers can apply complex algorithms to analyze patient characteristics and classify those by indicating factors such as “high fall risk.” This risk-categorized patient group can then be compared to the planned nurse and floor staffing on a shift-by-shift basis. By having a deeper understanding of patient risk factors and the ability to categorize and compare patient counts to staffing levels, the healthcare system can determine the exact resources required at all times to balance care needs and costs.

USE CASE #2: UNLOCKING DEEPER HEALTH INSIGHTS WITH SNOWFLAKE DATA MARKETPLACE

MANAGING SENSITIVE DATA TRANSFER

Transferring health data has traditionally been painful and inefficient even though the need to transfer sensitive health data is far from new. Transferring data is accomplished in isolated spots today, but it's often difficult and time-consuming for both the organizations providing and consuming shared data sets. Sharing health data today involves creating copies of data subsets, staging them, and posting them to an FTP server or an Amazon S3 bucket, or even emailing a CSV file. For data providers, this complex process creates security concerns, because they have a limited ability to govern published data.

To collect and house data, health data consumers need to build the proper infrastructure, which can include re-creating the database schema and connecting data sharing systems, before the first query can be run. This takes time and creates data latency, and as soon as there's any update to the data, data providers and data consumers must execute the entire process again.

SNOWFLAKE SECURE DATA SHARING

Snowflake's architecture enables secure, simple, and instantaneous data sharing without data movement or copying. This capability is especially relevant for healthcare and life sciences organizations, which often need to store, join, query, and share extremely large and potentially sensitive data sets with customers and partner institutions. The data sharing capability provides secure data access for partner organizations without the need to move petabytes of data from one location to another. Imagine how this capability transforms the ability of healthcare providers, research institutions, and pharmaceutical manufacturers to share data and work together more quickly to bring new therapies to market and combat aggressive diseases.

PROTECTING INFORMATION

For example, take a healthcare provider that uses Snowflake to collect data on early-stage colon cancer patients who are undergoing an innovative immunotherapy treatment developed by a partner pharmaceutical organization. The healthcare provider aggregates this data during routine clinical practice and shares it securely with its partner real-world evidence (RWE) organization, which, in this case, is a collaborative research partner to the pharmaceutical company. The RWE organization enhances the data set and shares this enriched data with the pharmaceutical partner, which has live access to the initial clinical data set via reader accounts.

The process requires no data movement, keeping sensitive protected health information secure while equipping data consumers with live access and the ability to immediately query the data and measure the effectiveness of a particular immunotherapy. The power of data sharing allows all stakeholders to collaborate across healthcare and life sciences disciplines faster and easier than ever before, allowing for innovation from developing effective treatment options and therapies to improving clinical trial designs.

USE CASE #3: DRIVING INNOVATION WITH LARGE-SCALE GENOMIC ANALYTICS

ANALYZING LARGE DATA SETS

Precision medicine, also known as personalized medicine, has evolved from a buzzword to a reality over the past decade due to breakthroughs in genomic research and DNA sequencing. Rather than relying on the analysis of single genes, precision medicine requires a holistic understanding of the entire genome of a patient, summarized through the analysis of petabytes of genetic data. The field of genomics is rapidly expanding, with different branches of precision medicine involving the integration of various data; pharmacogenomics, as just one example, takes clinical- and drug-related data into account along with genomic data to determine drug effectiveness and the risk of adverse events in particular patients. The research-based applications of genomics are wide-ranging and constantly evolving, spanning genotyping initiatives to genome editing and advanced epigenetic analysis.

THE AGILITY OF THE CLOUD

As innovative and promising as genomic research is to the global health community, it presents a significant technological challenge to institutions that are the keepers of the large and sensitive data sets. Genomic data is commonly stored in formats such as VCF, FASTA, BAM, and SAM. Some of these data sets are extraordinarily large and costly to store, are difficult to integrate with other data sources, and require special parsing at the time of query. Too often, genomic assets are buried in a stack of VCF files, preventing on-demand, interactive data exploration and analysis that is critical for research and assessment applications.

This is where the true value of a cloud data platform comes into play. With the help of a cloud data platform such as Snowflake, organizations can store both structured and semi-structured data in the same database while taking advantage of modern, compressed columnar storage. The ability to co-locate structured phenotype data and semi-structured annotation data (formatted as JSON, for example) provides numerous new possibilities.

