DATA:Scotland 2024

Tabular Editor

DATAmasterminds

Waterstons

ADVANCING ANALYTICS

An introduction to Snowflake - the data cloud

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Agenda

- A short history
- Overview
- Snowflake as a DB
- Integrations
- Snowpark

The cloud data warehouse

- Initially a response on challenges faced by traditional RDBMS
- Massivelly Parallell Processing (MPP)
- Still a take on EDW

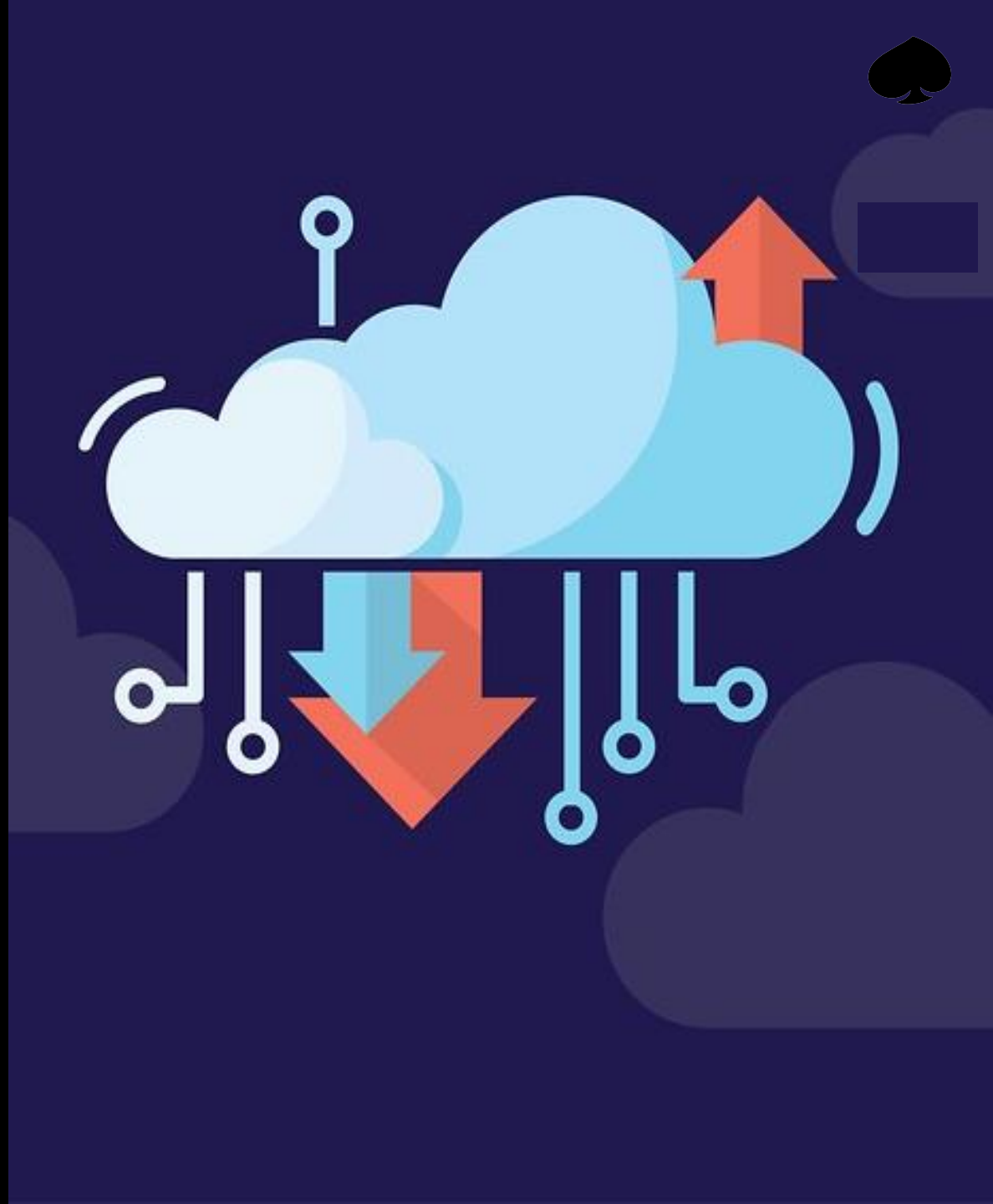
The cloud data platform

Can data lake functionality and EDW merge somehow?

Suggestions for solving the issues:

