databricks

Data Analysis with Databricks SQL

Databricks Academy

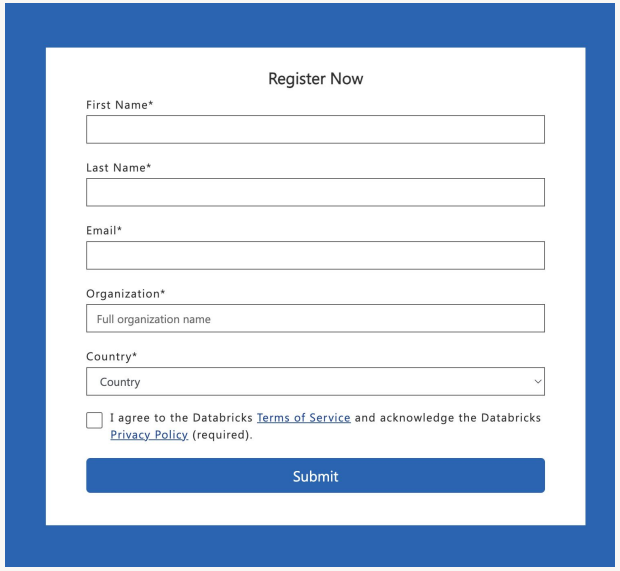
2024

Get access to the lab

If you haven't done so already - please register yourself and get your username

Registration

https://bit.ly/3z8DPSC



WIFI

RESEAU : COMET-JARDIN

PASS : REALMEETINGS2024

Agenda

Module Name	Duration
Ice breaker and org details	20 mins 13H00 -> 13h20
Intro - Databricks SQL Services and Capabilities	50 mins 13h20 -> 14h10
Unity Catalog in Databricks SQL	50 mins 14h10 -> 15h00
Break / Networking	40 mins 15h00 -> 15h40
Data Visualization and Dashboarding	50 mins 15h40 -> 16h30
Integration with AI	20 min 16h40 -> 17h00
Observability / Monitoring	20 mins 17h10 -> 17h30
Networking	30 mins 17h30 - 18h00

Your Hosts

Eugénie Vinet
Sr. Solutions Engineer

Ali Azouz
Sr. Technical Service Engineer

Jérome Ivain
Solutions Architect

Matthieu Lamairesse
Lead Solutions Architect

Course goals

1. Describe how Databricks SQL:
   - Works in the Lakehouse architecture
   - Data layout / table performance best practices

2. Use Databricks SQL to:
   - Create tables and Query data
   - Create visualizations and dashboards
   - Integrate with AI models

A few questions

- What do you do ?
  - Data Engineer
  - Data Analysts
  - DB Admin
  - Project Managers
  - Other

A few questions

- How long have you been working with Databricks ?

  Less than 6 months

  6 months to a year

  1 year to 2 years

  2 years or more

A few questions

- How many of you have worked with DB SQL before ?
- For how long?
  - Less than 6 months
  - 6 months to a year
  - 1 year to 2 years
  - 2 years or more

A few questions

- What other data analysis tools do you also use ?

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Databricks SQL Services and Capabilities

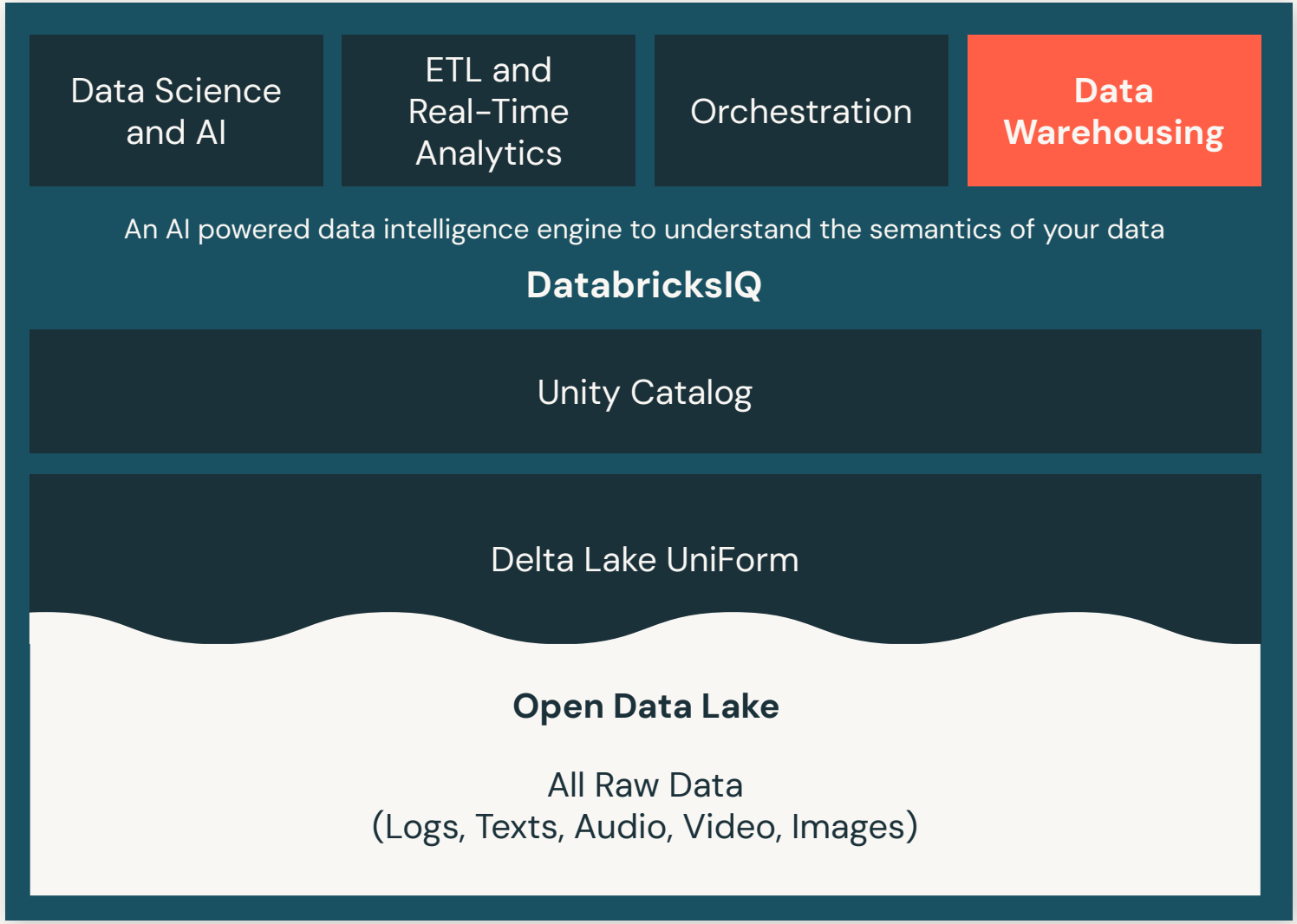
Databricks Academy 2023

Databricks SQL Services and Capabilities

Lesson Name	Duration
Introduction to DB SQL	30 mins
Data Modeling and performance best practices	10 mins

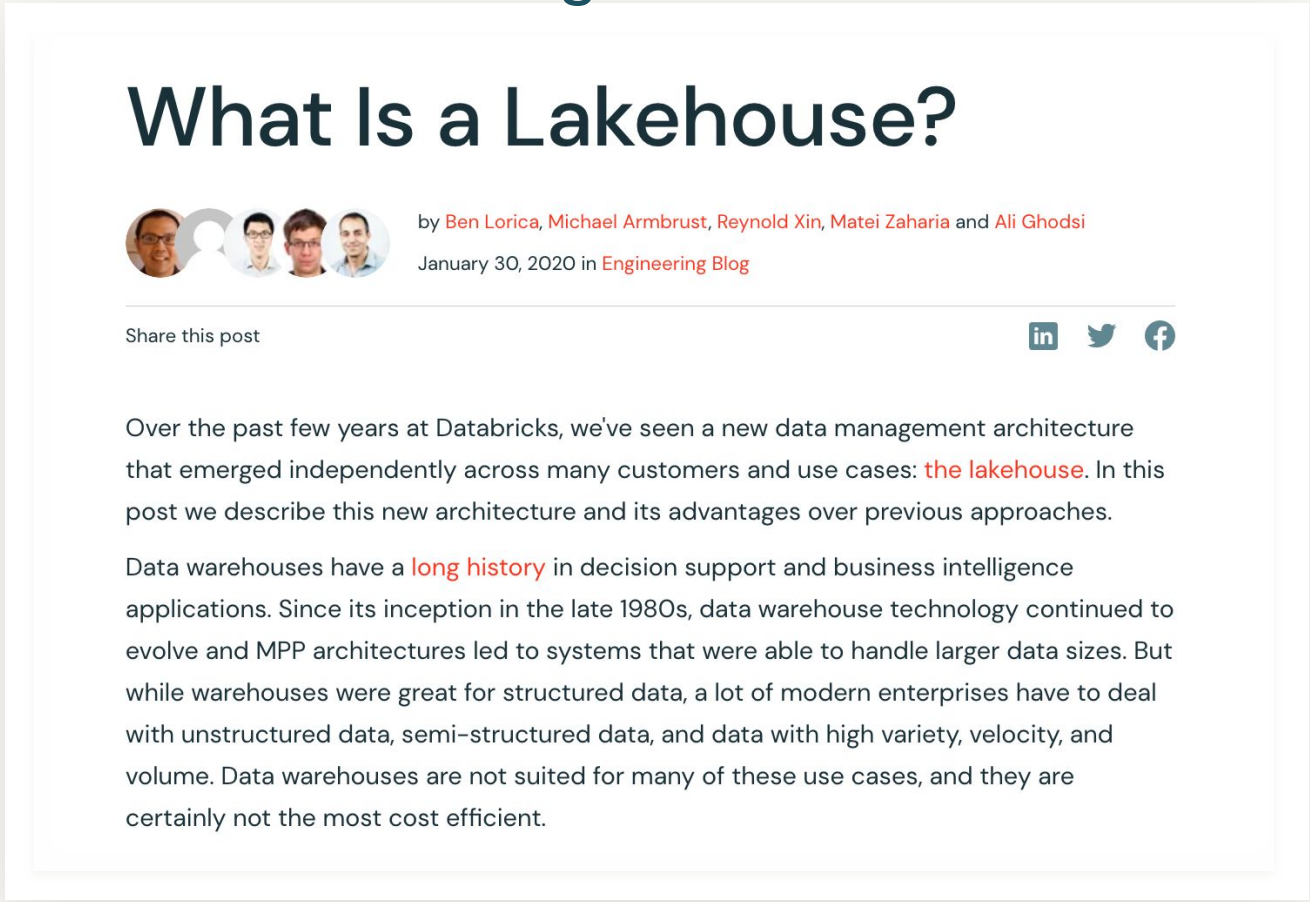
Introduction to Databricks SQL

Databricks SQL
intelligent data warehousing on the Data Intelligence Platform



Databricks SQL

Data warehousing on a lakehouse architecture is now standard



What Is a Lakehouse?

by Ben Lorica, Michael Armbrust, Reynold Xin, Matei Zaharia and Ali Ghodsi

January 30, 2020 in Engineering Blog

Share this post

Over the past few years at Databricks, we've seen a new data management architecture that emerged independently across many customers and use cases: the lakehouse. In this post we describe this new architecture and its advantages over previous approaches.

Data warehouses have a long history in decision support and business intelligence applications. Since its inception in the late 1980s, data warehouse technology continued to evolve and MPP architectures led to systems that were able to handle larger data sizes. But while warehouses were great for structured data, a lot of modern enterprises have to deal with unstructured data, semi-structured data, and data with high variety, velocity, and volume. Data warehouses are not suited for many of these use cases, and they are certainly not the most cost efficient.

2020

Databricks pioneered the lakehouse architecture

Today

74% of global enterprises have adopted lakehouse

MIT Technology Review Insights, 2023

Trusted by organizations of all sizes

7,000+ Databricks SQL customers across industries

AI is changing everything — including data warehousing

Introducing intelligent data warehousing

User experiences with natural language and data intelligence

Access for everyone to ask questions of their data

Predictive optimizations for your infrastructure

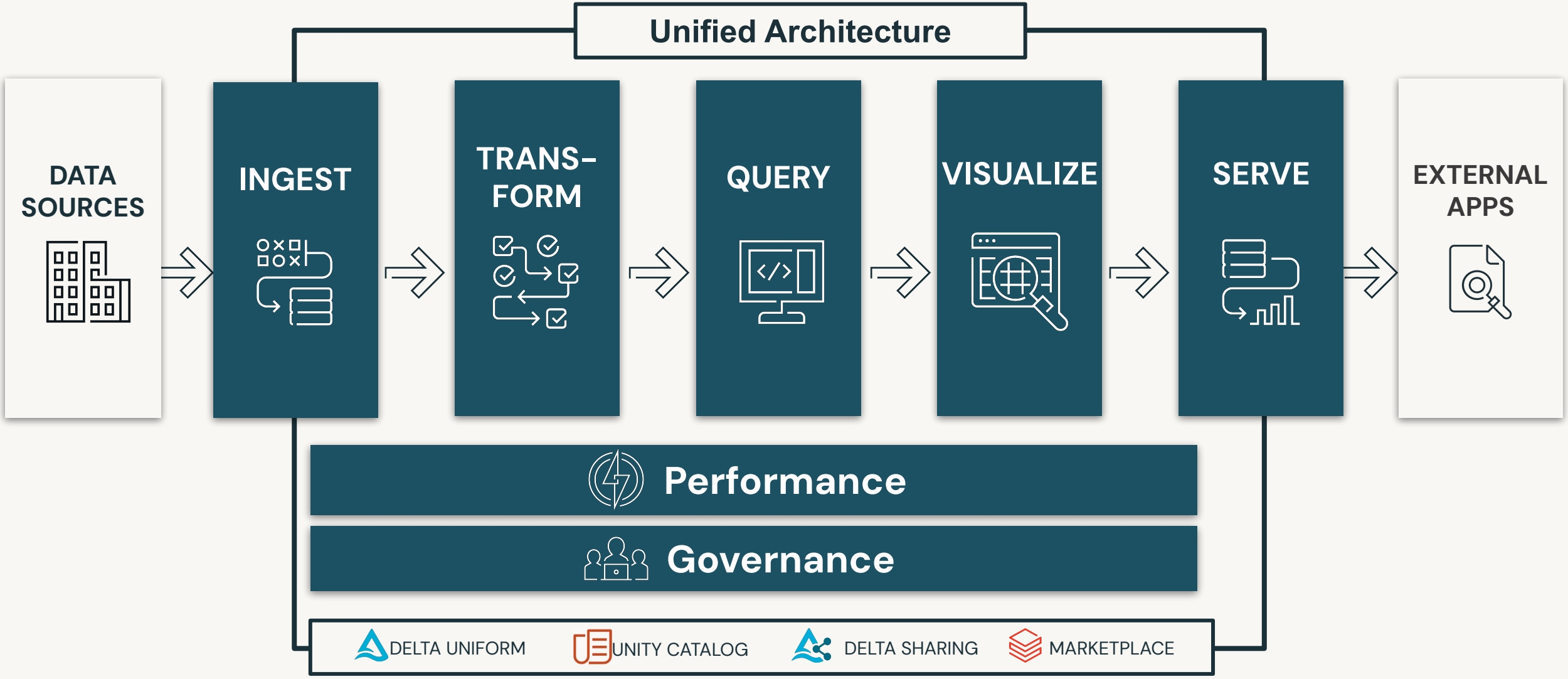
Intelligent, automated management and tuning

World-class price performance

The best TCO in the market

Intelligent data warehousing with Databricks SQL

Complete Data Warehousing Solution



Complete Language functionality

✓ ANSI SQL

✓ Query **LLMs** and use built-in **AI functions** [Preview]

✓ **Spatial** SQL [Preview]

✓ Data Modeling With pk/fk Constraints

✓ **Programming**: SQL UDFs, Variables, Identifiers, Temp Views, Temp Tables*, Scripting*, Stored Procedures*, **Python** UDFs,

* coming soon

Lakehouse Federation

Discover, query, and govern all your data - no matter where it lives

- **Unified view** into all your data
- **Unified engine** for all your data and use cases
- **Unified governance** across all data sources

Three
reasons why customers love Databricks SQL

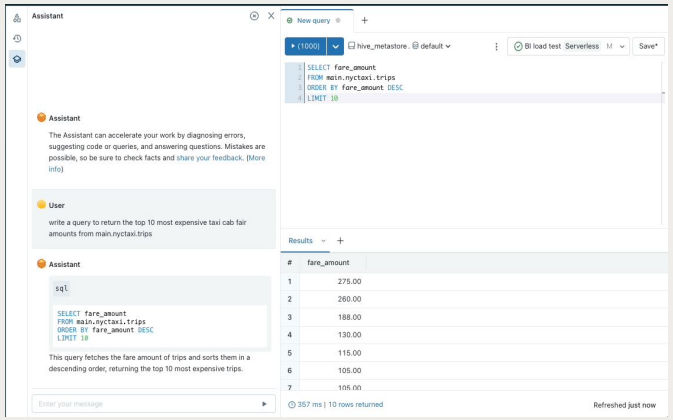
1. **Intelligent Experiences** with built-in understanding of your data
2. **Predictive Optimizations** for all your workloads
3. **Best Price/Performance** for the lowest TCO

