AAA-Data

The Gold Standard for AI, Apps, and Analytics

ASTRONOMER

It’s time enterprises strive to manage their data with the same rigor they use to manage their finances.

A Triple-A (AAA) rating is finance’s highest seal of trust. Credit-rating agencies like S&P, Moody’s, and Fitch introduced these letter grades to show how likely an entity is to repay debt, with AAA signaling minimal default risk—essentially “best in class.”

Today, AAA remains the gold standard for stability. Governments with AAA bond ratings enjoy strong economies and predictable growth, while enterprises earning AAA demonstrate consistent profitability, strong governance, and prudent risk management.

But what has any of this got to do with data?

Extending AAA-Ratings to Data

Just as in finance, that assurance—the confidence that outcomes will be reliable and predictable—is something modern enterprises crave when it comes to data. This confidence is critical to power the three most important data-driven software initiatives their teams are working on today. By happy coincidence, these initiatives can also be summarized with three As, representing AAA-quality data:

- AI
- Apps
- Analytics

AI, apps, and analytics will shape the success or failure of enterprises in today's digital economy. But no matter how smart your models, innovative and responsive your apps, or insightful and timely your analytics, they are only as good as the data feeding them.

In real terms, what does AAA-quality data mean to your business? It gives you a competitive moat by standing out through great customer experiences, innovating faster, and operating with consistently lower cost and risk.

On the flip side, if your data isn't dependable or readily accessible, you risk eroding trust with your customers, burning countless hours on firefighting instead of innovating, and missing the critical insights that fuel high performing enterprises.

Let's dig into why AAA-quality data is so important.

Data's Role Has Changed—Dramatically

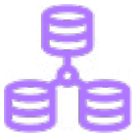
Data isn't just the basis for business analysis anymore—it's quickly becoming the backbone for operationalizing the entire enterprise. Whether it's personalizing customer-facing applications, transforming business processes with high performance and reliable AI, or generating fresh insights to guide informed decisions, data underpins nearly everything we do.

But there is a reality many data teams are facing: higher expectations and more complex data environments have outpaced their ability to consistently deliver reliable and trusted AAA-quality data to the business.

The old ways of simply layering on new tools won't cut it. Instead, we need a fundamental shift in how teams build, manage, and consume data—that's where **DataOps (Data Operations)** comes in, elevating data to a AAA-trust rating.

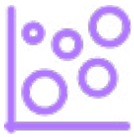
Challenges That Undermine AAA-Data Ambitions

Despite data being ever more abundant, AI models becoming smarter and analytics faster, enterprises still face seemingly insurmountable obstacles to unlock value.



Siloed, Fragmented Environments

Legacy on-premise systems collide with cloud-native data stacks, leading to duplicate datasets, confusion over ownership, and a lack of cohesive standards. This fragmentation only grows more complex as organizations experiment with new data platforms and tools.



Limited Skills Availability

Data engineers juggle heavy backlogs, work with suboptimal tooling, and struggle to collaborate effectively with adjacent teams such as software and ML engineers. The result is slower turnaround times, communication breakdowns, and missed opportunities to innovate.

Non-Differentiated Toil & Expense

As data teams patch together a plethora of disparate tools to operationalize data, they sink excessive hours and budgets into complex configurations rather than focusing on delivering business value.

Flying Blind

Without robust observability and governance controls, it's difficult to ensure data quality, track lineage, or measure the direct impact data products have on business outcomes. This lack of oversight opens the door to poorly performing AI, costly errors, and missed insights with the added risk of regulatory and compliance issues.

This reality has spurred the need for a fundamental shift—a move toward DataOps that can dramatically streamline operations and foster innovation.

DataOps: Laying the Foundation for AAA-Data

15 years ago DevOps started to gain adoption, delivering huge advances in agility, time to market, and software quality. So DataOps aims to do the same for data today. How much of an impact will DataOps make? In its 2024 Market Guide for DataOps, Gartner® predicts data engineering teams can be **10x more productive** by adopting DataOps.