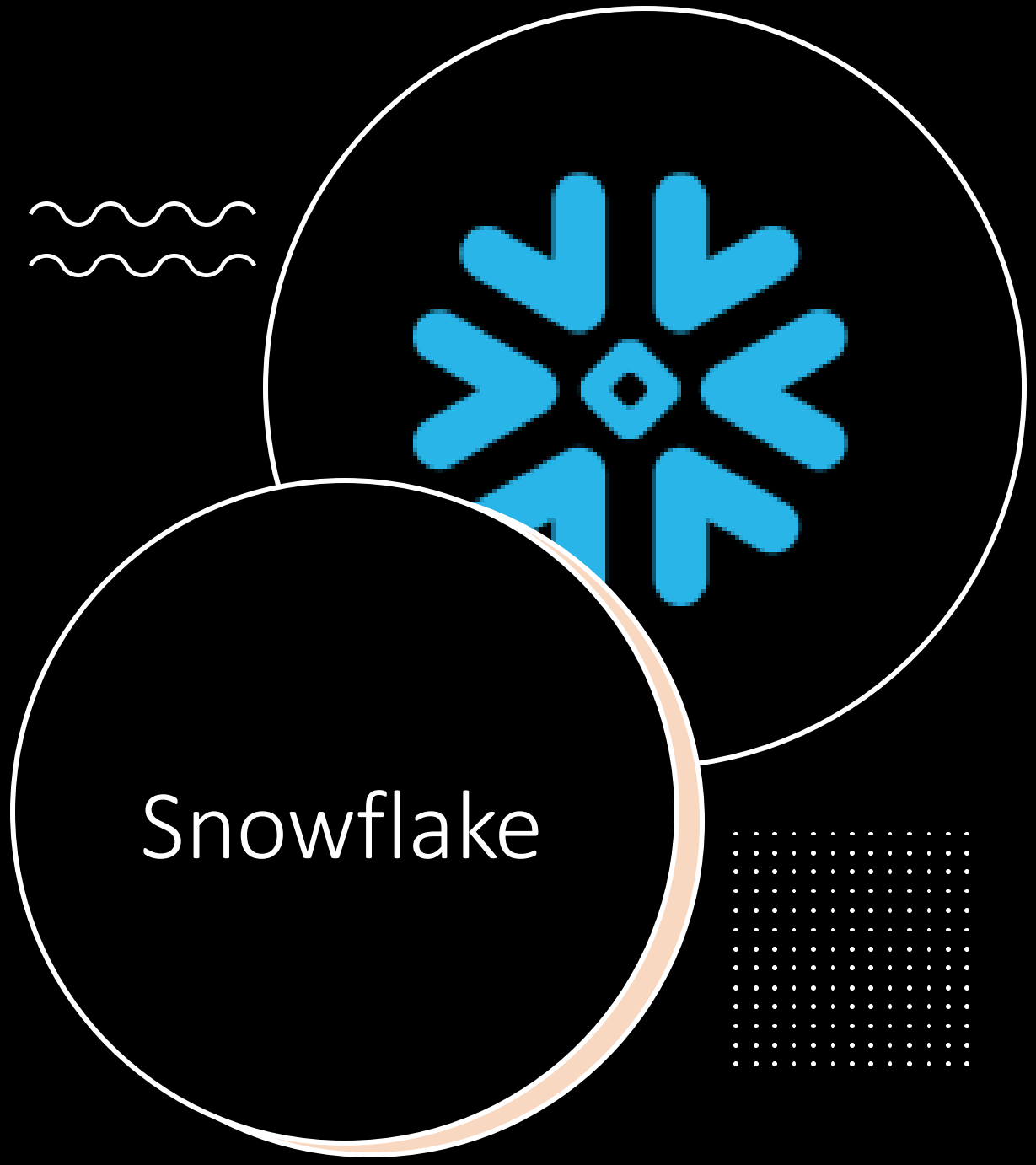
- Logical data warehouse
- Cloud data warehouse
- Virtualization

Enter the new cloud data platforms



Definition of a cloud data platform

- No longer just your Dad-a-base…
- Storage supporting diverse data types
- Compute and tools supporting diverse workloads
- Tooling for CI/CD, encryption, RBAC etc
- Data management tools



- Established in 2012
- Launched publicly in 2015
- Record IPO in 2020
- Unique architecture with fully separated storage and compute
- Based on ANSI SQL
- Started as a data warehousing service

Snowflake vs Databricks

- Snowflake comes from EDW world
- Databricks from Spark orchestration, data science and python data engineering

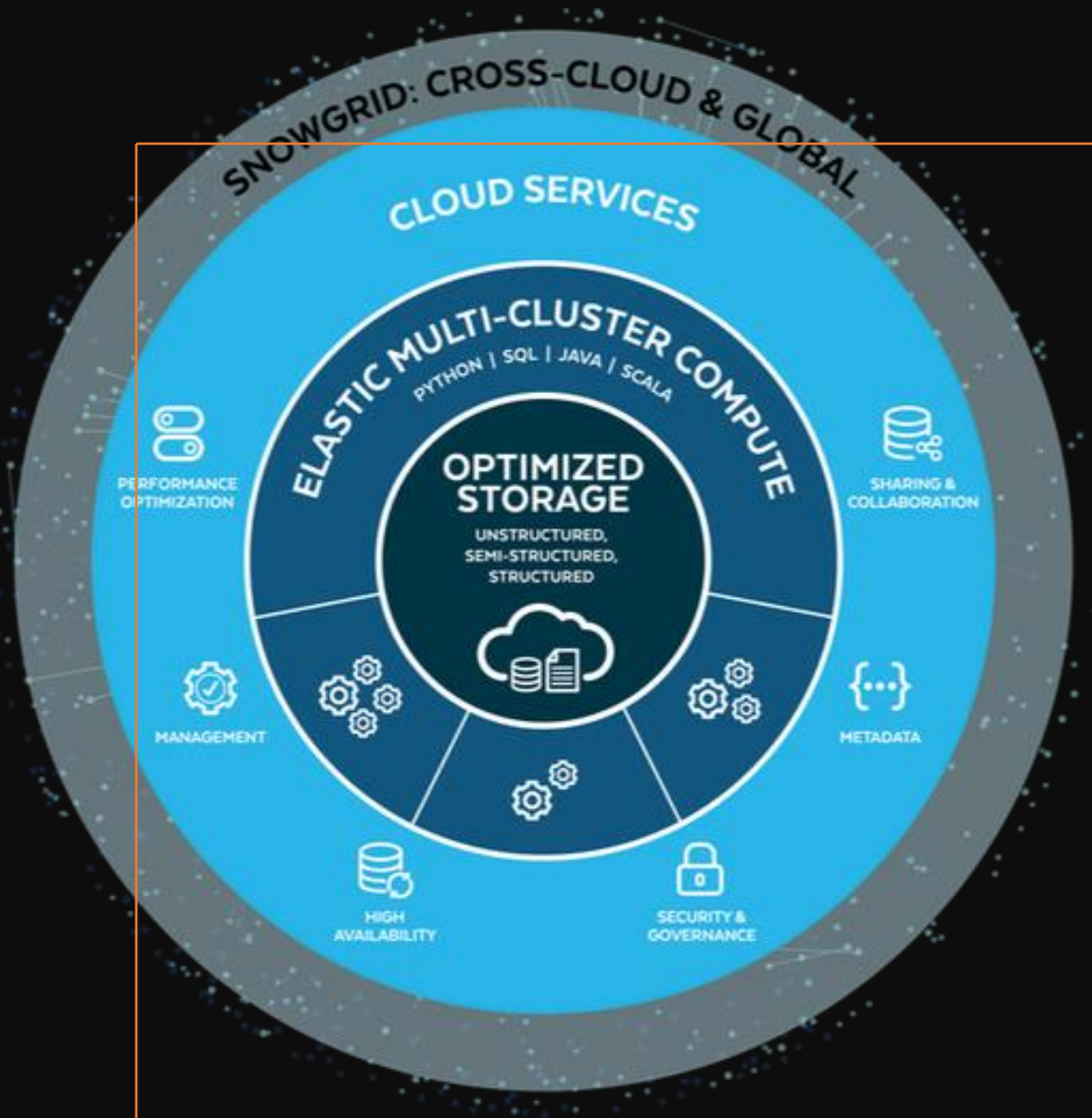
- Converge as both have added new features