1

Intelligent experiences with built-in understanding of your data

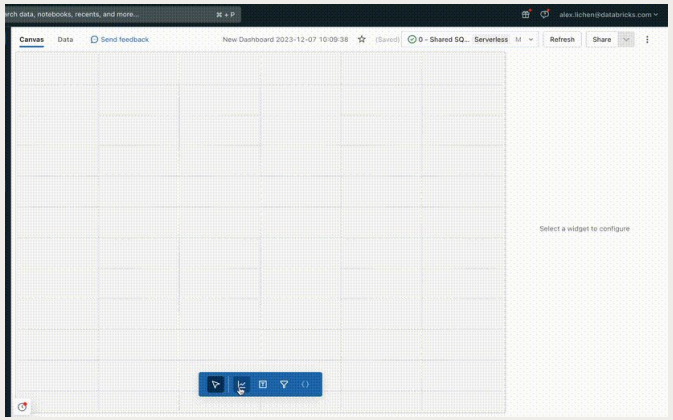
Intelligent experiences with natural language

Powered by DatabricksIQ



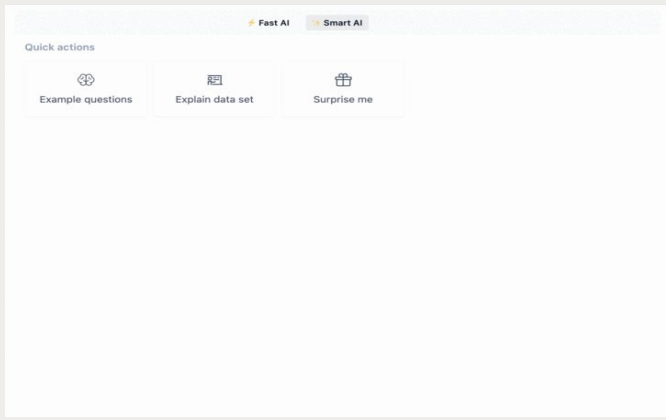
SQL Editor

Data Science / Engineers



Dashboards

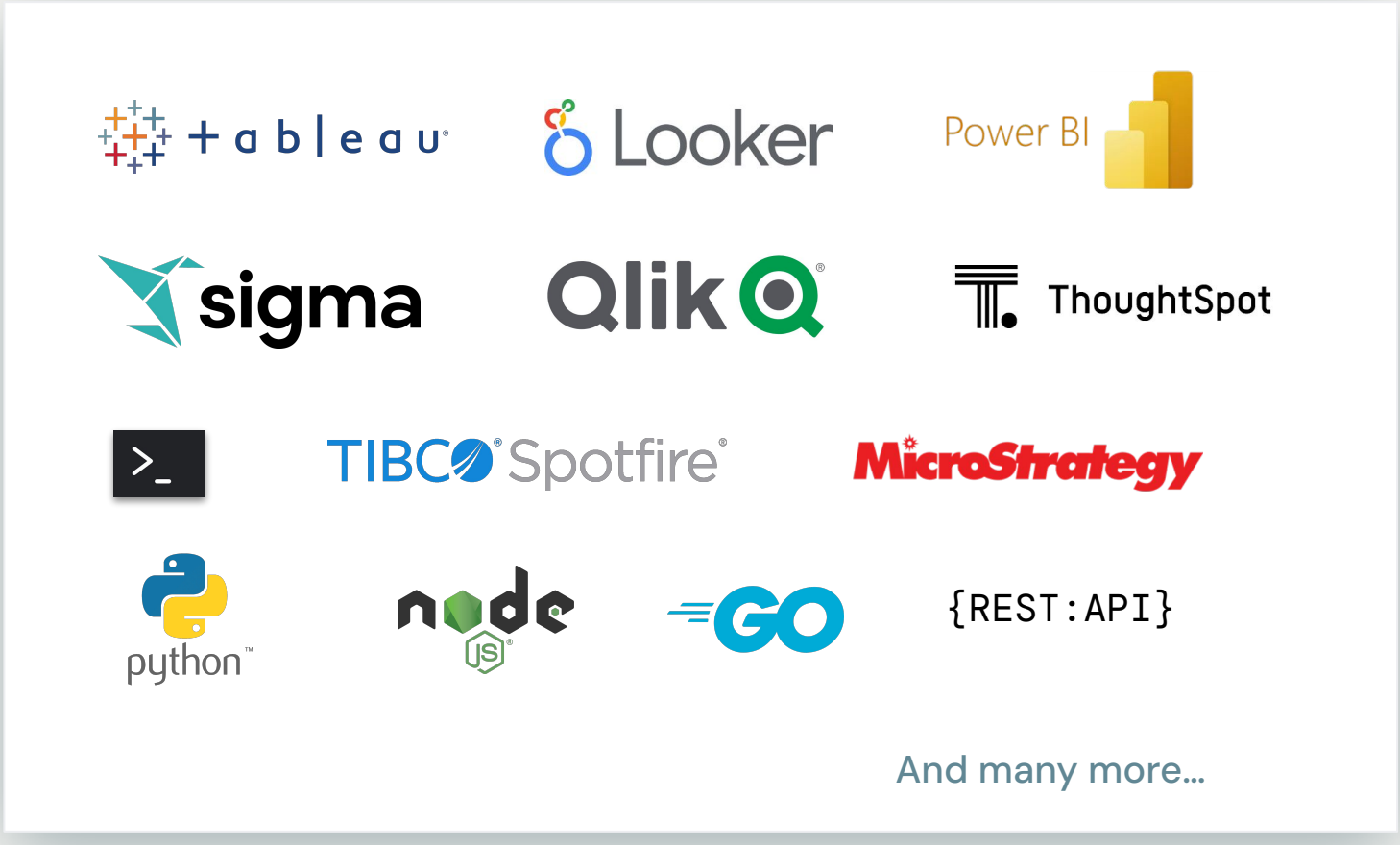
Analysts



Project Genie

Business Users

First-class integration with leading BI tools

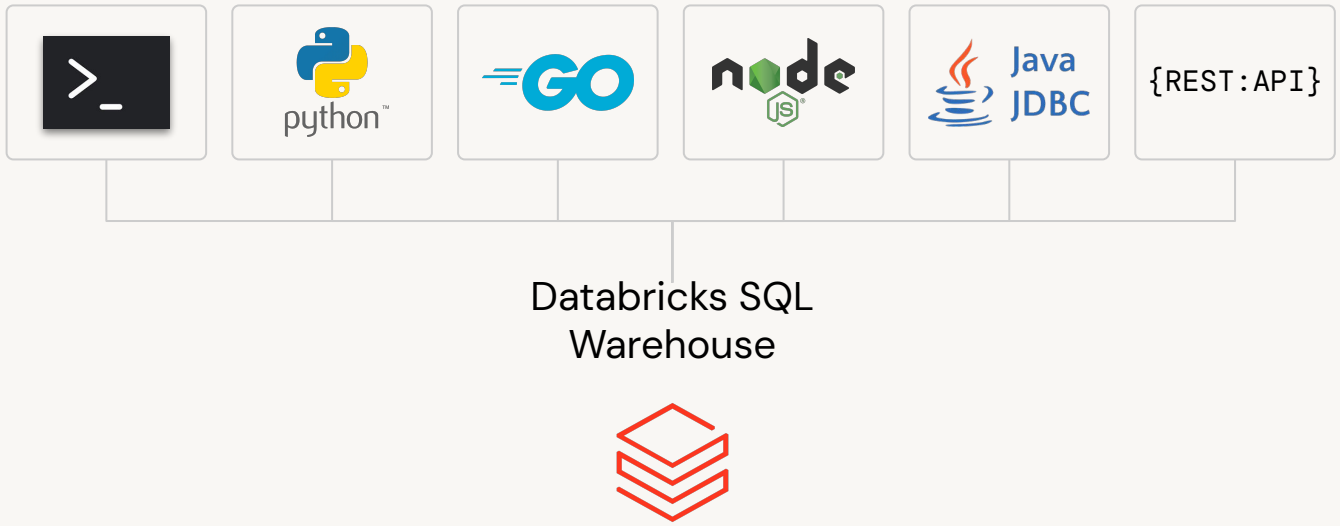


Use your existing BI Tools, SQL Workbenches, or IDEs to discover insights or build custom data apps with Databricks; using familiar tools and languages

Build Data Apps on Databricks SQL!

Run SQL from anywhere and build custom data applications

- Developers can interact with Databricks SQL programmatically by automating tasks, integrating with other systems and build custom applications leveraging compute power
- Ability to use Native Go, Node.js as well as CLI and **REST API** makes it accessible to wide range of developers

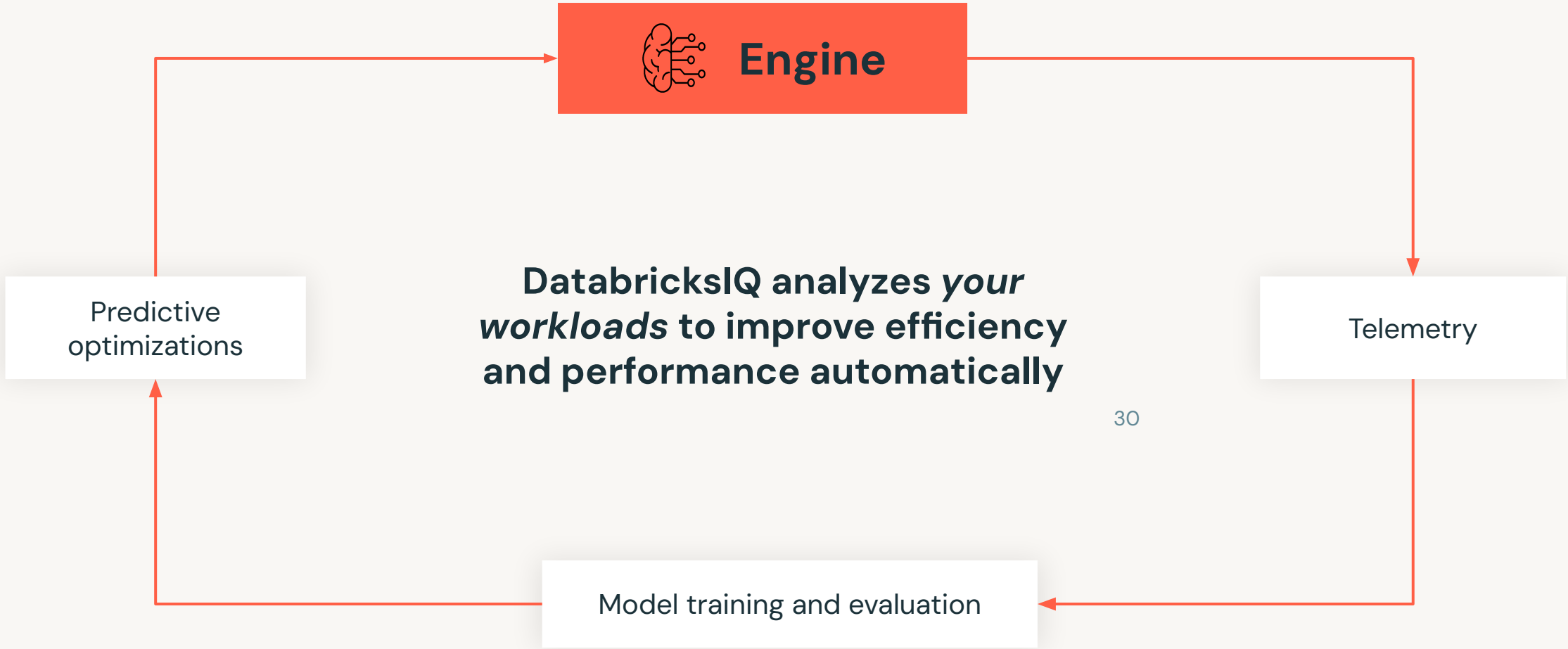


2

Predictive optimizations for all your workloads

Predictive optimizations in our engine

Powered by DatabricksIQ

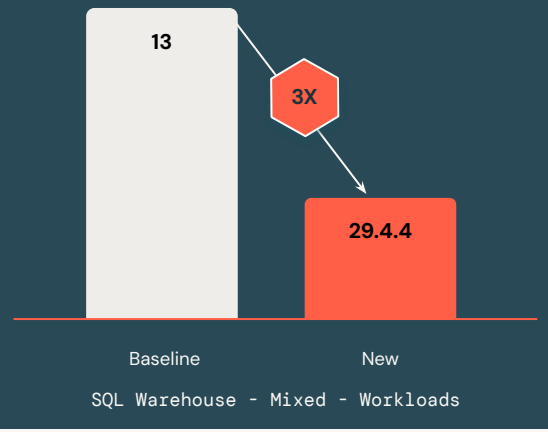


Predictive optimizations in our engine

Examples

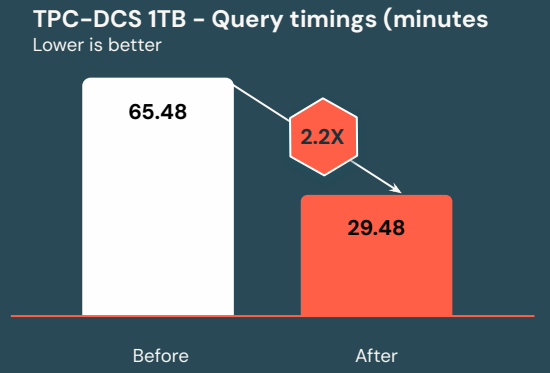
Intelligent Workload Management

Leverages machine learning to efficiently route queries and scale clusters to maximize cost/performance



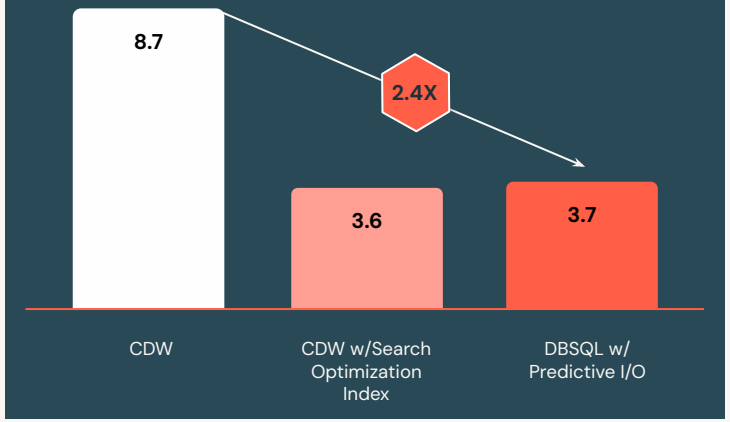
Automatic Data Layout

Eliminates knobs to optimize storage with ROI-based table maintenance algorithms



Indexless Indexing

Predictive i/o delivers comparable performance **without** expensive search-optimized indexes



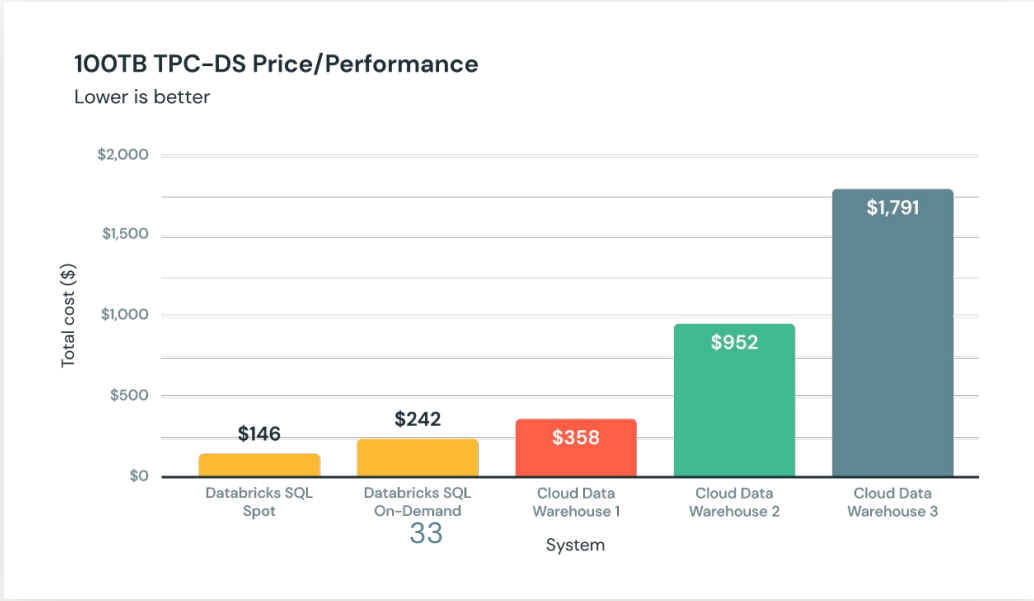
3

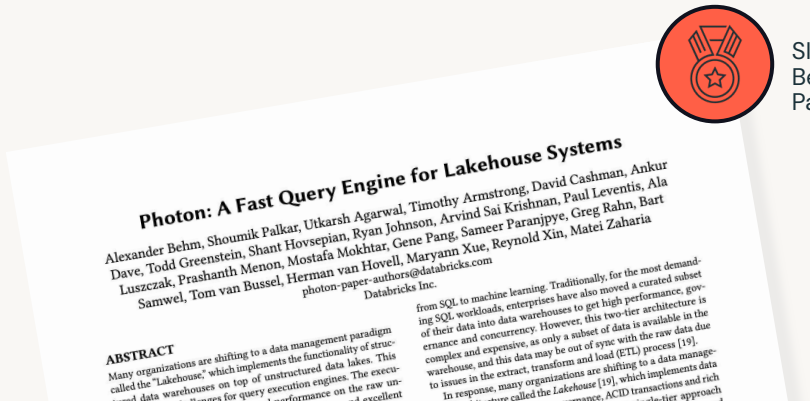
Best price/performance for the lowest TCO

Photon Query Engine

Next-gen, vectorized query engine with world-record performance

Written from the ground up in C++, Photon takes advantage of modern hardware for faster queries, providing TPC world-record price/performance compared to other cloud data warehouses — all natively on your data lake.