As its name suggests, DataOps is all about operationalizing data. It orchestrates sophisticated workflows that transform raw inputs from source systems (operational apps, databases, sensors, logs, APIs, etc.) into reliable and trusted data products ready for consumption. It automates critical stages in the data lifecycle like ingestion, integration, transformation, and ML/AI processes, augmenting them with controls that take care of discovery, observability, quality monitoring, and governance.

As data volumes surge and use cases become more sophisticated, **DataOps is essential for unifying, governing, and scaling your data**—ensuring every insight and innovation is fueled by the most reliable information possible.

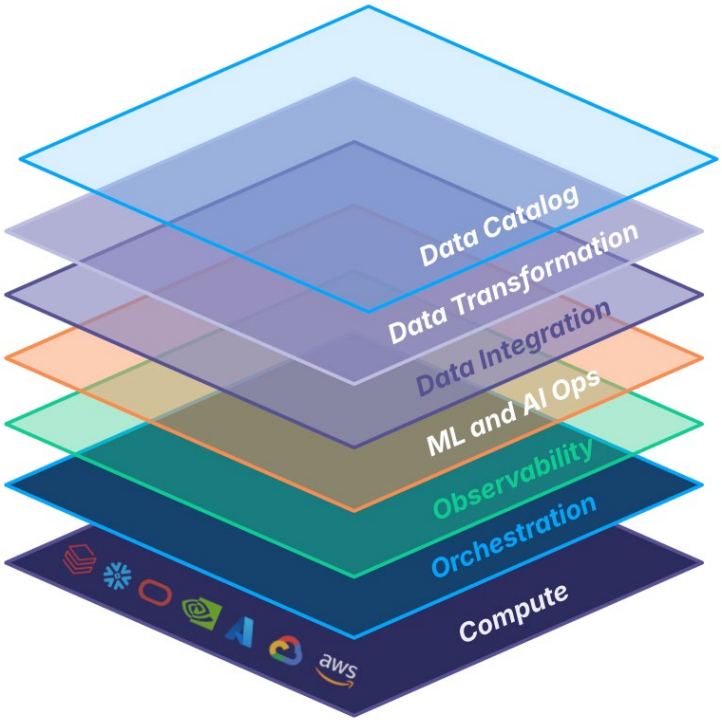
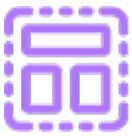


Figure 1: *A complex stack of technologies are needed to operationalize data.*

Orchestration: The Cornerstone for AAA-Data

A big step toward enabling DataOps and delivering AAA-data is adopting **modern data orchestration**.

Why orchestration? Because it's the control plane that manages data flows, tasks, and infrastructure across your entire data lifecycle. Orchestration ties data sources to consumers—handling transformations, pipelines, and dependencies, allowing you to stay agile by integrating the best tools on the market, so you're never locked into outdated tech. No other layer of the data stack has this vantage point for:

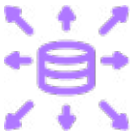


Unifying Complex Data Estates

Orchestration can aggregate data from any source, in any location, across hybrid or multi-cloud environments.

Enabling Cross-Team Collaboration

By using modern developer tooling for workflows, data engineers, AI/ML engineers, and software developers can collaborate seamlessly.



Simplifying the Tech Stack

Consolidates multiple data tools into a single platform that supports the end to data lifecycle.

Establishing Governance Through Visibility

Centralized observability shows data lineage, quality, and usage—all in one place.

Meet Astro: A Unified DataOps Platform

At Astronomer, we've developed Astro—an orchestration and observability platform built to empower data teams to **build**, **run**, and **observe** data products for AAA-data confidence. Here's the breakdown:

Astro Build

Developer tooling that empowers engineers to efficiently build, test, & deploy data products on Apache Airflow, the de-facto industry standard for data orchestration.

Astro Run

Reliable, scalable, and secure Airflow pipelines that run across hybrid and multi-cloud environments, providing detailed reporting on cost and usage.