SIMPLIFIED QUERYING

Take, for example, a health institution that is researching genetic markers for cystic fibrosis. With the help of a cloud data platform such as Snowflake as the foundation for their data stack, researchers can efficiently query both horizontally (one patient across positions) and vertically (one position across patients) without copying the data to adapt the structure. By joining genomic data with other data sources drawn from insurance claims, EHR systems, lab results, or social determinants of health, it is now possible to create a full patient profile. Any annotation data is stored as nested JSON, requiring no special parsing. Researchers can then share the results with a partner organization—perhaps the developer of a promising immunotherapy treatment—without having to copy it and build predictive models with their data science tools of choice.

By keeping genomic data about patients with specific disease states live and queryable and by feeding analytical results back into the cloud data platform, valuable data is democratized and researchers, data scientists, and geneticists can perform deeper, predictive analysis.

USE CASE #4: CATCHING THE NEXT WAVE OF IoMT

THE GROWTH OF IoMT

The Internet of Medical Things (IoMT) comprises a universe of medical devices and applications that are connected to healthcare IT systems via the internet. It includes a range of internet-connected devices including consumer health wearables, remote patient monitoring trackers, sensor-enabled hospital beds, medication-tracking systems, and medical supplies and equipment inventory tracking systems. The expanding IoMT ecosystem is transforming healthcare and improving patient outcomes by enabling remote monitoring of chronic diseases, improving drug management, and delivering a better patient experience. It is also increasing the safety of medical supplies and reducing costs.

To reap the benefits, healthcare organizations are starting to invest heavily in this promising new space: The number of IoMT devices is projected to be between 20 billion and 30 billion by 2020,[3] and it is estimated that the IoMT market will be worth $158.1 billion in 2022.[4]

A FLEXIBLE PLATFORM

However, device integration and interoperability are arguably the biggest challenges for the success of IoMT. The machine and log data from the devices must be integrated into the IT systems of healthcare, life sciences, and pharmaceutical organizations so the organizations can continually ingest and analyze the data situationally. The corresponding IT infrastructures must be robust enough to be able to handle enormous amounts of data and process it in a fast, secure manner. They must also be scalable to accommodate growing volumes of data generated by these connected devices.

A cloud data platform such as Snowflake enables healthcare organizations to share more easily data collected from connected medical devices. Snowflake can ingest structured and semi-structured data from any data source, making ingesting and integrating semi-structured data from IoMT devices much easier. Additionally, Snowflake enables users to run analytical workloads off of fresh data for better analytics and decision-making, and Snowflake can scale to store large amounts of data and run many queries concurrently. With a cloud data platform such as Snowflake to manage and query IoMT data quickly and easily, healthcare organizations can improve and accelerate the delivery of health services to patients while life sciences and consumer health companies can develop and more quickly bring to market better treatments, therapies, and health solutions.

DATA-DRIVEN INNOVATION

In the medical devices space, ingesting, integrating, and analyzing IoMT data is critical not only for monitoring the effectiveness of new devices, but also for gaining a competitive edge. Medical device companies develop new innovations, but improved effectiveness often comes at a higher price point. One manufacturer was struggling to demonstrate the value of a new device to its hospital customers and needed to overcome cost objections by providing data that would prove the device's effectiveness. However, the company could access only old, stale data, and it did not have a core, centralized data platform that would accommodate performant JSON queries. By switching to Snowflake Cloud Data Platform, the manufacturer created a centralized, single source of truth that reduced the time required for JSON queries from days to minutes. By democratizing data across its marketing, sales, and operations teams, the company was finally able to demonstrate to hospital customers and prospects the true effectiveness of its new solution as illustrated by data-driven insights.