Photon: A Fast Query Engine for Lakehouse Systems

Alexander Behm, Shoumik Palkar, Utkarsh Agarwal, Timothy Armstrong, David Cashman, Ankur Dave, Todd Greenstein, Shant Hovsepian, Ryan Johnson, Arvind Sai Krishnan, Paul Leventis, Ala Luszczak, Prashanth Menon, Mostafa Mokhtar, Gene Pang, Sameer Paranjpye, Greg Rahn, Bart Samwel, Tom van Bussel, Herman van Hovell, Maryann Xue, Reynold Xin, Matei Zaharia
photon-paper-authors@databricks.com
Databricks Inc.

ABSTRACT

Many organizations are shifting to a data management paradigm called the "Lakehouse," which implements the functionality of structured data warehouses on top of unstructured data lakes. This ... for query execution engines. The execution ... performance on the raw un- ... excellent

from SQL to machine learning. Traditionally, for the most demanding SQL workloads, enterprises have also moved a curated subset of their data into data warehouses to get high performance, governance and concurrency. However, this two-tier architecture is complex and expensive, as only a subset of data is available in the warehouse, and this data may be out of sync with the raw data due to issues in the extract, transform and load (ETL) process [19]. In response, many organizations are shifting to a data management ... called the Lakehouse [19], which implements data ... transactions and rich ... approach

SIGMOD 2022
Best Industry
Paper Award

Databricks SQL
intelligent data warehousing on the data intelligence platform

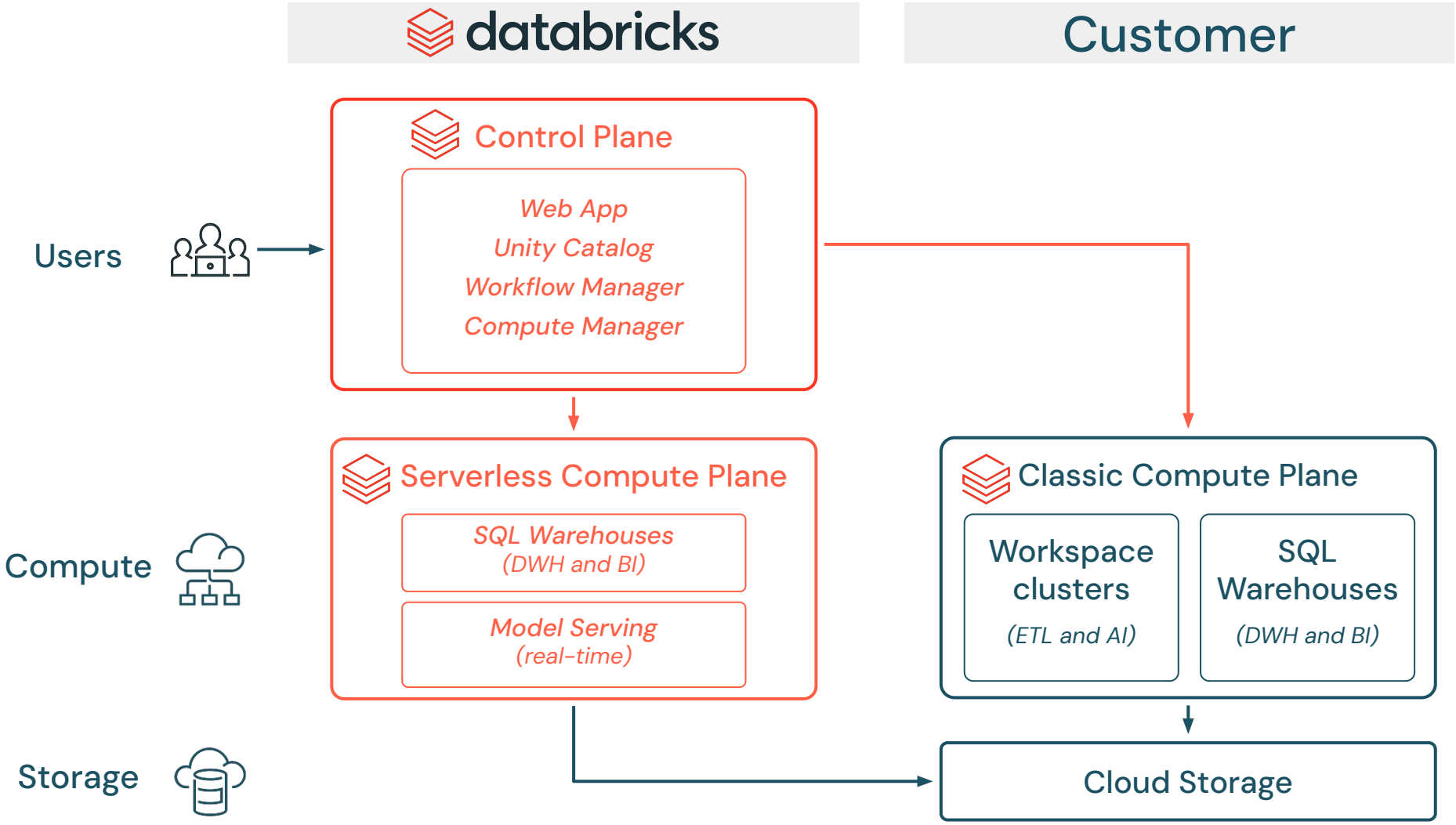
Intelligent experiences
with built-in understanding of your data

Predictive optimizations
for all your workloads

Best price/performance
for the lowest TCO

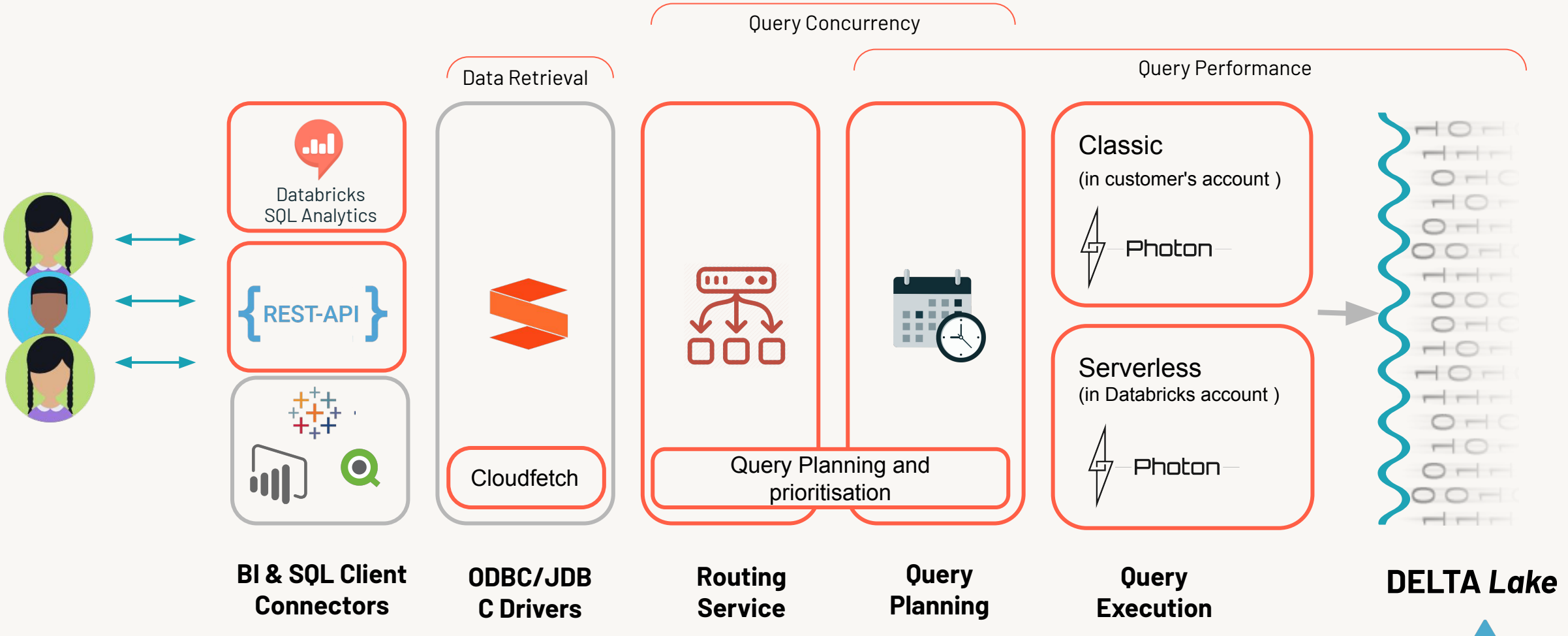
Databricks Datawarehouses Architecture

Databricks Serverless - Overview



Anatomy of a Query on Databricks SQL

Difference in architecture vs "standard" clusters



Databricks SQL Service offers

Databricks SQL Pricing / DW Offering

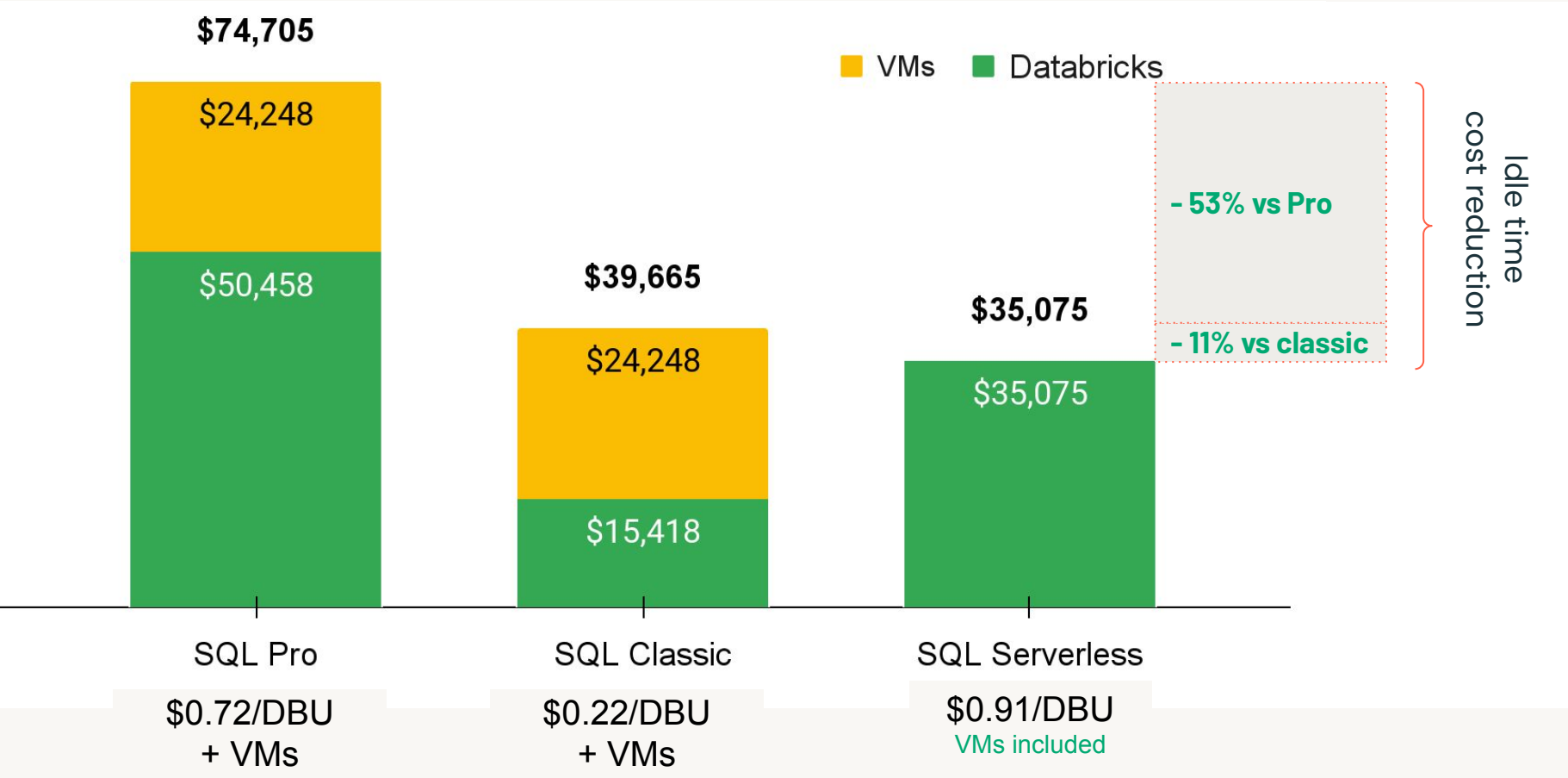
SQL Classic	SQL Pro	Serverless SQL
Databricks SQL Classic	**Databricks SQL Pro**	**Databricks SQL Serverless**
$0.22/DBU	$0.72/DBU	$0.91/DBU*
(+infrastructure)	**(+infrastructure)**	
Self-managed, good for exploratory SQL workloads	Self-managed, better performance, unlock new workloads	Best for all workloads and performance, fully managed, elastic, best value
"GOOD"	**"BETTER"**	**"BEST"**

**** Infrastructure (VMs) costs included***

FEATURE MATRIX		CLASSIC Self-Managed, Introductory SKU	PRO Self-Managed, Compute in your account	SERVERLESS Fully Managed, Elastic, Best Value
		GOOD	BETTER	BEST
EXPLORATORY SQL	SQL Editor with intelligent auto complete, ANSI SQL	✓	✓	✓
MANAGEMENT & GOVERNANCE	Query History & Profile, Data Explorer (Unity Catalog), Managed Data Sharing	✓	✓	✓
CONNECTIVITY	SQL Rest API, Python, Node.js, Go, Partner Connect	✓	✓	✓
PERFORMANCE	Photon Engine (Massively Parallel Processing)	✓	✓	✓
	Predictive I/O	X	✓	✓
SQL ETL/ELT	Query Federation, Materialized Views, Workflows Integration	X	✓	✓
DATA SCIENCE & ML	Python UDFs, Notebooks Integration, Geospatial, LLM AI Functions	X	✓	✓
SERVERLESS DATA WAREHOUSE	Instant, Elastic, Fully Managed Compute	X	X	✓
HIGH CONCURRENCY BI	Intelligent Workload Management	X	X	✓
	Serverless Query Result Caching*	X	X	✓