Astro Observe

A single pane of glass for monitoring data workflows, with full lineage, alerting, and proactive recommendations.

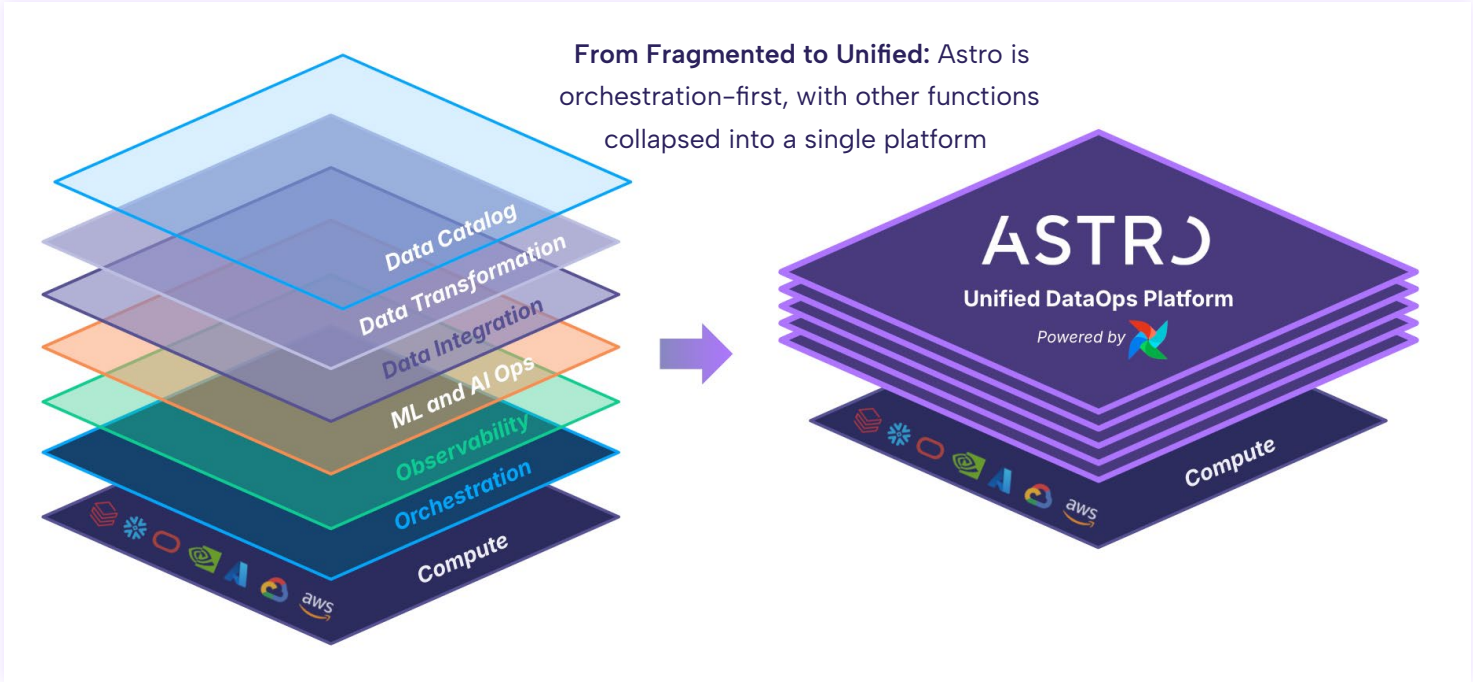


Figure 2: *Astro is positioned to be the leader in unified DataOps as the data landscape continues to evolve*

Astro's ongoing roadmap—integrating orchestration, observability, and the broader DataOps stack—provides a unified platform for overseeing pipelines, data quality checks, and business impact all in one place. From high-scale startups to established Fortune 500 giants, data teams worldwide use Astro to tame complexity, boost reliability, and accelerate their journey to AAA-quality data.

Your Roadmap to DataOps and AAA-Data

If you're looking to start—or refine—your DataOps journey, a common path unfolds in three stages.