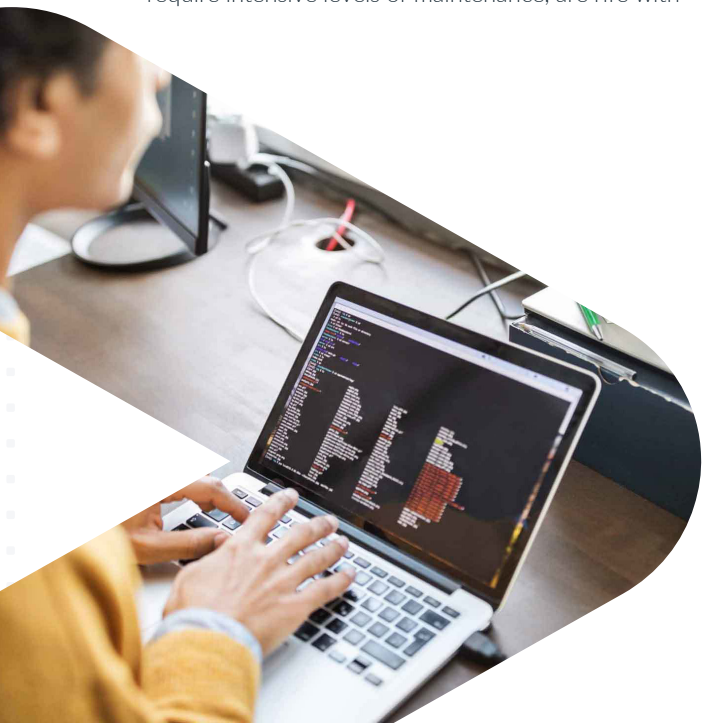
[3] prnewswire.com/news-releases/internet-of-medical-things-forecast-to-2021-300474906.html
[4] www2.deloitte.com/global/en/pages/life-sciences-and-healthcare/articles/medtech-internet-of-medical-things.html

USE CASE #5: BUILDING THE NEXT GENERATION OF HEALTHCARE APPLICATIONS

THE FUTURE OF MEDICINE

Emerging technologies such as AI, machine learning, and cloud computing hold incredible promise for the future of healthcare and life sciences organizations. From improving patient care to accelerating medical research and clinical trial analysis, these organizations stand to provide potentially limitless benefits for patients and customers if they can harness these technologies and put them to use.

But too often, healthcare and life sciences organizations are hindered by traditional data stacks that were created long before the cloud existed. As a result, they rely on complex data infrastructures that require intensive levels of maintenance, are rife with scalability and performance issues, and struggle to combine data from multiple sources and deliver it to customers in an efficient manner. For organizations that deliver data-driven products and services, this lack of flexibility can translate to frustrating customer experiences and an inability to meet changing customer needs.



A MODERN ARCHITECTURE

Healthcare and life sciences organizations often opt to outsource application development projects or use open-source technologies to build data delivery solutions for their customers, rather than invest in a modern, flexible architecture that will support future data application development. But architectures that rely on open-source technologies tend to create overhead costs and require specialized expertise in terms of system maintenance. After large amounts of development time and money are wasted by running "free" solutions, and latency issues and incomplete data analysis inevitably frustrate customers, healthcare organizations almost always realize they need to rearchitect their whole stacks.

In the search for instant and infinite scalability and performance, healthcare organizations have turned to Snowflake Cloud Data Platform to support evolving and future product requirements. With a powerful, low-latency, robust platform to power data analytics applications and services, healthcare organizations can free themselves from having to maintain costly, high-maintenance infrastructures and instead focus on delivering to their customers insights derived from multiple data sources.

Another unique advantage of a cloud data platform such as Snowflake lies in its flexibility and elasticity to support more-complex workloads and use cases involving data science, AI, and machine learning. By leveraging integrations with Apache Spark, Python, R, and other services, data scientists have the tools they need to deliver powerful data models.