Databricks SQL classic vs. serverless – observed cost

Azure - West Europe - On Demand VMs

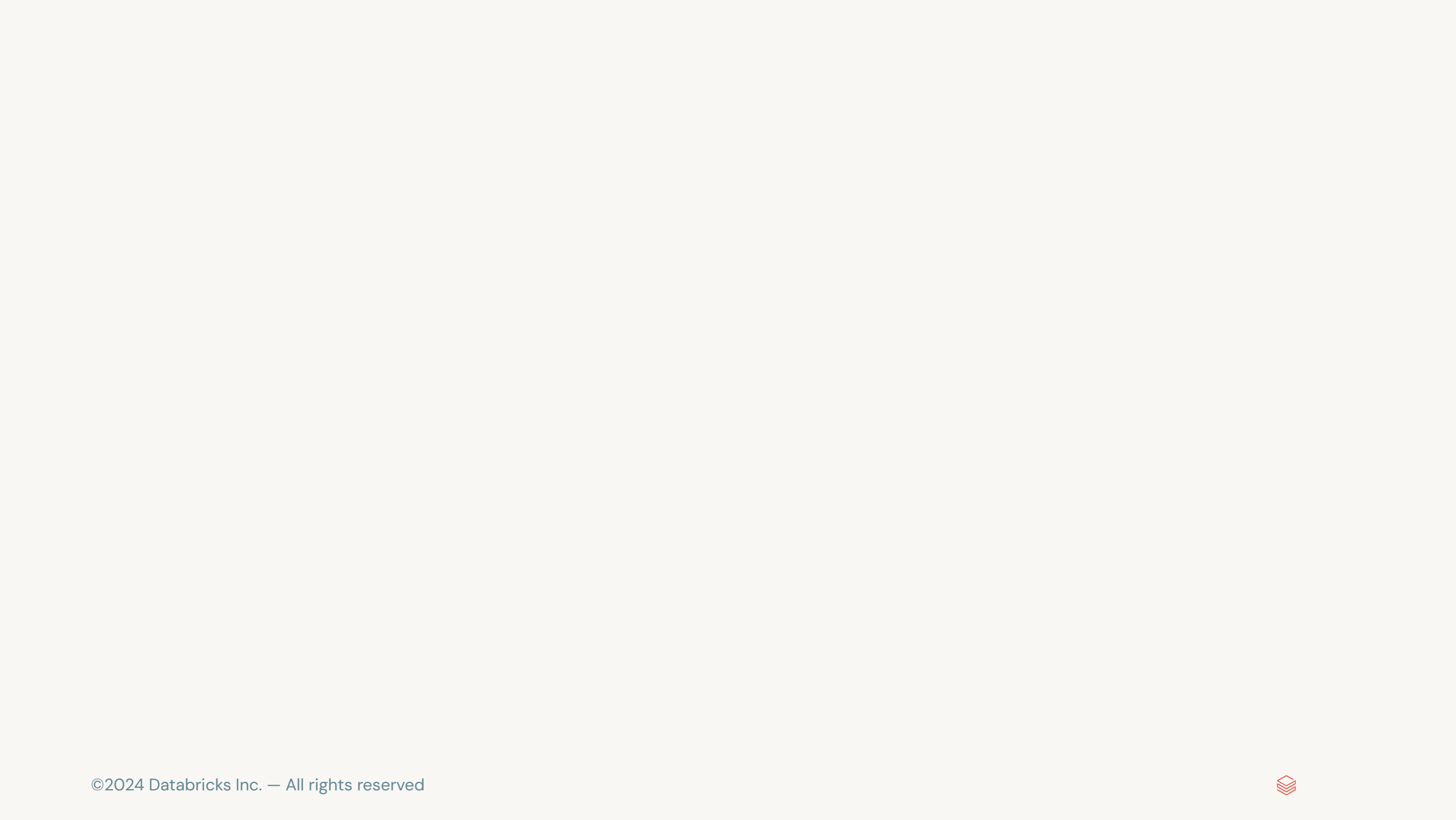


Annual costs - Medium Warehouse

Classic/Pro warehouse up 8 h/day 365d/y
Using on demand VMs

Assuming a average 55% usage rate for the Classic/Pro Warehouse

=> Observed average between (40 and 60) over 1 year

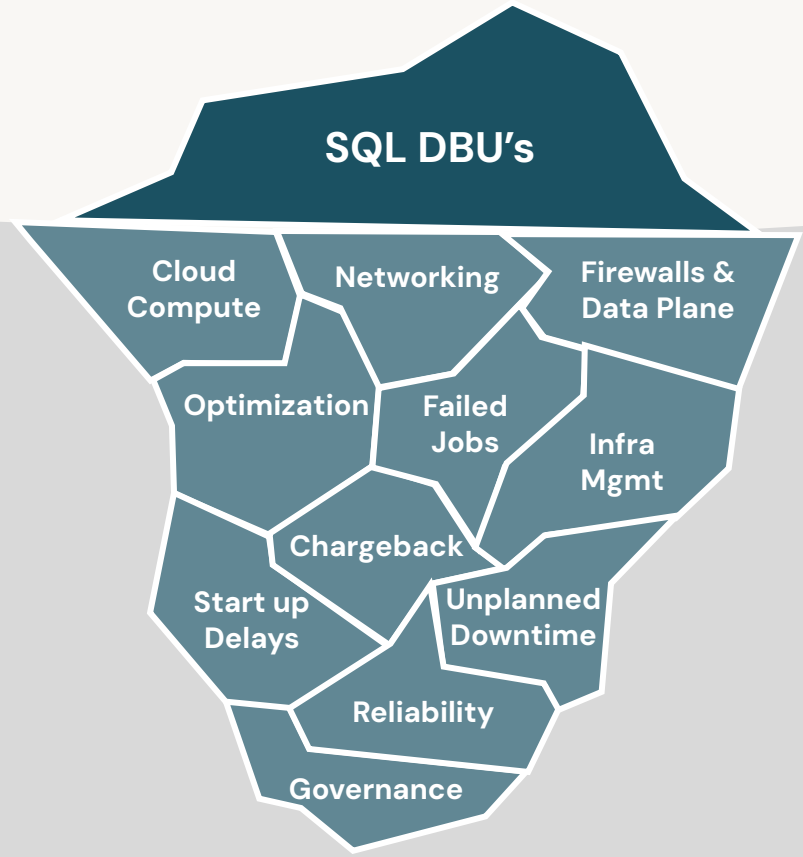


Serverless SQL delivers more business value than simply reducing compute costs.

Typical TCO Iceberg - SQL

Product price
25%

Hidden costs
75%



4 Key Value Drivers

Reduced Infrastructure Costs

- Reduced SQL Run Costs (Compute)
- Reduced Cloud Infra Costs

Lower Management Overhead

- Lower Chargeback Support
- Reduced Optimisation Efforts
- Reduced Infrastructure Management

Increased User Productivity

- Reduction in Failed Jobs
- Faster Start-up Time

Greater Business Impact

- Reliability for Critical Workloads
- Streamlined Governance

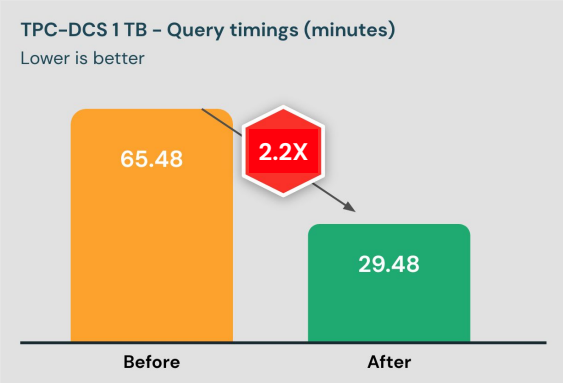
Serverless focusing our R&D Efforts

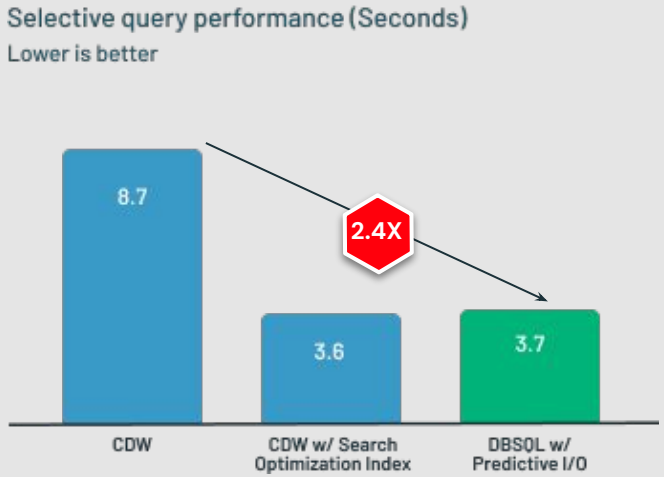
Leaps in performance thanks to AI-Powered features

Auto-tuning
automatically optimizes writes and compacts storage of managed tables to reduce latency and cost

Intelligent Workload Management
leverages machine learning to efficiently route queries and scale clusters to maximize cost / performance.

Predictive I/O
delivers comparable performance to expensive search-optimized index automatically





Roadmap

New Features

Intelligent Experiences

- Dashboards Enhancements (GA)
- AI Functions (Public Preview)
- SQL Editor + Assistant Enhancements (Preview)
- Vector seach from SQL (Public Preview)

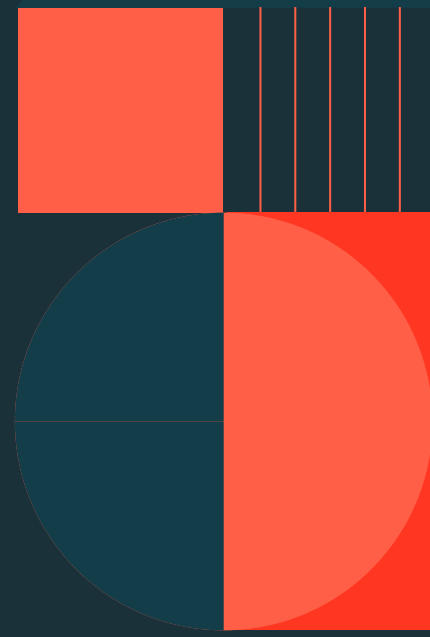
Predictive Optimizations

- Automatic Statistics (Preview)
- Intelligent Workload Management - Enhancements (GA)

Core Warehousing

- Lakehouse Federation (GA)
- Materialized Views and Streaming Tables (GA)
- SQL Scripting (Preview)
- Publish to PowerBI and Tableau (Preview)
- Serverless Warehouses on GCP (GA)
- HIPAA, PCI, FedRamp for Serverless Warehouses on AWS (GA)

Data Modeling and performance best practices



Data warehouse sizing

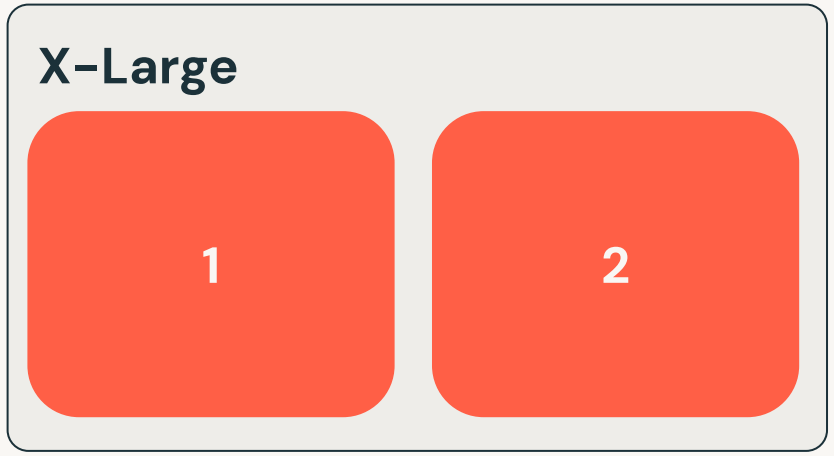
Data warehouse sizing

Endpoint Size : Compute capacity of a single cluster.

Adjust endpoint **Size** to adjust **single query Latency**

Reco : **Start with Medium** for typical BI style workloads

Increase size for low latency on larger dataset / complex queries

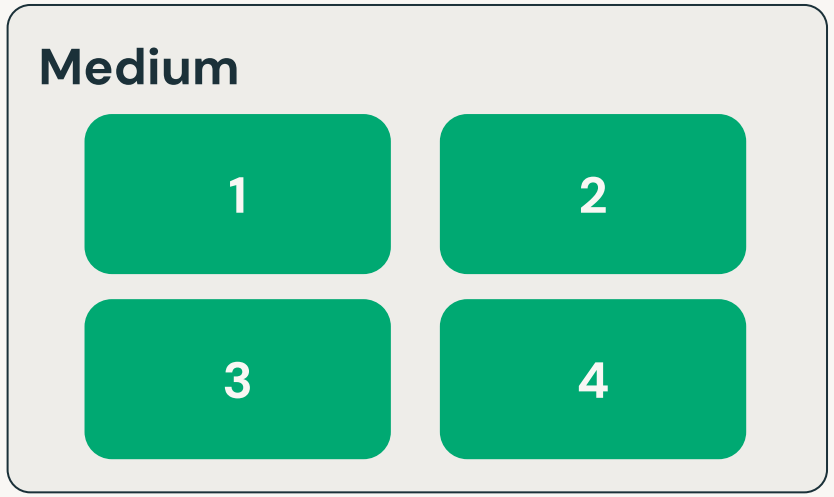


Endpoint Scaling : Number of concurrent clusters behind a single warehouse

Adjust **scaling** to increase **query throughput / concurrency**

Reco: Start with MIN = 1 and MAX = 5

More Users - Smaller Data Size



Data Layout

Performance

Query Performance

95 % of performances improvements can be addressed by **:**

1. **Using an optimized data format for storage**
2. **Optimized file size**
3. **Layout adapted to the end user's query patterns**

The rest (5%) can be addressed by :

- **Good SQL code (majority of cases)**
- Advanced parameter tuning (advanced / edge cases)

DELTA *Lake*

1. Choose the right file format

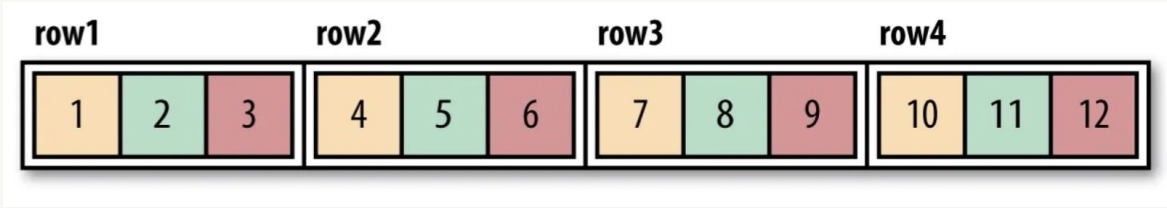
Column oriented offers the best performance for analytics use cases

Row oriented

Example : Text ; Avro

Data is stored and retrieved one row at a time

- Very difficult to filter ;
  Must read every data point in every lines



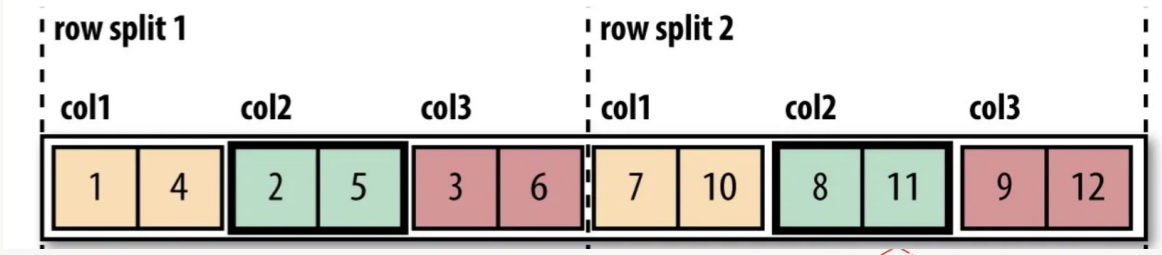
Column oriented

Example : ORC ; Parquet; **Delta**

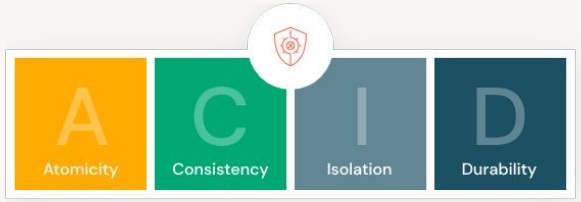
DELTA LAKE

Data is stored and read by column

+ Read only the columns required for the lines requested



Column oriented in not good enough…
=> Need Transactions



Open format **Delta Lake** is the foundation of the Lakehouse

- Databricks SQL stores and processes data using the **open source format** Delta Lake, based on Parquet
- Delta Lake adds **quality**, **reliability**, and **performance** to your existing data lakes
- Provides **one common data management framework** for data, analytics, and AI workloads.

+

THE LINUX FOUNDATION

- ✓ **ACID Transactions**
- ✓ Time Travel
- ✓ Schema Enforcement
- ✓ Identity Columns
- ✓ Advanced Indexing
- ✓ Caching
- ✓ Auto-tuning
- ✓ Fine-grained, Role-based access controls
- ✓ Python, SQL, R, Scala Support

2. Optimize file size

Fast Data Reading

Right sized files for ideal read parallelism

Too many small file => Large IO overhead

Too few large files => limited parallelism

=> harder to filter

Goal of `Optimize`

=> Create ideal file size according to table data volume

3. Layout adapted to the end user query patterns

Organize Data according to your query patterns

The less data you have to read the faster the query !

To work, data must be :

- Organised in a predictable manner

That is

- Flexible enough to allow different the use of predicate

Goal of `Z-ORDER / Liquid`
=> Equivalent to indexes on Databases

Treat Z-Order as you would an index

- Frequent filter columns/predicates
- Foreign Keys

Reco : Limit ZOrder to 4 to 6 columns / dimensions

With Delta Lake, partitioning is NOT recommended (except in specific cases**)

Partitioning has a physical reality
=> Creates folder structure

- partition_column (Folder)
  - file
  - file

=> **Locks table on single effective predicate** (filter) and reduces performance on others

Lab details

Technical Environment Overview

The Databricks SQL workspace

- Everyone:
  - is in the same workspace
  - has their own catalog (you will create them)
  - is using the same SQL warehouse

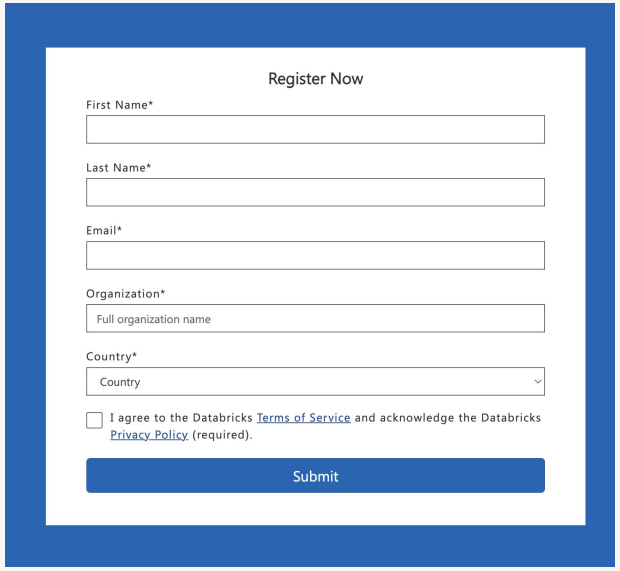
- Only the instructor has administrator privileges in the workspace
  - only a select few tasks in this course require admin privileges
  - you will see these tasks in the slides in order to provide context
  - the labs do not require admin privileges

Get access to the lab

If you haven't done so already - please register yourself and get your username

Registration

https://bit.ly/3z8DPSC

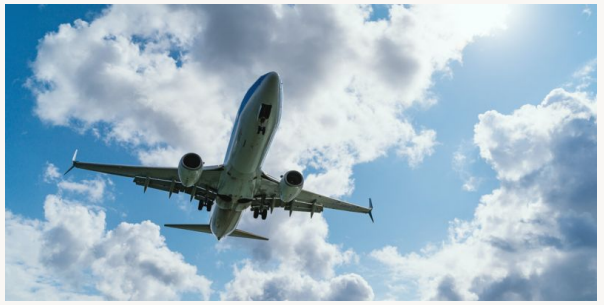


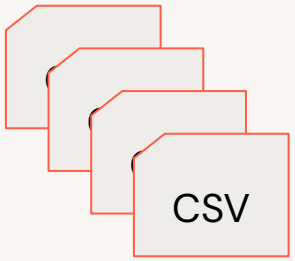
Lab Material

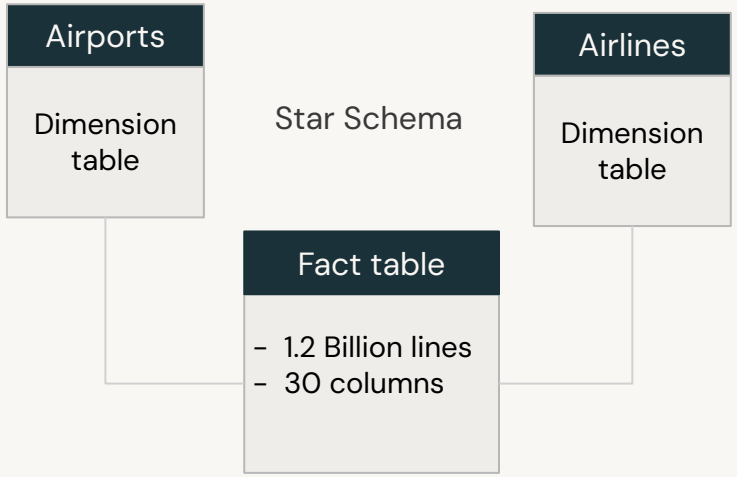
https://github.com/frenchlam/DBKS_SQL_training_july3rd