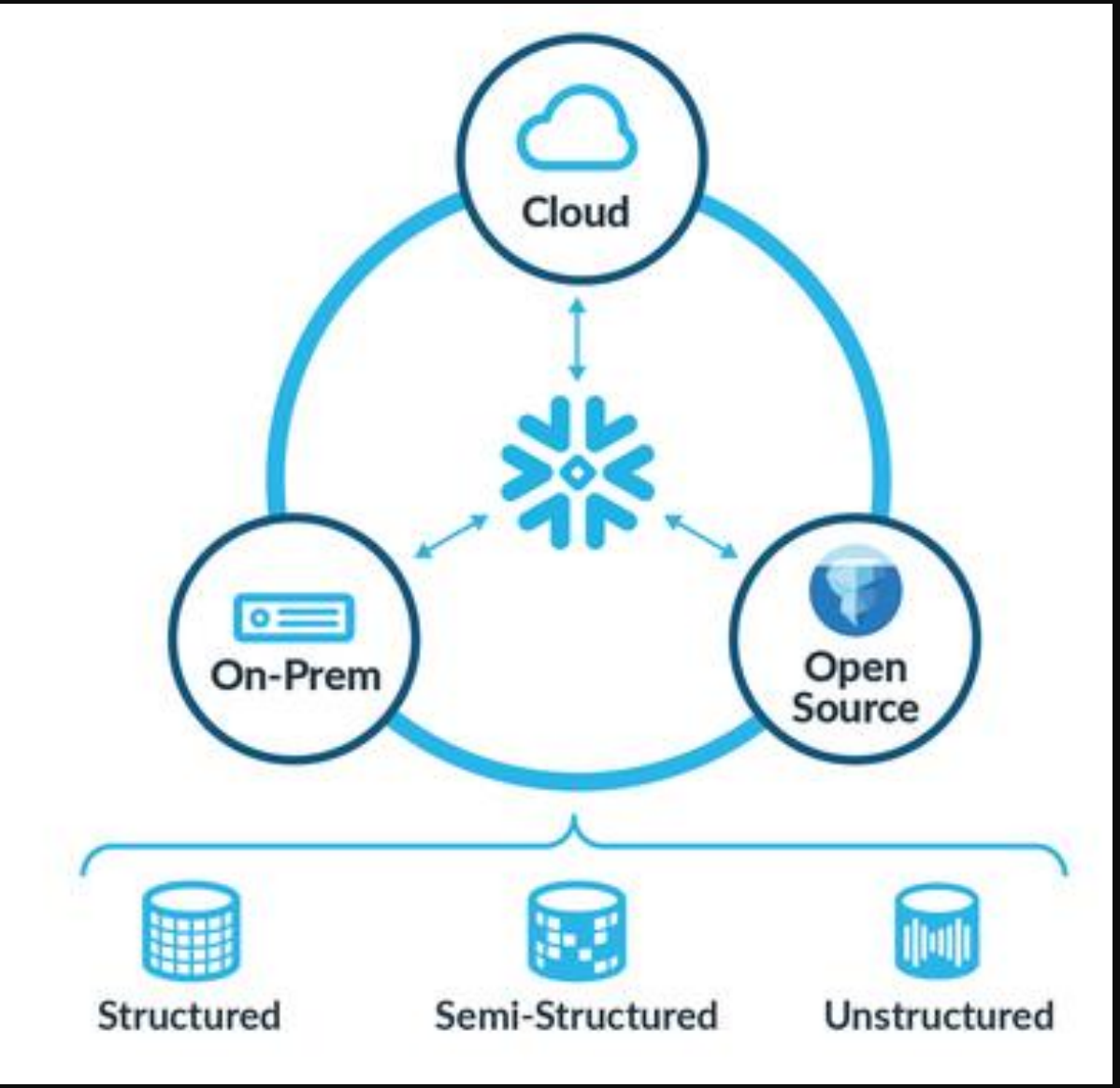
Snowflake vs Databricks

Handbags at dawn

The Snowflake Architecture

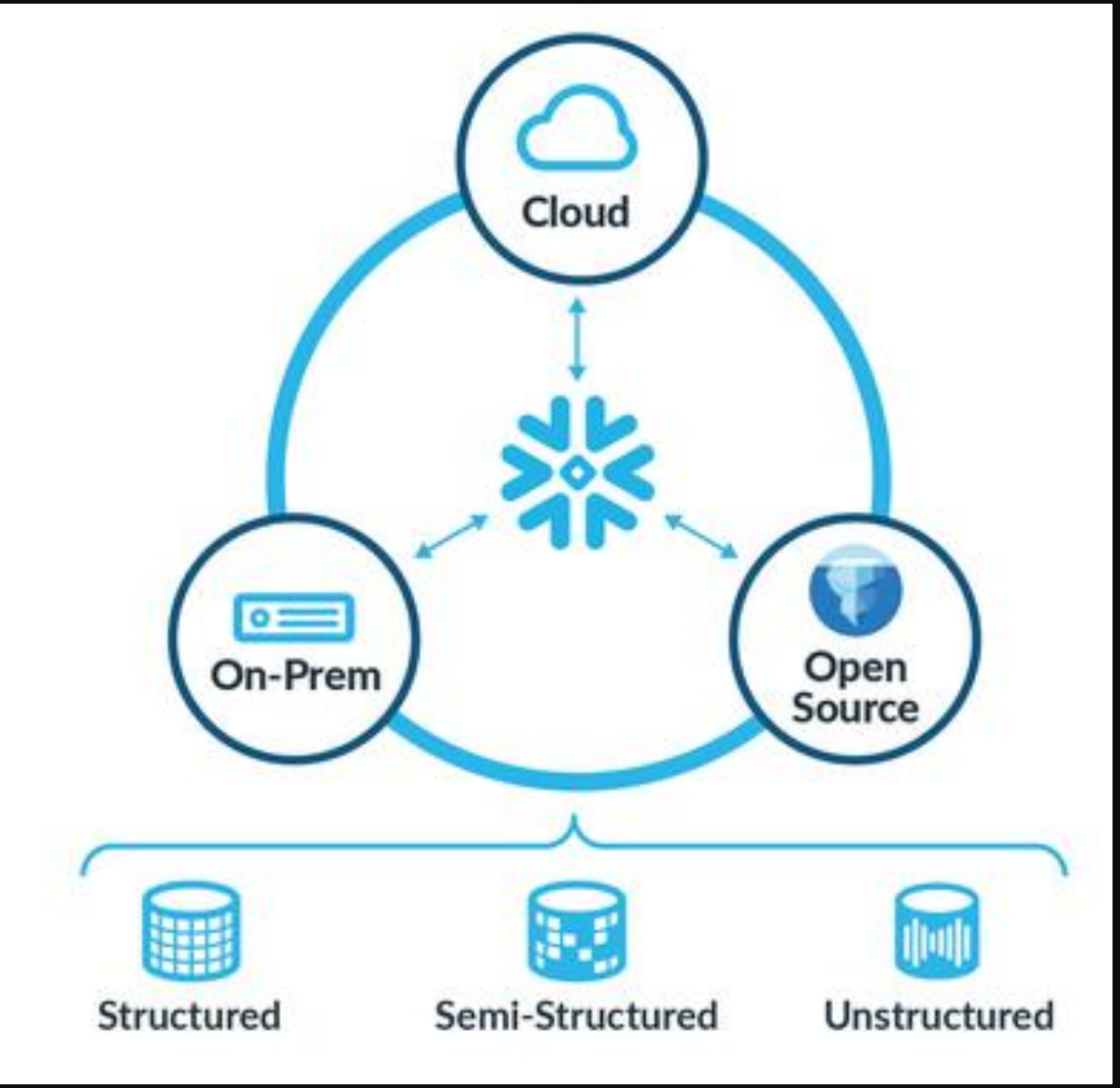
- The core Snowflake platform
  - Storage





Storage

- Databases for ACID + RDBMS
  - Automated partitioning
  - Time travel
  - Autotuned
- Internal Stage for semi- & unstructured
- External stages to on-prem & cloud