ACCELERATING INSIGHTS

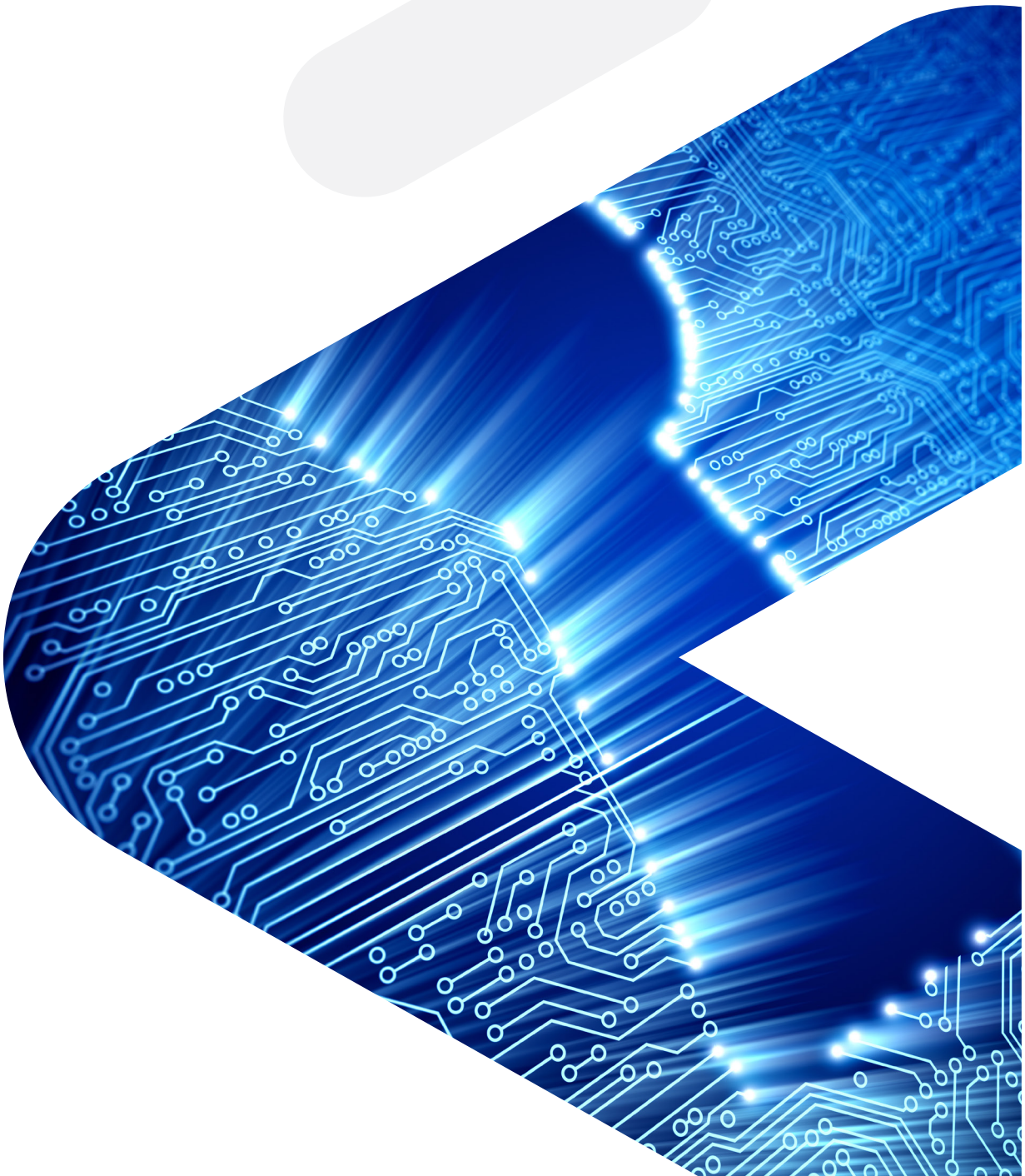
One example of how using a modern architecture can be successful is found within the pharmaceutical industry, where companies are constantly assessing methods to streamline clinical trials and reduce the amount of time required to bring new products to market. Challenges such as low patient enrollment can create costly time delays and slow the progress of clinical trials. A cloud data platform can accelerate the collection, cleaning, analysis, and reporting of clinical trial data sets while facilitating deeper, predictive analysis and data modeling so pharmaceutical companies can identify the reasons for roadblocks such as low patient enrollment and unlock key insights from clinical trial results.

By planning to include scalability and performance in their data stack, healthcare and life sciences organizations can remove from their development teams the burden of adding additional resources to support burgeoning amounts of health data; support real-time analytics for better clinical and research outcomes; and deliver fast, reliable, and useful insights to meet the evolving needs of patients and customers.

CONCLUSION

Healthcare and life sciences organizations can gain significant benefits by unlocking the value of their data. They can deliver quality care outcomes by building comprehensive patient views, facilitate deeper health insights with secure and seamless data sharing, drive innovation with large-scale genomic analytics, reap the benefits of the growing IoMT, and build the next generation of healthcare applications.

By embracing a cloud data platform such as Snowflake as part of their digital transformation, healthcare organizations can build a data infrastructure that supports future data management requirements. Indeed, hundreds of healthcare and life sciences organizations already depend on Snowflake to turn health data into actionable insights, drive medical and technological innovation, and enable better patient care.



ABOUT SNOWFLAKE

Snowflake Cloud Data Platform shatters the barriers that prevent organizations from unleashing the true value from their data. Thousands of customers deploy Snowflake to advance their businesses beyond what was once possible by deriving all the insights from all their data by all their business users. Snowflake equips organizations with a single, integrated platform that offers the only data warehouse built for any cloud; instant, secure, and governed access to their entire network of data; and a core architecture to enable many other types of data workloads, including a single platform for developing modern data applications. Snowflake: Data without limits. Find out more at **snowflake.com**.