Airline ontime Dataset (ASA Data Expo 2009)

US Domestic flights 1988 - 2008

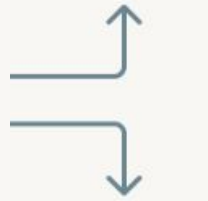




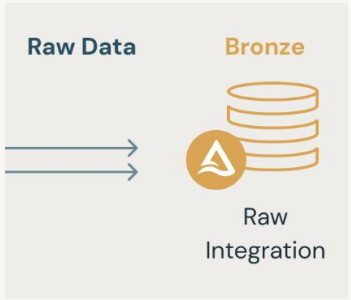


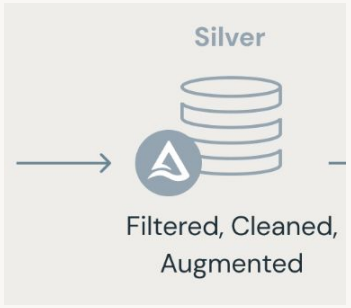
oriented Airports

oriented Airlines

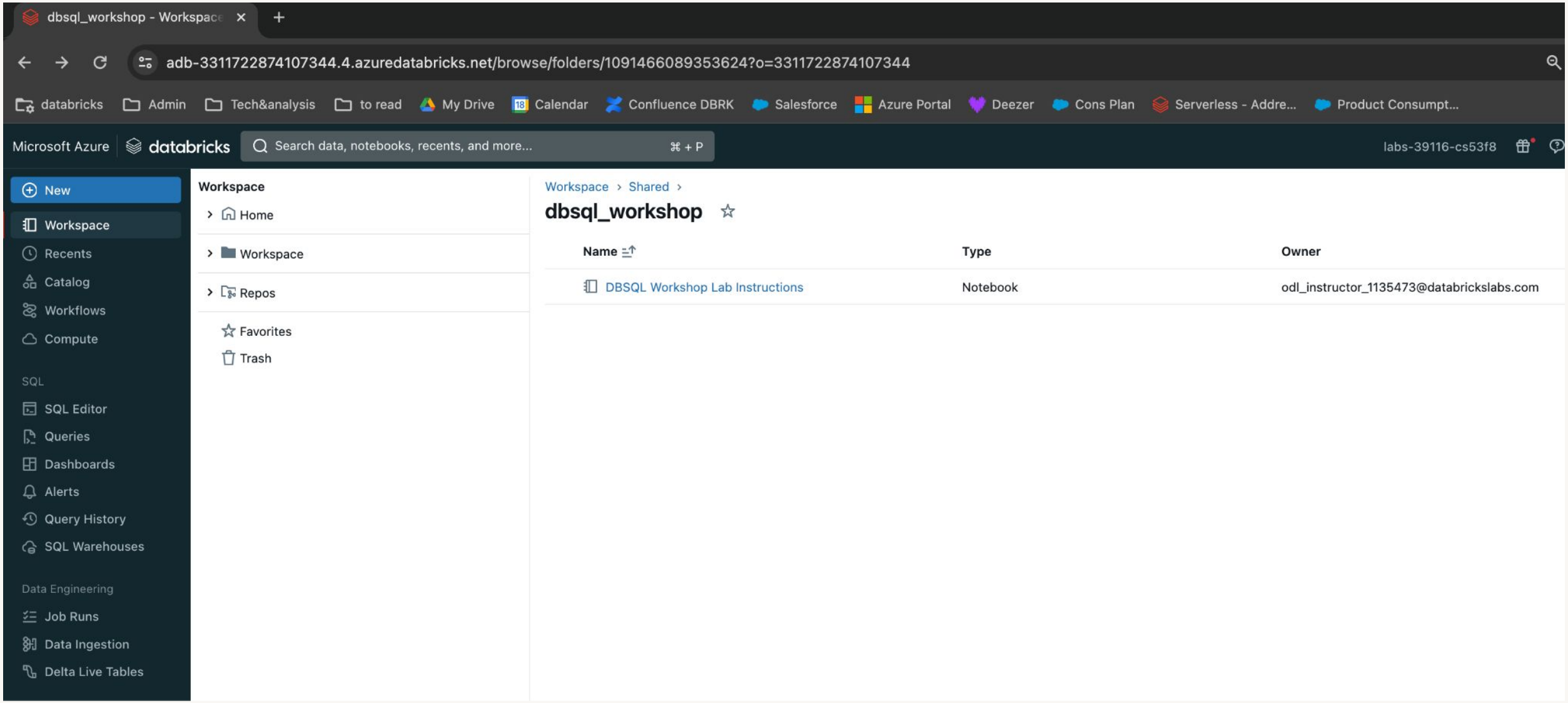


Delta Lake





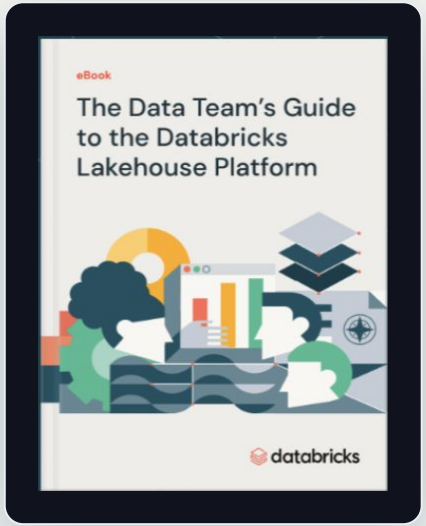
LAB – Getting started



Databricks' guide to the lakehouse

SCAN ME

Bill Immon



SCAN ME

SCAN ME

Unity Catalog in Databricks SQL

Data and AI governance drives business value

"Organizations are finally realizing the value of data as an asset that needs to be protected, managed and maintained to increase asset value"

—

IDC

"Organizations seeing the highest returns from AI have a framework for AI governance to cover every step of the model development process"

—

The State of AI in 2022, McKinsey & Co

"AI is now an enterprise essential, and as such, AI governance will join cybersecurity and compliance as a board-level topic"

—

Forrester, 2023 AI Predictions report

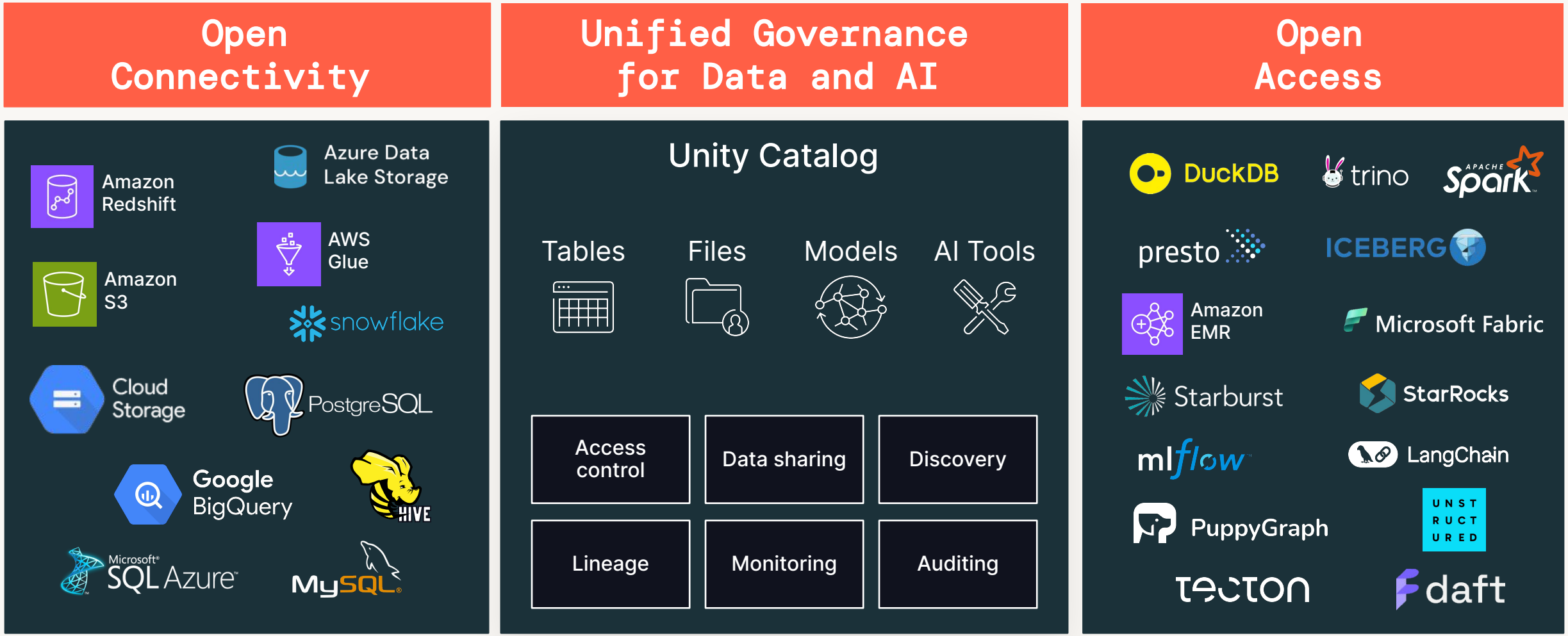
An Ideal Governance Solution Needs:

Open Connectivity
Any data, any source, any format

Unified Governance
Across data and AI

Open Access
Any compute engine/client

Databricks Unity Catalog



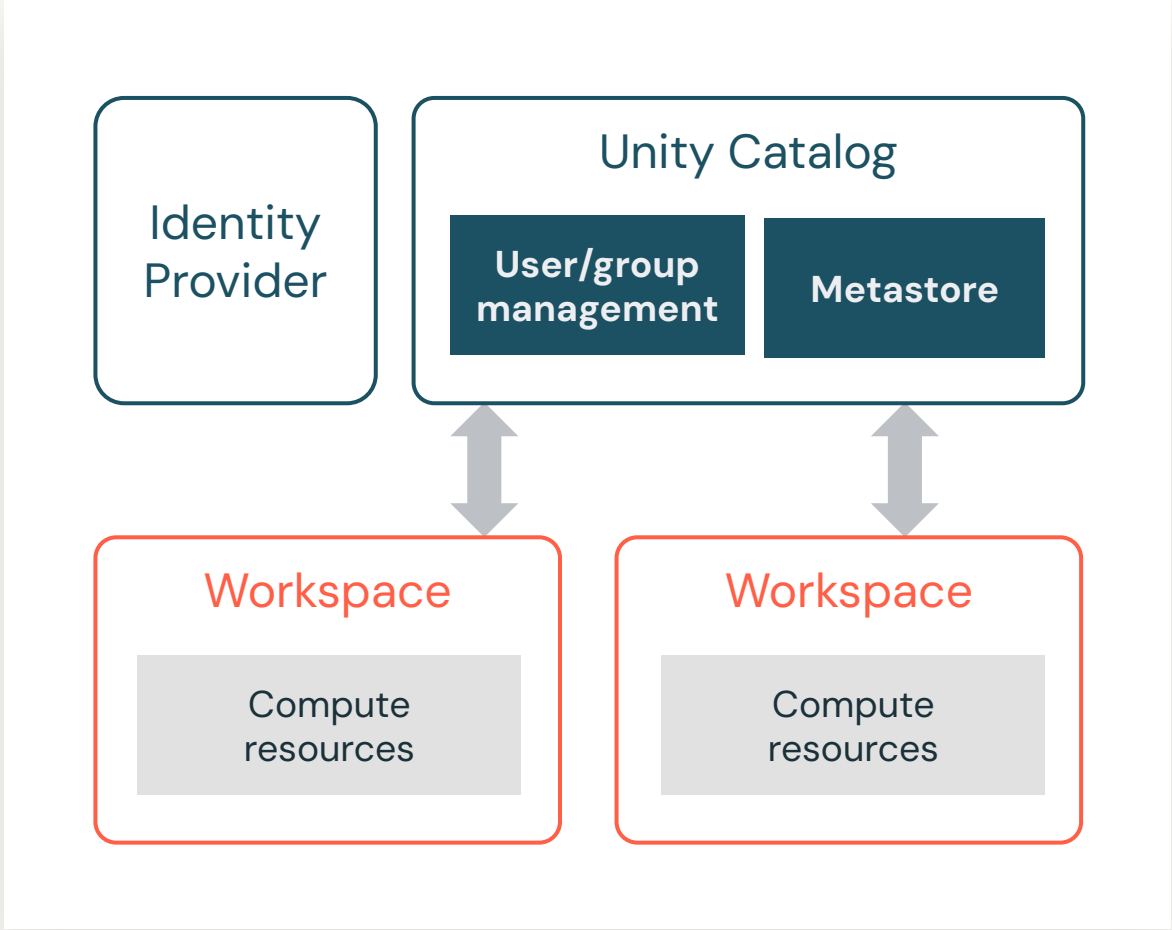
Unity Catalog
Architecture

Implements access control on data

Access control is always enabled

Works across multiple workspaces

Grants permissions to users at the account level



Fundamental Concepts

Working with file based data sources

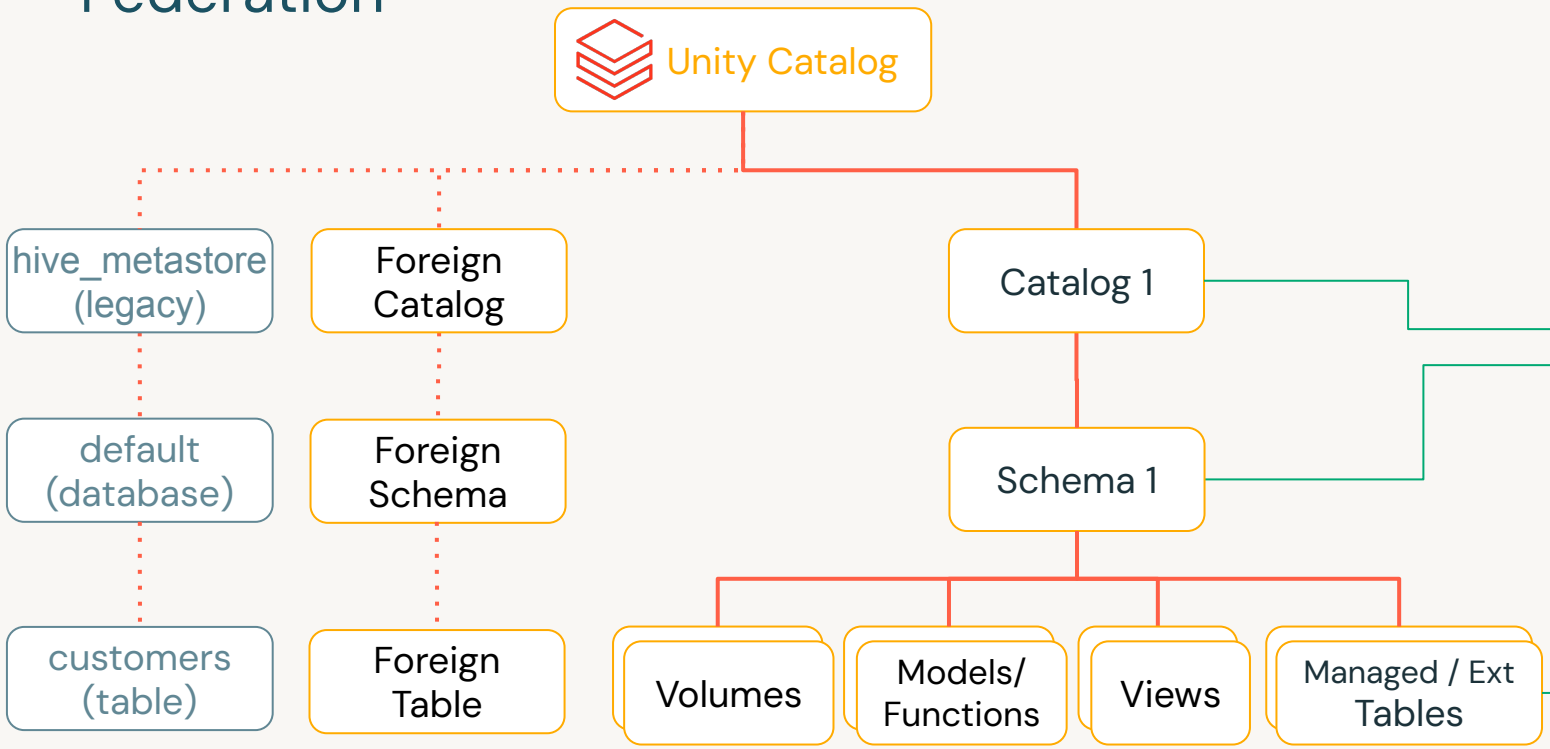
- Credentials
  - Cloud provider credential to connect to storage
- External Locations
  - Storage location used for external tables or arbitrary files
- Managed Data Sources
  - External Location that is used exclusively for tabular data
- Volumes
  - Arbitrary file container inside an external location