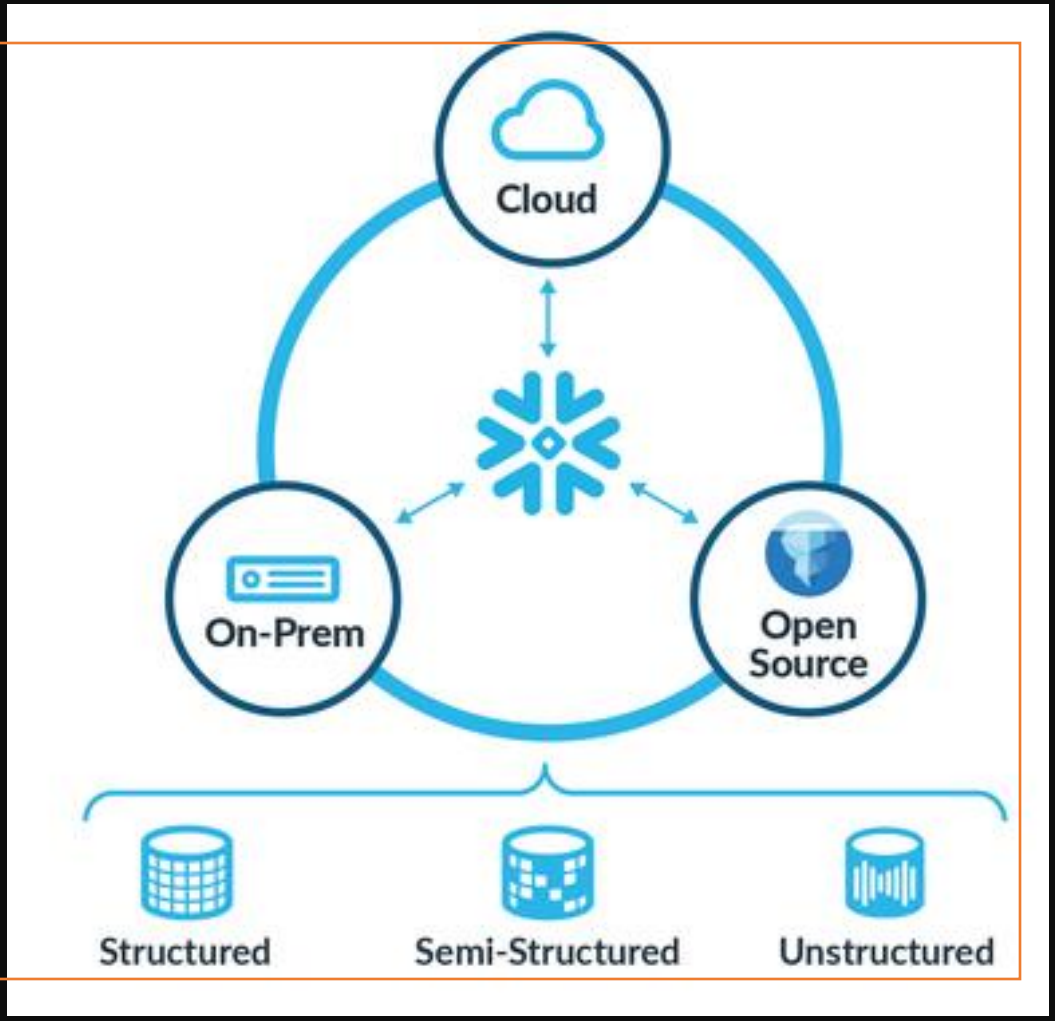
Storage

- Cloud stages support S3, GCS & ADLS
- On-prem only S3-compatible

- External stages support
  - JSON/XML/CSV…
  - Avro/Parquet…
  - Apache Iceberg
  - Delta Lake