1

First, you **lay the foundation** by implementing or upgrading orchestration environments to Astro for core ETL and data delivery. This move ensures a reliable baseline of automated workflows that are stable, scalable, and designed to equip your teams with a core operating model.

2

Next, you **expand to more advanced workloads**, gradually incorporating AI/MLOps and porting workflows from legacy tools into the same orchestration environment. This step consolidates your data ecosystem, reducing complexity while boosting efficiency.

3

Finally, you **establish a DataOps standard**, often by setting up a shared services model or Center of Excellence that formalizes best practices, governance, and continuous improvement across the organization.

Each stage of this journey brings you closer to AAA-quality data, where trustworthy, timely, and high value data underpins your AI, apps, and analytics initiatives.

DataOps in Action

Use Cases and Success Stories

DATAOPS AT FORD

PB-Scale Innovation for Autonomous Driving

CHALLENGE

Ford engineers faced scalability issues with their legacy, cron-based system, which was ill-equipped to process over 1 petabyte of sensor data weekly for autonomous driving. This limited system hindered visibility and efficiency, delaying AI model training and tuning.

SOLUTION

To overcome these obstacles, Ford adopted Airflow to automate and centralize complex workflows across both cloud and on-prem environments. They further enhanced their operations by implementing Astronomer's enterprise-grade Airflow management platform, which provided integrated CI/CD capabilities and a unified view of hybrid pipelines, optimizing resource allocation for both CPU and GPU-intensive tasks.

RESULTS

This strategic shift enabled the team to process over 1 petabyte of data weekly, run 300+ parallel workflows, and significantly reduce errors. Now, Airflow and Astronomer together manage thousands of pipelines daily, accelerating AI model development and boosting overall operational efficiency.

Read the Full Case Study

DataOps in Action

Use Cases and Success Stories

DATAOPS AT NORTHERN TRUST

Modernized Financial Services

CHALLENGE

Northern Trust, responsible for managing $1.5 trillion in assets, was hindered by fragmented data workflows. Poor visibility into job execution and late detection of failures resulted in recurring data quality issues, manual troubleshooting, and delayed delivery of critical financial data.

SOLUTION

The firm adopted Astronomer's orchestration platform. This move centralized their data pipelines, provided real-time monitoring and alerts, and streamlined the troubleshooting process, ensuring that job failures were identified and resolved quickly.