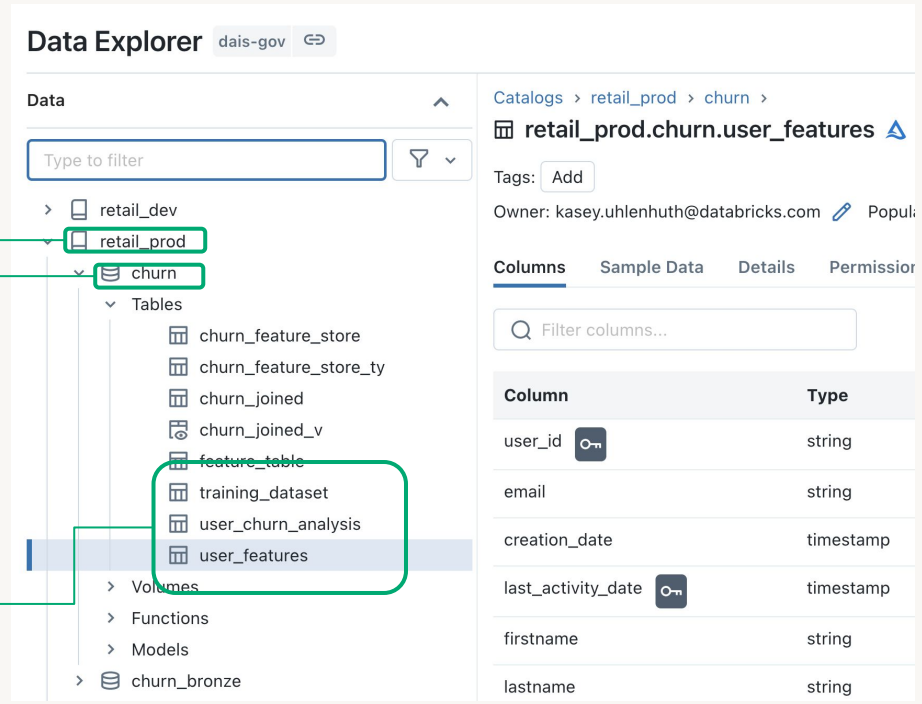
Working with databases

- Connections
  - Credential and connection information to connect to an external database
- Foreign Catalogs
  - A catalog that represents an external database in UC and can be queried alongside managed data sources and file sources

Governed namespace across file and database sources

Access legacy metastore and foreign databases powered by Lakehouse Federation






```
SELECT * FROM main.paul.red_wine;  -- <catalog>.<database>.<table>

SELECT * FROM hive_metastore.default.customers;

SELECT * FROM snowflake_warehouse.some_schema.some_table;
```

Unity Catalog Features

Discovery

AI Generated Documentation (Preview)

Tagging (Preview)

Semantic Search

Data Usage Insights

Access Control

Row and Column Security

Volumes

Scala in Shared Access Mode (Preview)

ABAC (Preview)

AI Governance

Models in Unity Catalog

Feature Store

Vector Search

Lineage

Volumes

Federated Sources

Models (Preview)

Bring Your Own Lineage (Preview)

Sharing

Notebooks

Marketplace

Models (Preview)

Clean rooms (Preview)

Monitoring

Lakehouse Monitoring

System Tables-Billable Usage

Follow Along Demo: Setting Up a Catalog and Schema

Follow along Demo

Catalog Walkthrough

- Data Discovery
- AI Governance
- Data Access
- Data Lineage
- Data Sharing
- Monitoring

LAB 1 – Unity Catalog

Setting up your data assets

- Create a catalog
- Create a schema
- Create a volume
- Create a managed table
- Grant access to your catalog
- Query your data

databricks

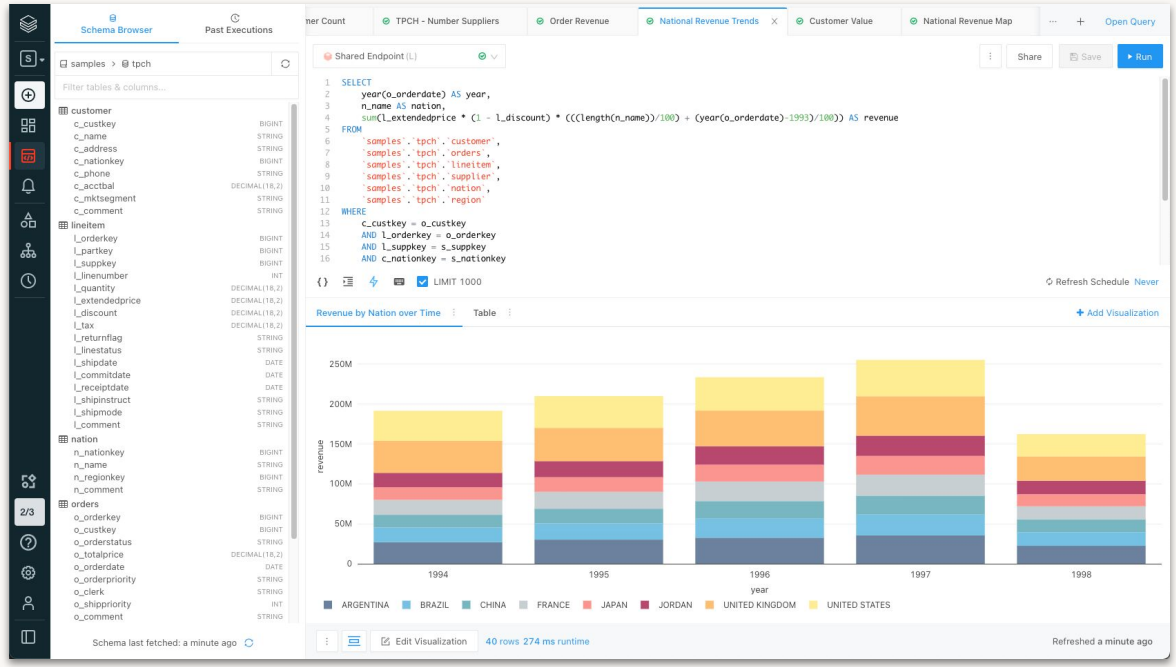
Data Visualization and Dashboarding

Databricks Academy 2023

Databricks SQL Query Editor

Collaboratively query, explore, and transform data in-place

- Easily **ingest** data from cloud storage, local files, or business applications using Fivetran
- Discover data, explore database schema, and query data using **ANSI SQL**
- Save, share, and reuse queries across teams to get to results faster
- Orchestrate queries, alerts, and dashboards with automated **workflows**
- Stay up to date with alerts and automatic refresh schedules

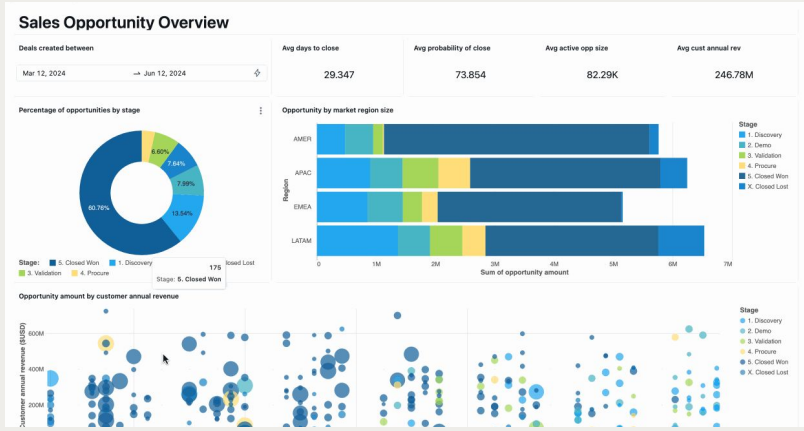


Databricks AI/BI

Intelligent analytics for real-world data

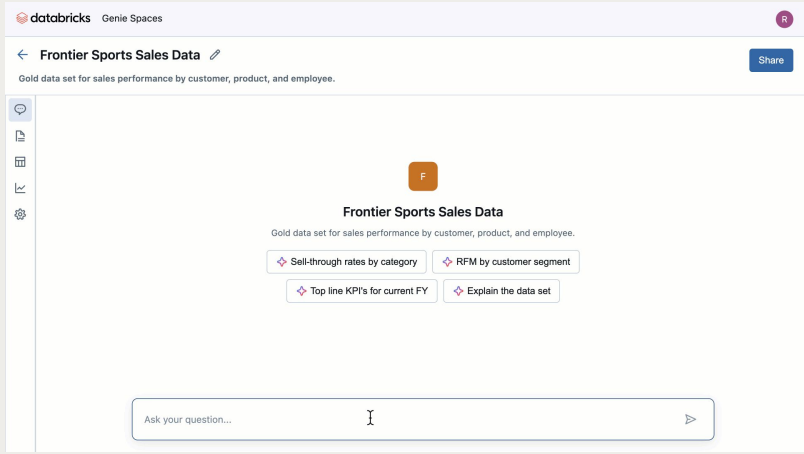
Generally Available

Dashboards



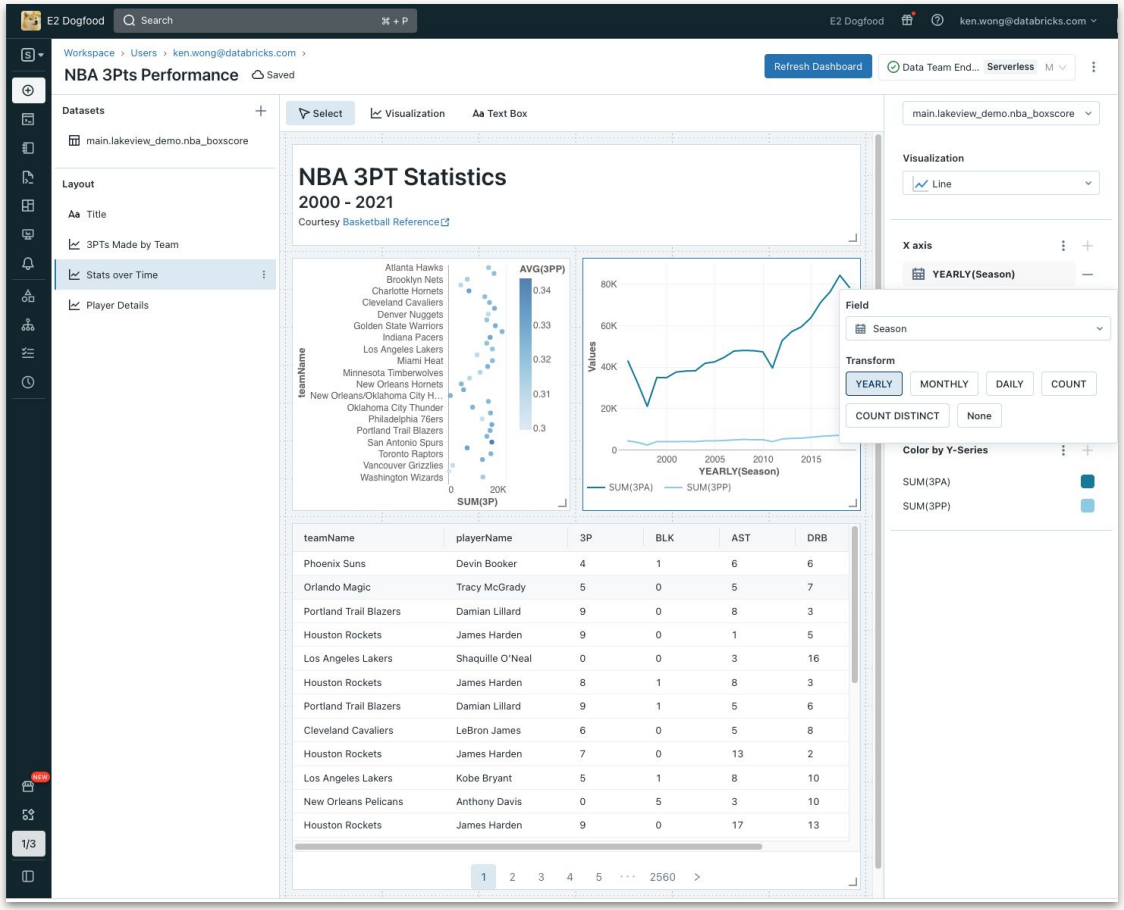
Public Preview

Genie



Governed and secured with Unity Catalog

AI/BI Lakeview: Native BI for the Lakehouse



Simple

New content model, new visualization library, and **SQL-optional UX** for simple use cases

Shareable

Publish dashboards with optimizations for broad distribution **beyond the workspace**

Integrated

Integrations into **Unity Catalog** and interoperability with Notebooks

AI/BI Genie Spaces:

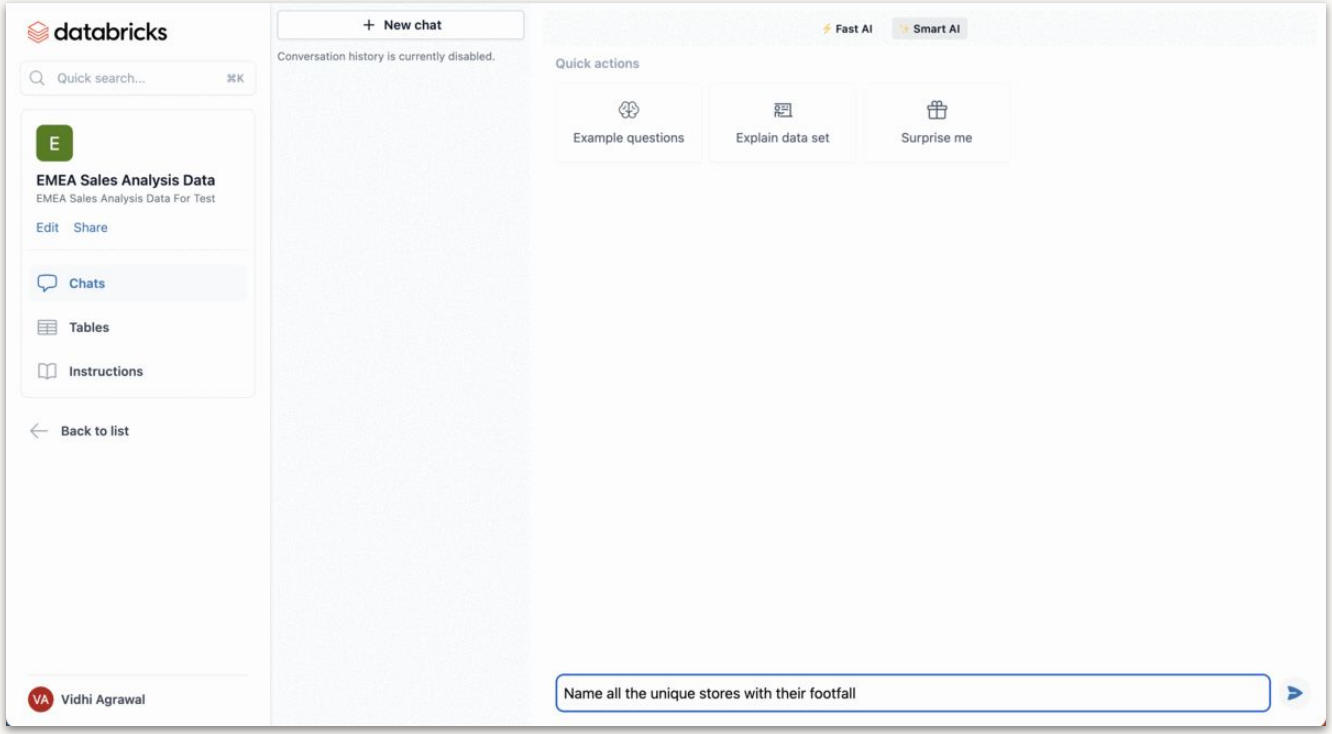
Data and AI for all with natural language

Enable business users to interact with data with LLM-powered Q&A

Ask questions in natural language and receive answers in text and visualizations

Curate dataset-specific experiences with custom instructions

Powered by Databricks SQL & DatabricksIQ



Deep Power BI & Tableau Integrations

Seamless catalog integration & data model sync

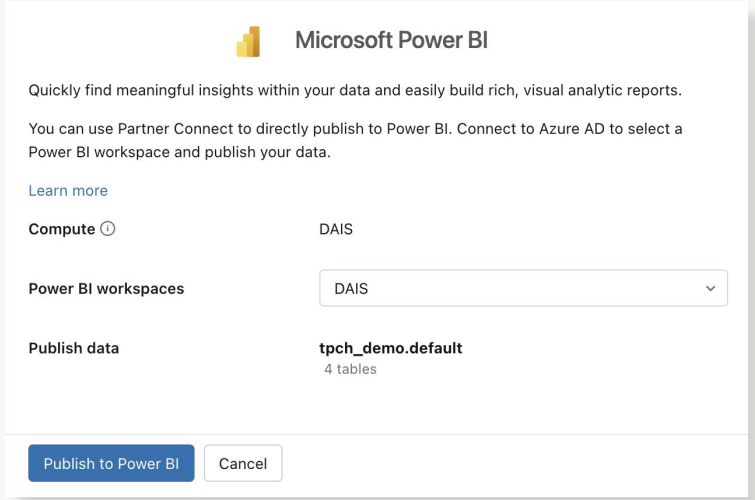
Power BI Integration

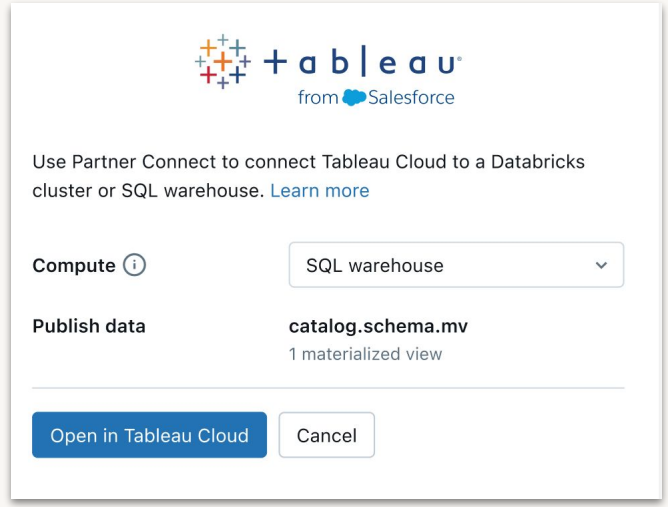
Publish UC datasets from Databricks UI, without PBI Desktop to Power BI Online.