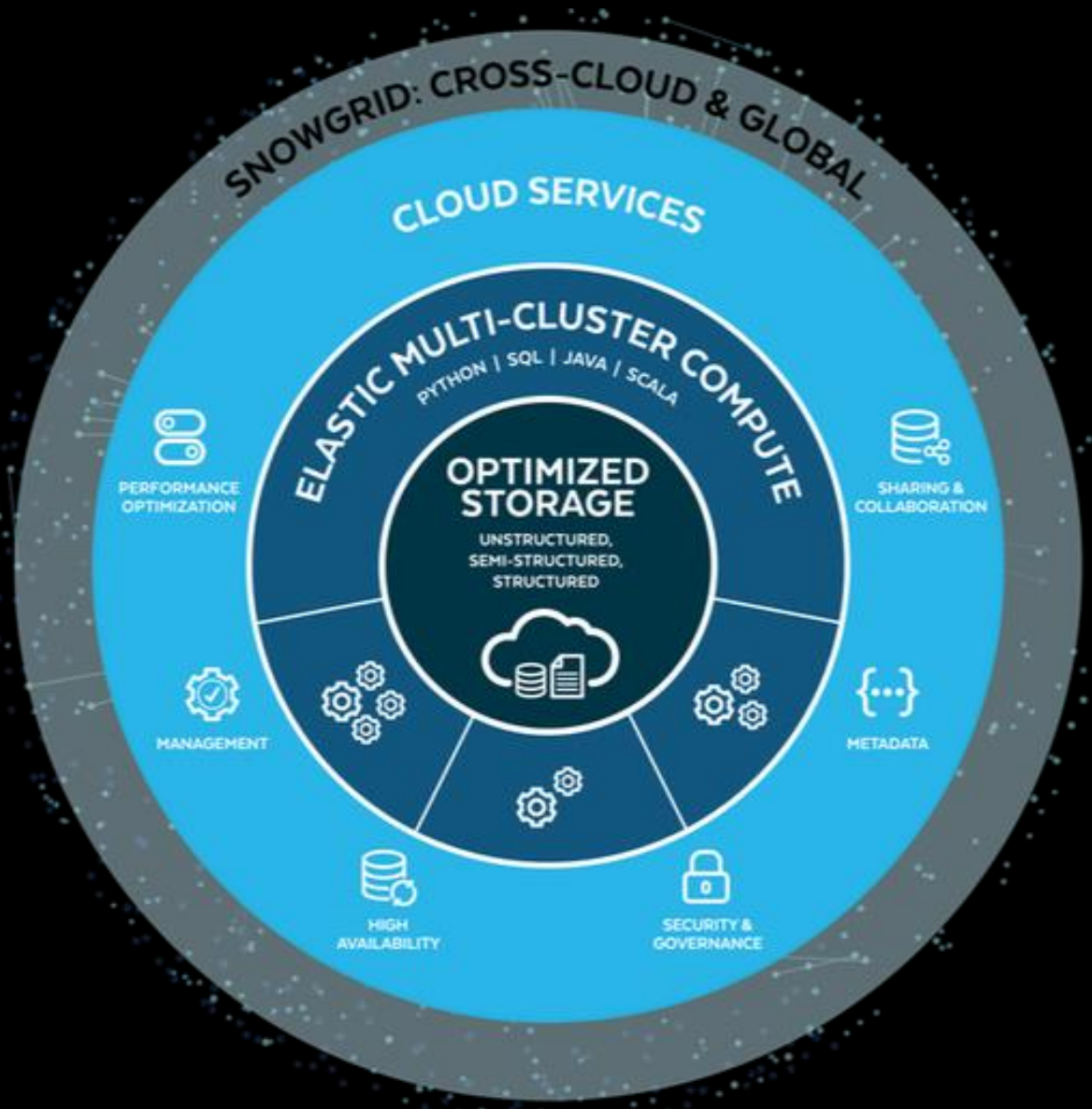
Storage

- Create External Tables
- Build materialized views on semi-structured data



The Snowflake Architecture

- The core Snowflake platform
  - Storage
  - Compute



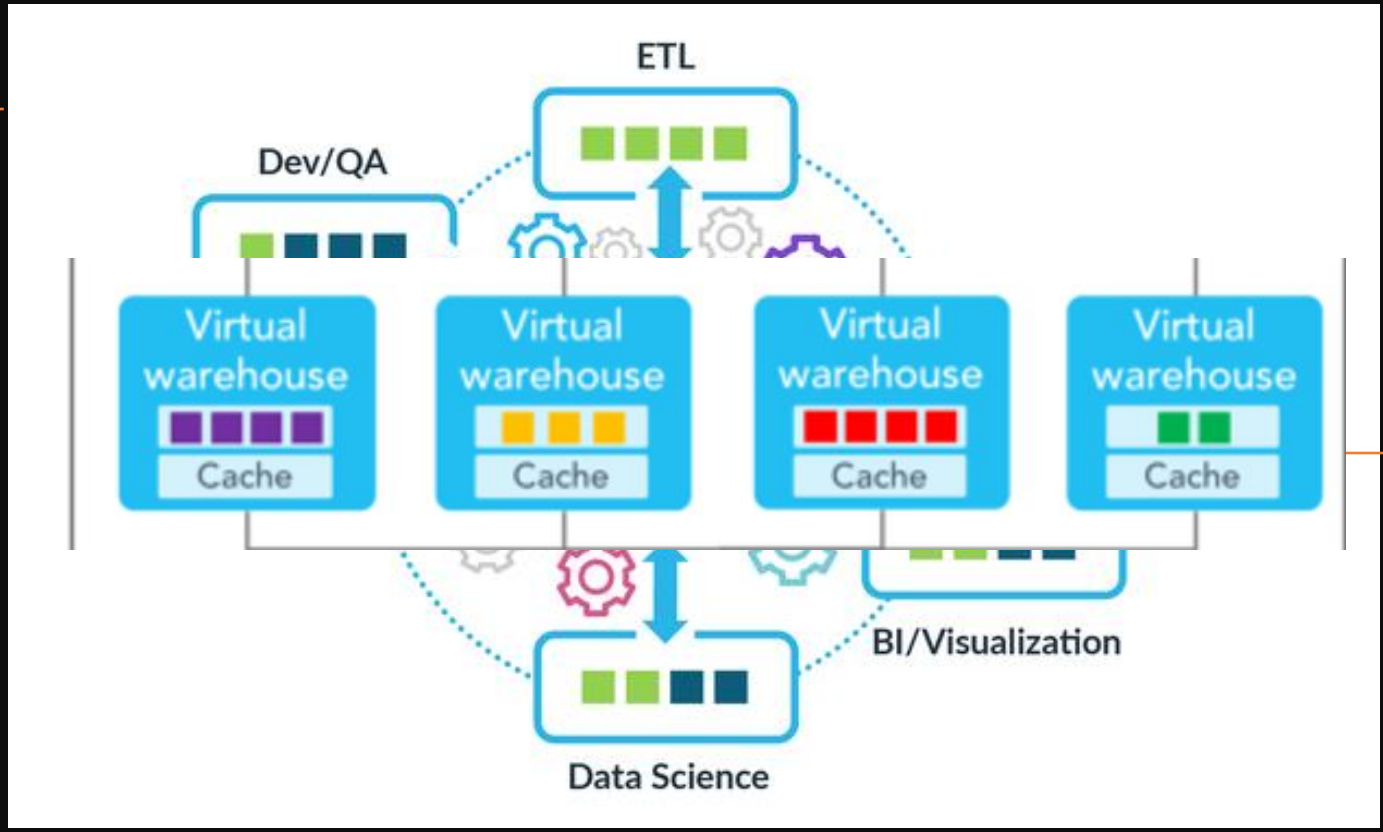
Compute

- Called warehouses
- Elastic
  - From XS -> 6XL
- 2 types
  - Normal
  - Snowpark (memory) optimized
- Auto-pause + instant restart