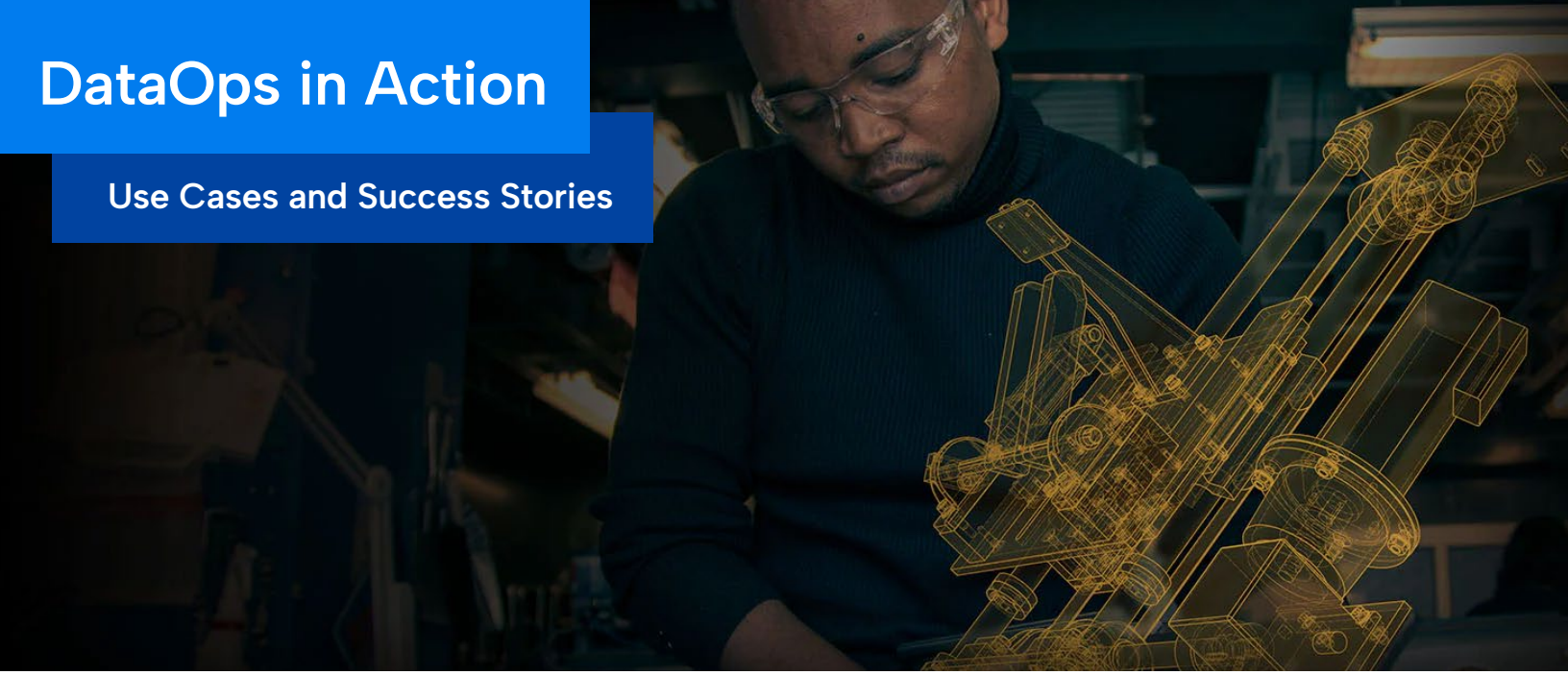
RESULTS

By implementing this solution, Northern Trust significantly improved data reliability and operational efficiency. The enhanced visibility and proactive management of workflows ensured timely and accurate delivery of analytics data products, reducing manual interventions and ultimately strengthening their data-driven decision-making process.

Read the Full Case Study

DataOps in Action

Use Cases and Success Stories



DATAOPS AT AUTODESK

Cloud Transformation in 12 Weeks. 90% Fewer Errors & 33% Faster Deployments.

CHALLENGE

Autodesk's legacy systems struggled to manage the increasing complexity of its cloud-based data workflows. The existing orchestration tools lacked scalability and visibility, resulting in frequent pipeline errors and slowed deployment times that hindered efficient data processing.

SOLUTION

Autodesk turned to Astronomer. By centralizing and automating data workflows across its cloud environment, the company gained enhanced real-time monitoring, improved visibility, and seamless integration of diverse data sources—addressing the scalability and reliability challenges head on.

RESULTS

The migration was completed smoothly and ahead of schedule, with no long-tail issues. The new Airflow platform eliminated major operational burdens, allowing teams to concentrate on accelerating product innovation and supporting Autodesk's cloud transformation. Autodesk has extended its use of Astronomer in its CI/CD platform, leading to fewer data errors and faster code deployments.

Read the Full Case Study

Ready to Get Started?

Striving for **AAA-quality** data means your data is truly ready for prime time. DataOps is the practical framework that keeps everything humming, and orchestration is the backbone ensuring every part of your data workflow moves in sync. The result? A data operation that's as trusted, reliable, and impactful as any AAA rating should be.

We'd love to help you explore where DataOps can take your organization—and how Astro can jumpstart your journey. Let's connect and talk through how we can apply these best practices to your specific data environment and business needs. We're here to guide you, every step of the way.

Achieve AAA-Data Status with Astro.

Astronomer is unifying data orchestration and data observability to bring actionable intelligence and reliability where it matters most – the critical data products powering your organization.

Book a Demo

Learn More