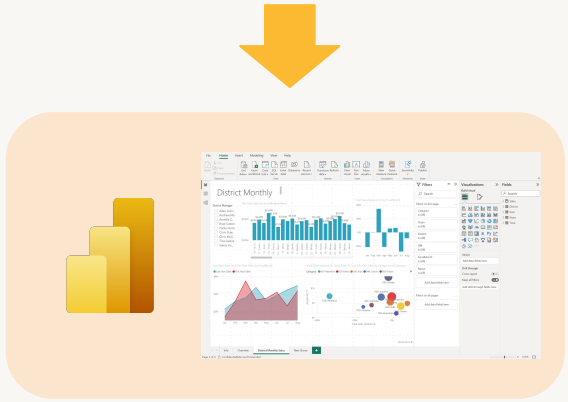
Sync entire schemas including table relationships (PK/FK) to save time.

Tableau Integration

Easily explore Unity Catalog datasets in Tableau Online with a single click from Data Explorer.







Lab:
Data Visualizations

DAWD 01-5

Follow along Demo

Data Visualizations

- Create a Query in SQL Editor
- Create two visualizations

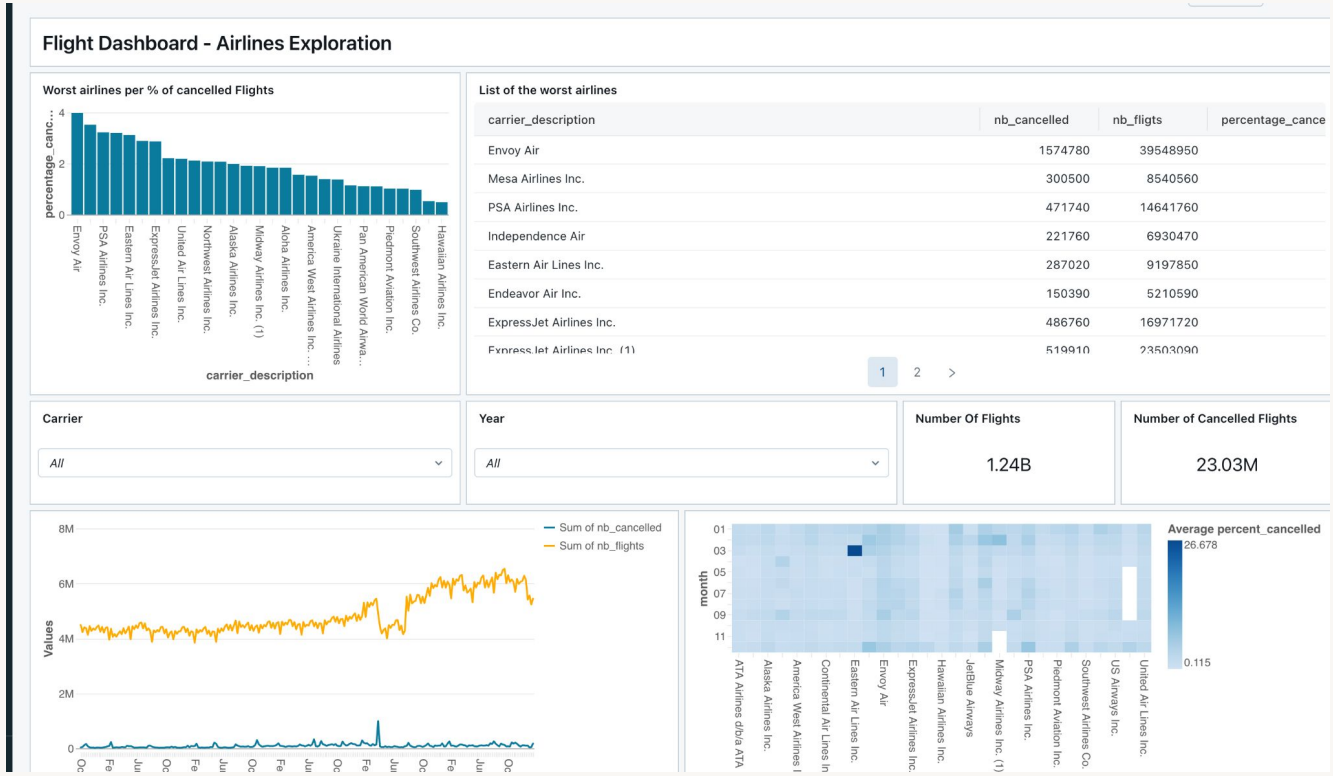
Lab:
Lakeview Dashboards

DAWD 01-5

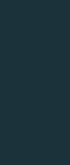
Lab

Dashboards

- Create your own Lakeview dashboard



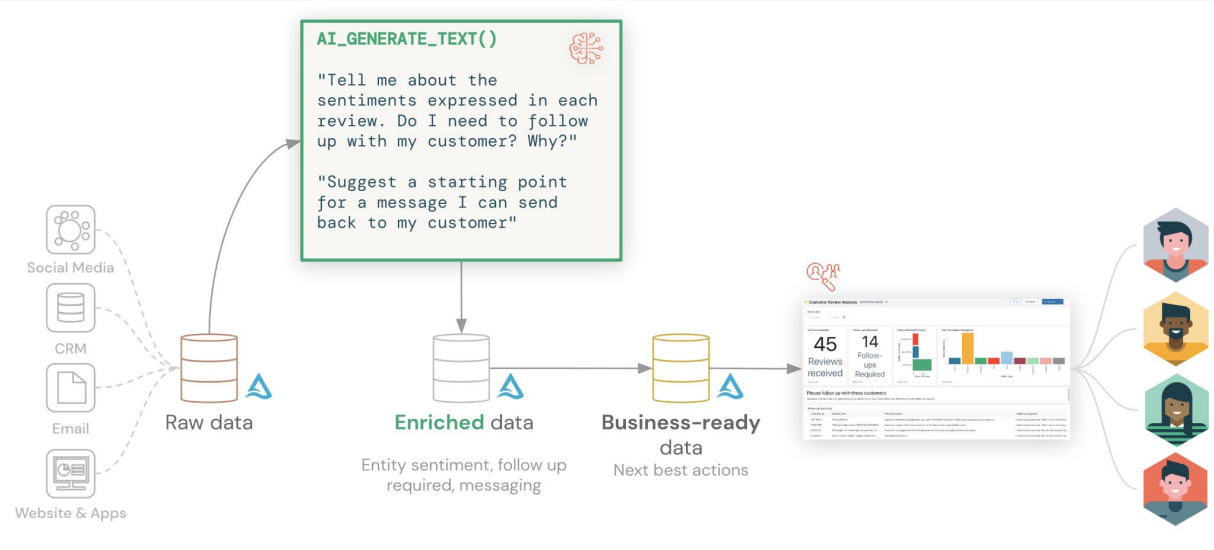
Integration with AI



AI Functions for DBSQL

Access Proprietary and Open Source LLMs directly within DBSQL

- Enable analysts to classify data with LLMs using **built-in functions.**
- Generate product descriptions, summaries, and more by simply adding the **ai_query()** function.



Public Preview

Use built-in AI Functions

Analyze unstructured data with best-in-class models

Built-in functions invoke a state-of-the-art generative AI model to perform tasks like, sentiment analysis, classification and translation.

Use cases

- Extract top product issues from call center transcripts—without manual tagging!
- Tag customers as a potential churn risk based on customer support chat logs
- Generate customized product descriptions for ad campaigns—automatically
- Read product reviews to understand buying decision criteria

...many more...

- ai_analyze_sentiment
- ai_classify
- ai_extract
- ai_fix_grammar
- ai_gen
- ai_mask
- ai_similarity
- ai_summarize
- ai_translate

Use ai_query() function

The ai_query() function allows you to serve your machine learning models and large language models using Mosaic AI Model Serving and query them using SQL.

You can use ai_query() to:

- Query endpoints that serve custom models,
- Query foundation models made available using Foundation Model APIs,
- Query external models.

```
SELECT
 sku_id,
 product_name,
 ai_query(
   "my-external-openai-chat",
   "You are a marketing expert for a winter
holiday promotion targeting GenZ. Generate a
promotional text in 30 words mentioning a 50%
discount for product: " || product_name
 )
FROM
 uc_catalog.schema.retail_products
WHERE
 inventory > 2 * forecasted_sales
```

How to leverage your AI Models in Databricks SQL?

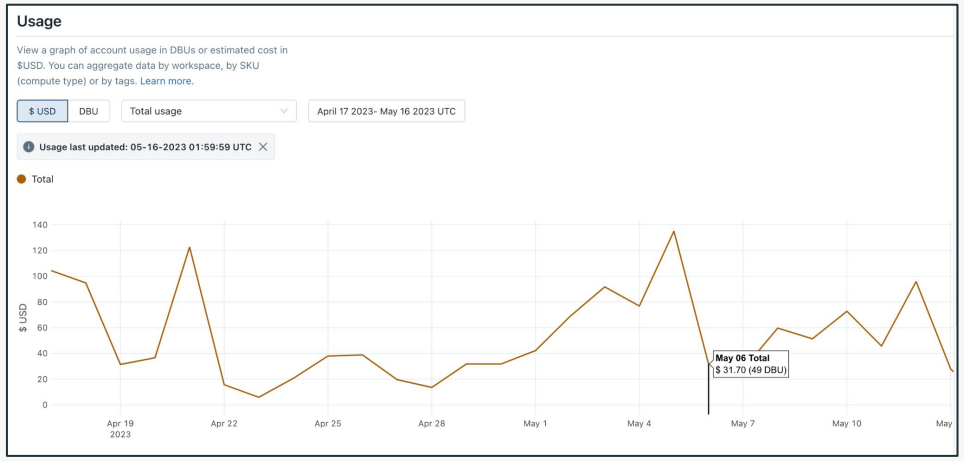
1. Call an AI Foundation Model using SQL
2. Create a SQL function calling a Foundation Model
3. Leverage a custom AI Model in SQL
4. Leverage an external AI Model in SQL

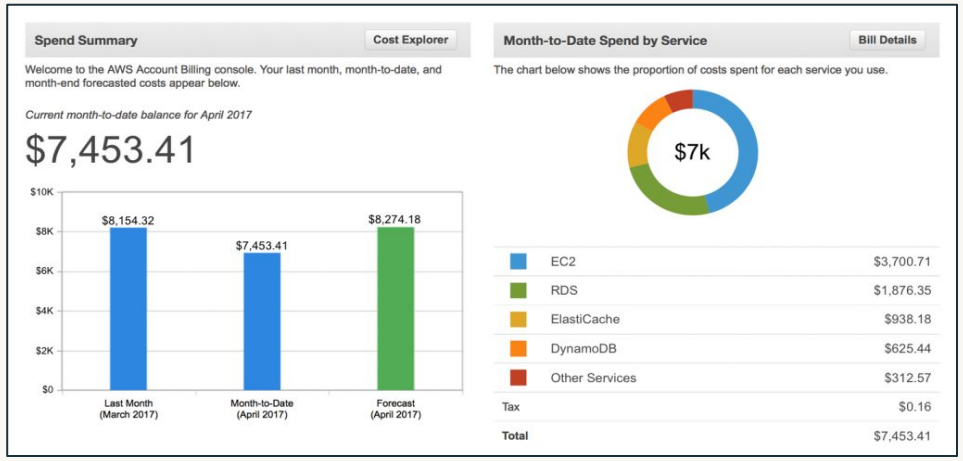
Observability –
using System Tables

What is Observability?

Observability is a key aspect of a data platform which:

- Provides visibility into detailed platform usage
- Helps to correlate the spend/cost implications with different use cases
- Enables Security & Audit of data platform access





What are some Observability questions we may want to answer?

- Monitoring Costs
  - Which are my top spending clusters?
  - Which are my top spending jobs?
  - Which are my top spending projects?
- Monitoring Security and Audit
  - Monitor and track Users and User Groups access to data of different classifications
  - Track Account Logins & modifications
- Monitoring Platform Usage / Pipeline states
  - What states are my pipelines in ?
  - How many new jobs are being added every month?
  - Which are my long running jobs/queries?
  - What are the cluster & job configs being used?
  - How many users are there in the workspace?

Data Observability & Optimisation

Which are my largest tables?
Which tables have the most frequent writes?
Which columns to z-order by?

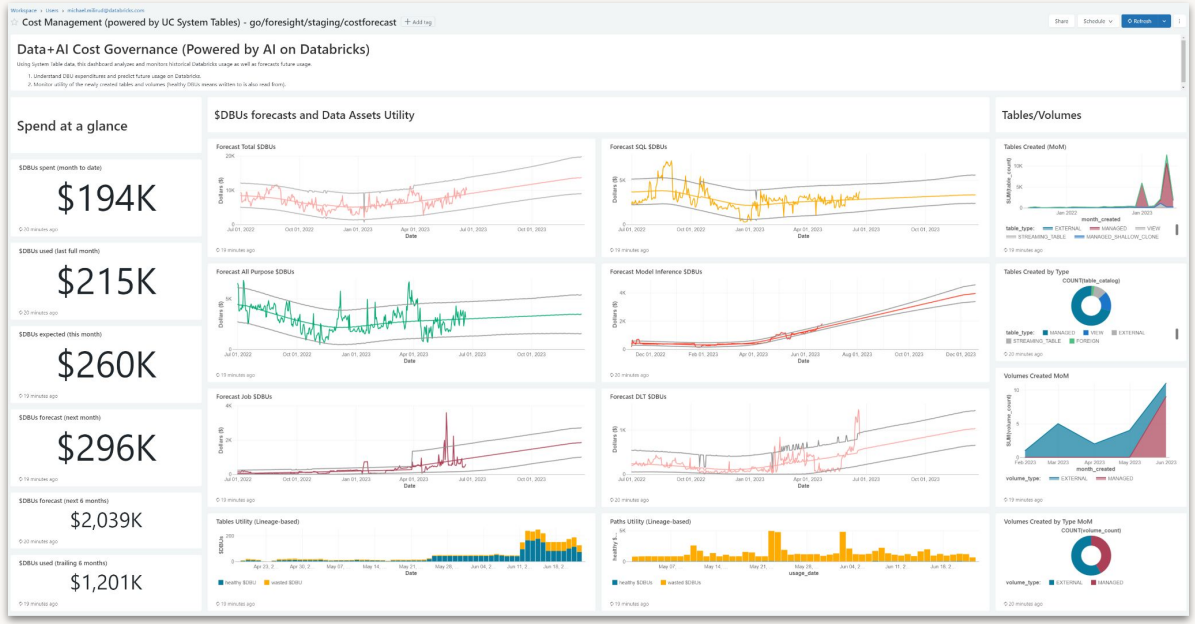
Performance/Resource Utilisation

Which are my lowest utilised clusters?
How is utilisation trending at a hour/min level

System Tables

System Tables are a Databricks-hosted analytical store for **all** of Databricks operational data's warm path used for historical customer observability, including:

- Audit/lineage analytics
- Cost/usage analytics
- Efficiency analytics
- SLO analytics
- Data Quality analytics

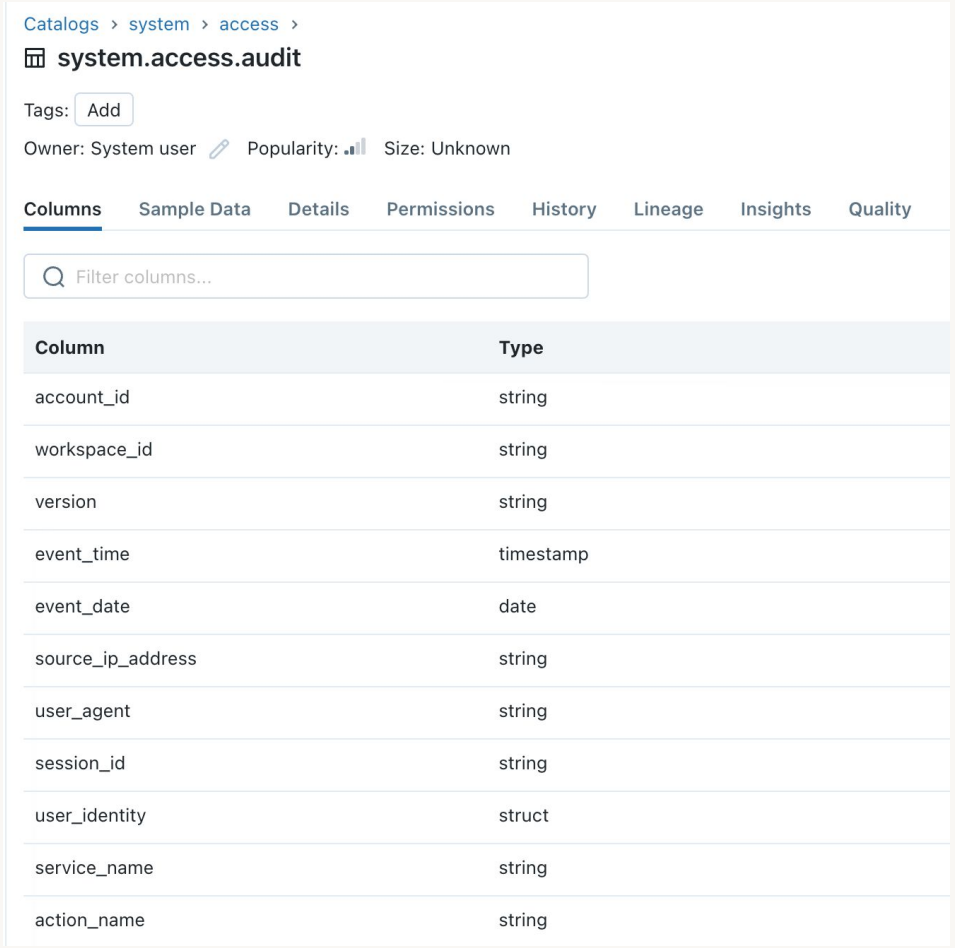


for jobs, notebooks, clusters, SQL/ML endpoints, etc.