Compute

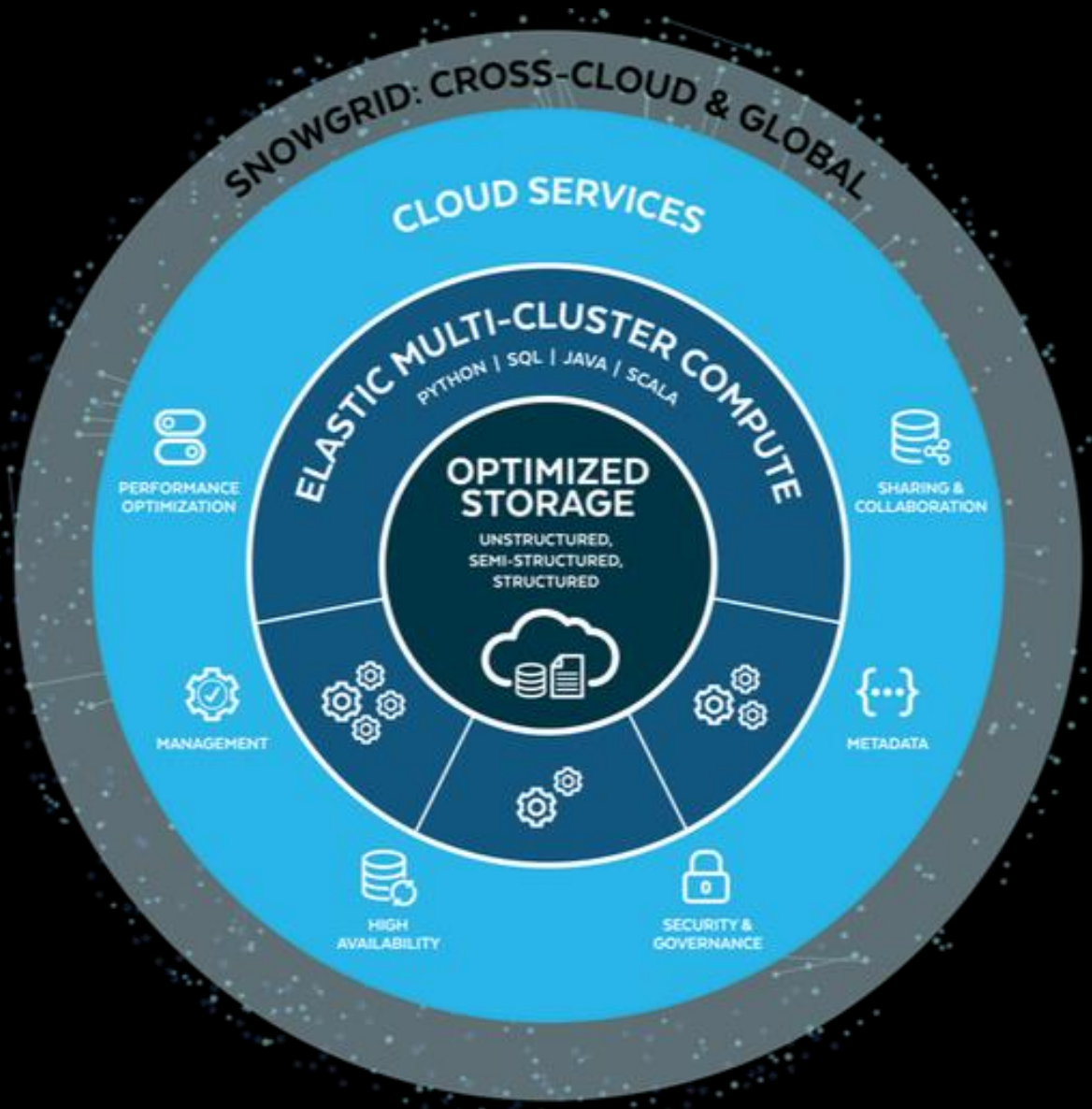
- Consists of CPU & RAM
- Cache
- Separate warehouses per usecase

- Be mindful of auto-pause = cache emptied
- Plan your usecase usage patterns



The Snowflake Architecture

- The core Snowflake platform
  - Storage
  - Compute
  - Cloud Services



Cloud Services

- The central administration and control layer
- 4 pillars
  - Maintenance & tuning
  - Administration
  - Networking & Encryption
  - Resource Manager

Cloud Services – 4 pillars

- Maintenance & tuning
- Administration
- Networking & Encryption
- Resource Manager

Cloud Services – 4 pillars

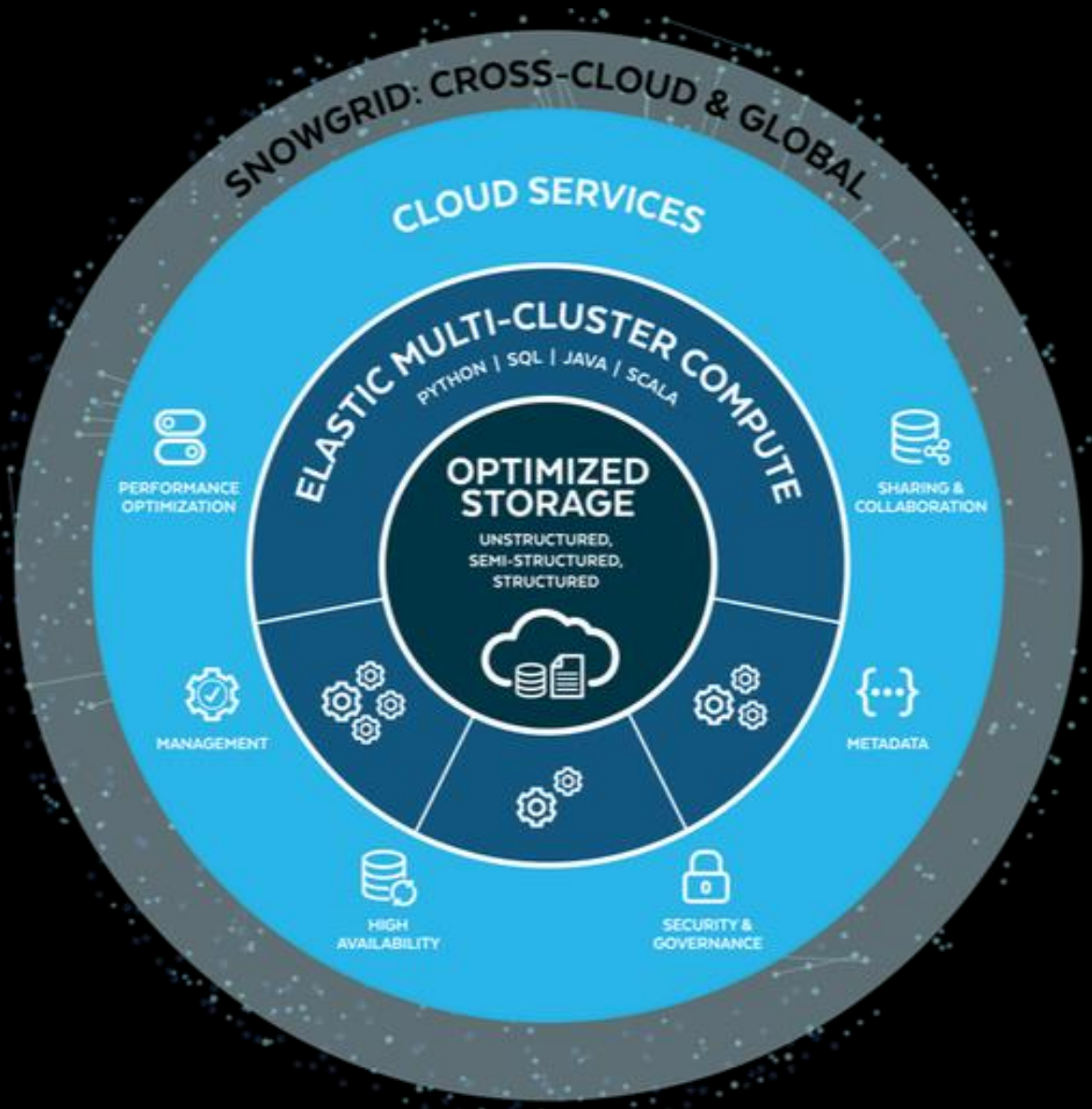
- Maintenance & tuning
- Common meta-data repository
- Snowflake is “DBA-free”
  - Auto-tuning of queries
  - Auto-partitioning
  - Auto-indexing/”Indexfree”