Audit Events

Audit Log events in System tables helps you to answer common account usage questions

- Who accessed this table?
- Which users accessed a table within the last day?
- Which tables did a user access?
- View all permissions changes
- View the most recently run notebook commands



Billable usage

Analyze and optimize DBU consumption by leveraging usage tables

- What is the daily trend in DBU consumption?
- How many DBUs of each SKU have been used throughout this month?
- How much of each SKU did a workspace use on June 1?
- Which jobs consumed the most DBUs?
- How much usage can be attributed to resources with a certain tag?
- Show me the SKUs where usage is growing
- What is the usage trend of All Purpose Compute (Photon)?

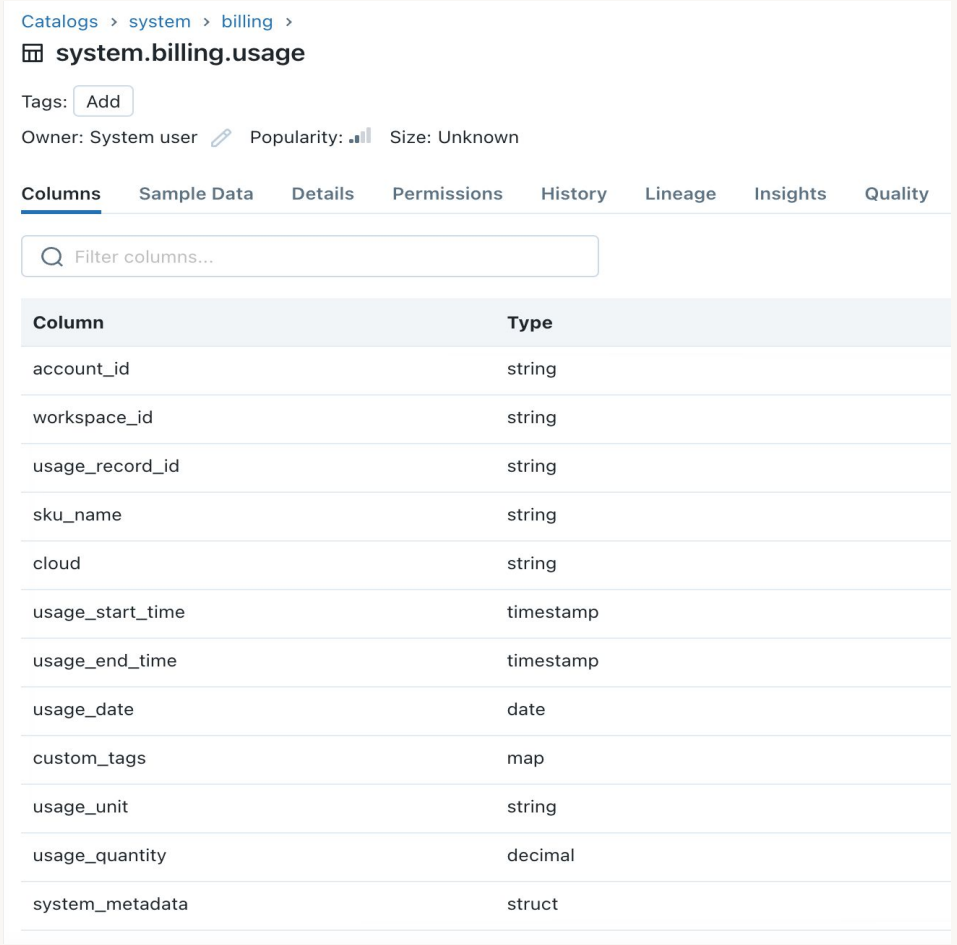
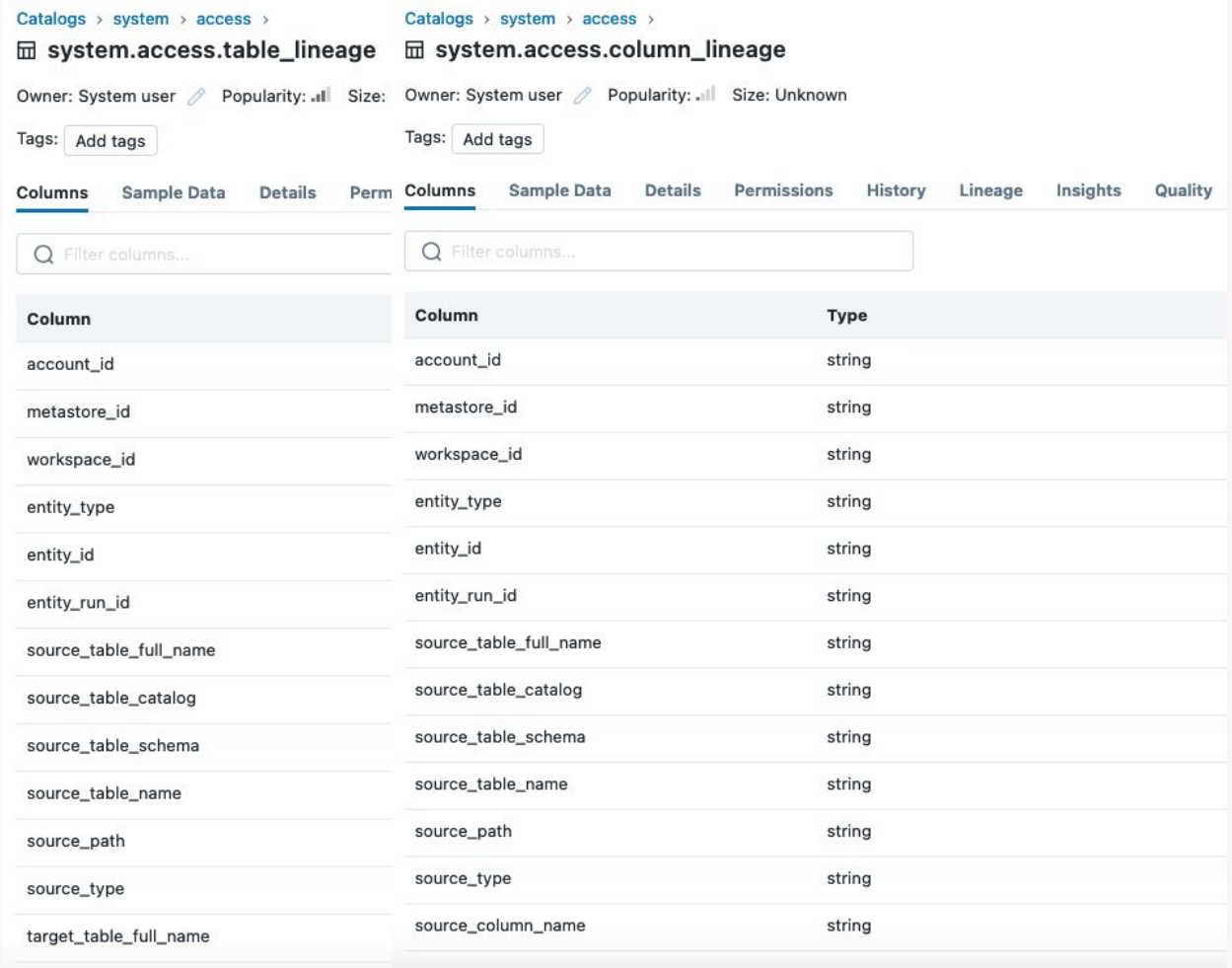


Table and Column Lineage

Build on Unity Catalog's data lineage feature, allowing you to programmatically query lineage data to fuel decision making and reports.

There are two lineage system tables:

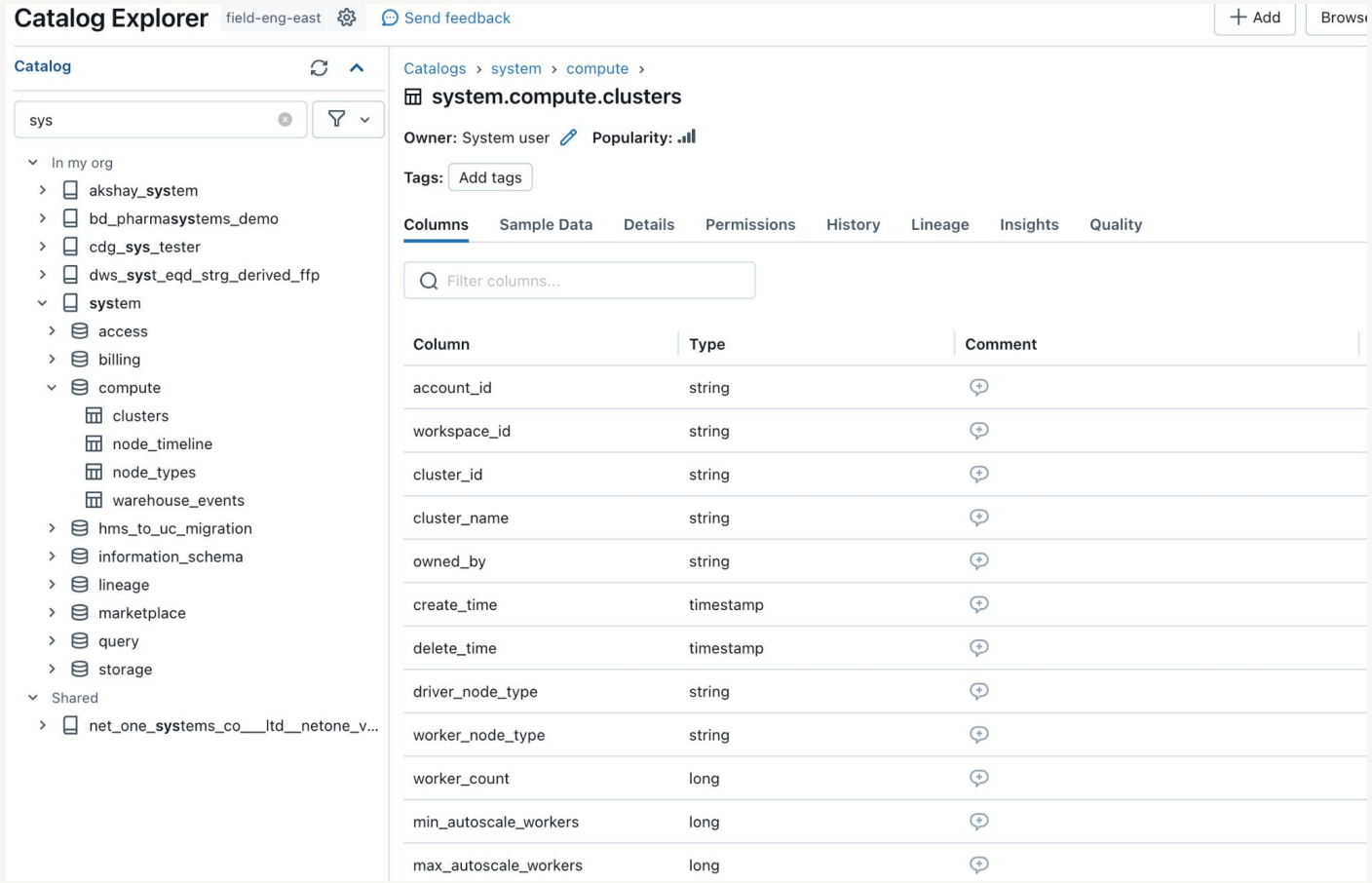
- system.access.table_lineage
- system.access.column_lineage



Clusters

Understand infrastructure usage and scaling events

- How long were clusters up ?
- What type of VM types were used ?
- How did they scale up / down



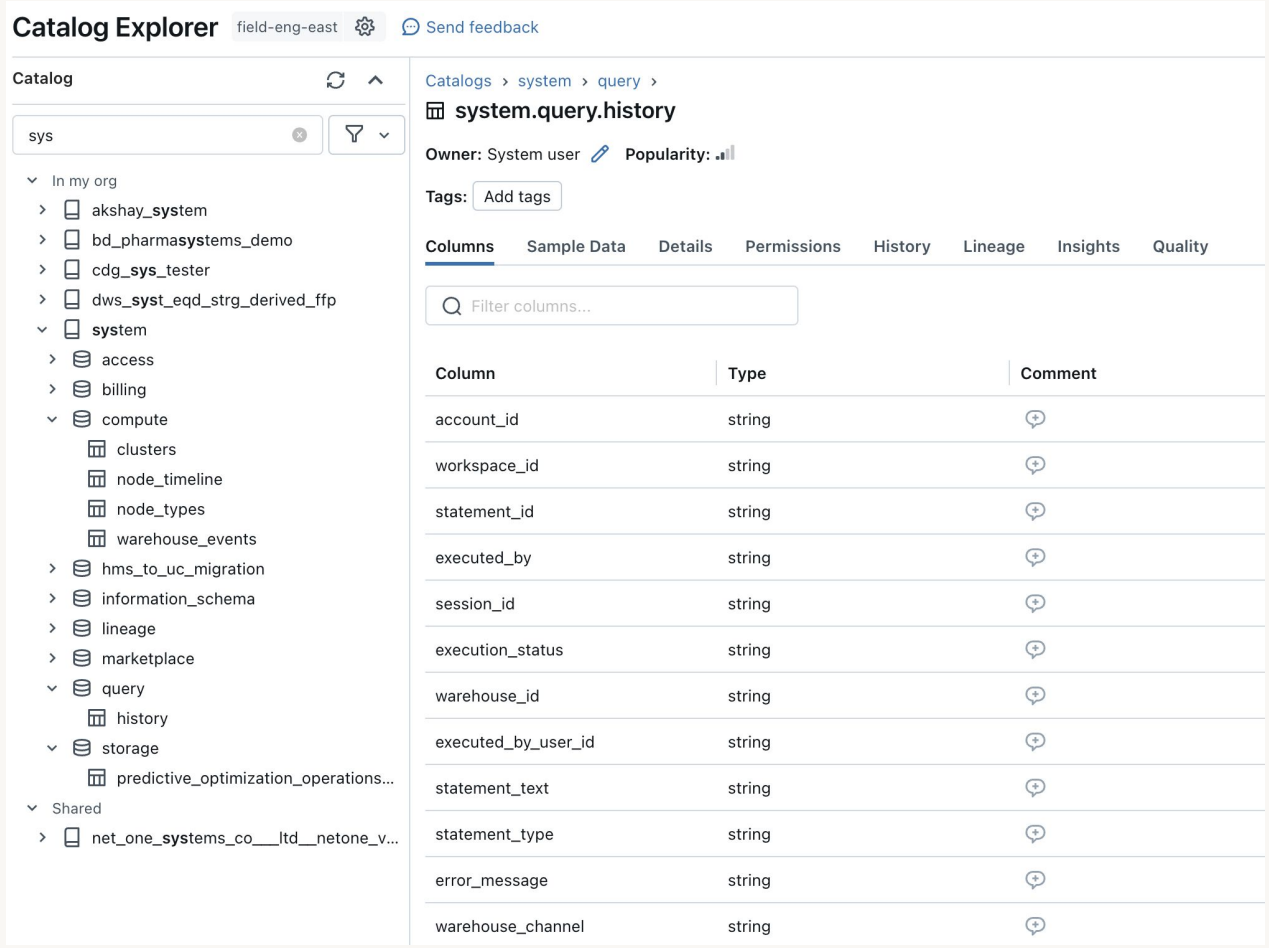
Schemas

- system.compute.clusters
- system.compute.node_timeline
- system.compute.node_types
- system.compute.warehouse_events

Query

Understand how data is being queried and by whom

- What tables/column are most frequently used ?
- How are tables being queries ?
- Who looks at what data ?



How to understand usage and costs

1. Query the Billing table to get all serverless product usage cost by workspace

2. Import the prepared account monitor dashboard

Summary and Next Steps

What we've learnt

- What Databricks SQL is
- How Databricks SQL works in the Lakehouse architecture
- How to ensure the best performance with Databricks SQL
- How Databricks SQL can help you:
  - Create tables and Query data
  - Create visualizations and dashboards
  - Integrate with AI models

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databricks | DATA INTELLIGENCE DAY

MARDI 23 AVRIL, PARIS

Une demi-journée pour découvrir la Data Intelligence Platform :

- Sessions Techniques
- Témoignages clients : RATP et Kiliba
- Networking
- Formations hands-on *(après-midi)*

AGENDA & INSCRIPTION :
https://events.databricks.com/data-intelligence-day-paris

databricks DATA INTELLIGENCE DAY

EN PRÉSENTIEL

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Découvrez la Data Intelligence Platform

MARDI 23 AVRIL, 8H30

Thank you!