Cloud Services – 4 pillars

- Administration
  - Transaction manager
  - Security/RBAC
  - Authentication & Authorization
- Networking & Encryption
  - Intra-cluster
  - Cloud connectivity
- Resource Manager
  - Cluster management

The Snowflake Architecture

- The core Snowflake platform
  - Storage
  - Compute
  - Cloud Services
  - Snowgrid

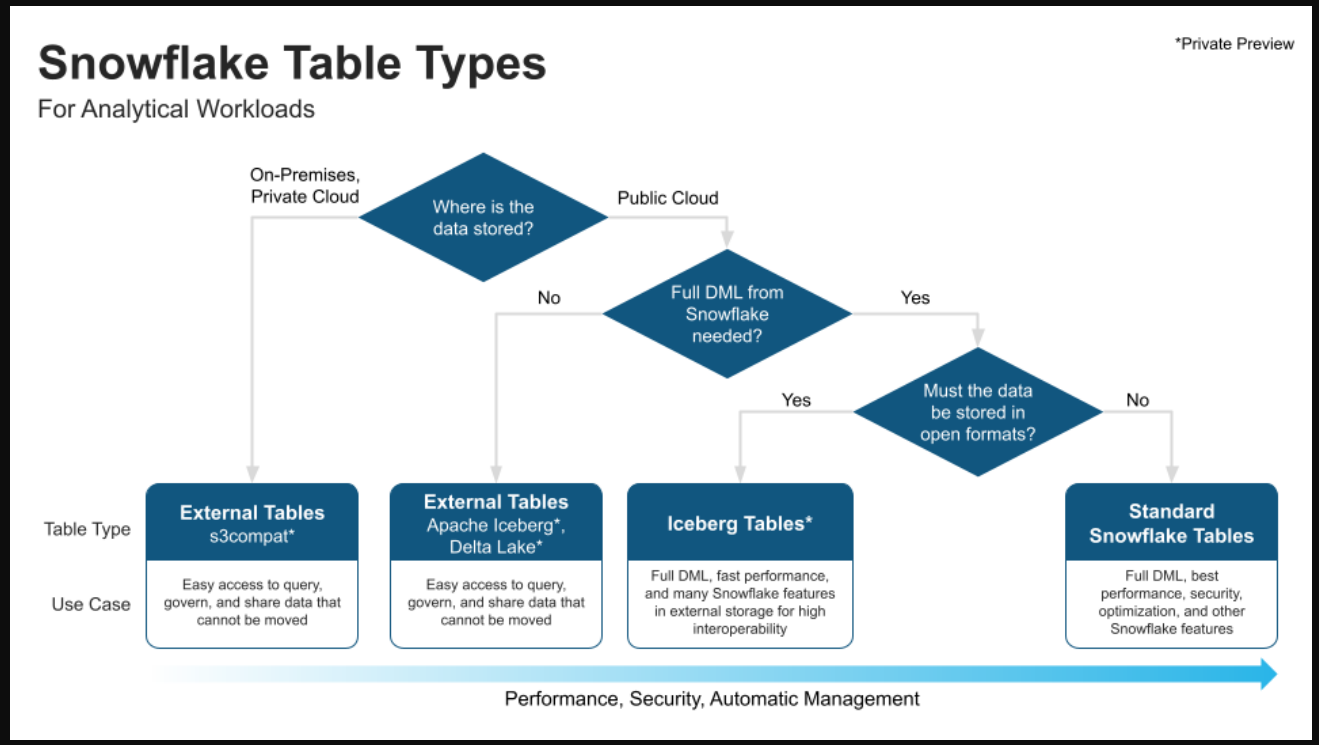


Snowgrid

- Snowgrid
  - Global Snowflake internal network
- Cloud Agnostic

Integrations

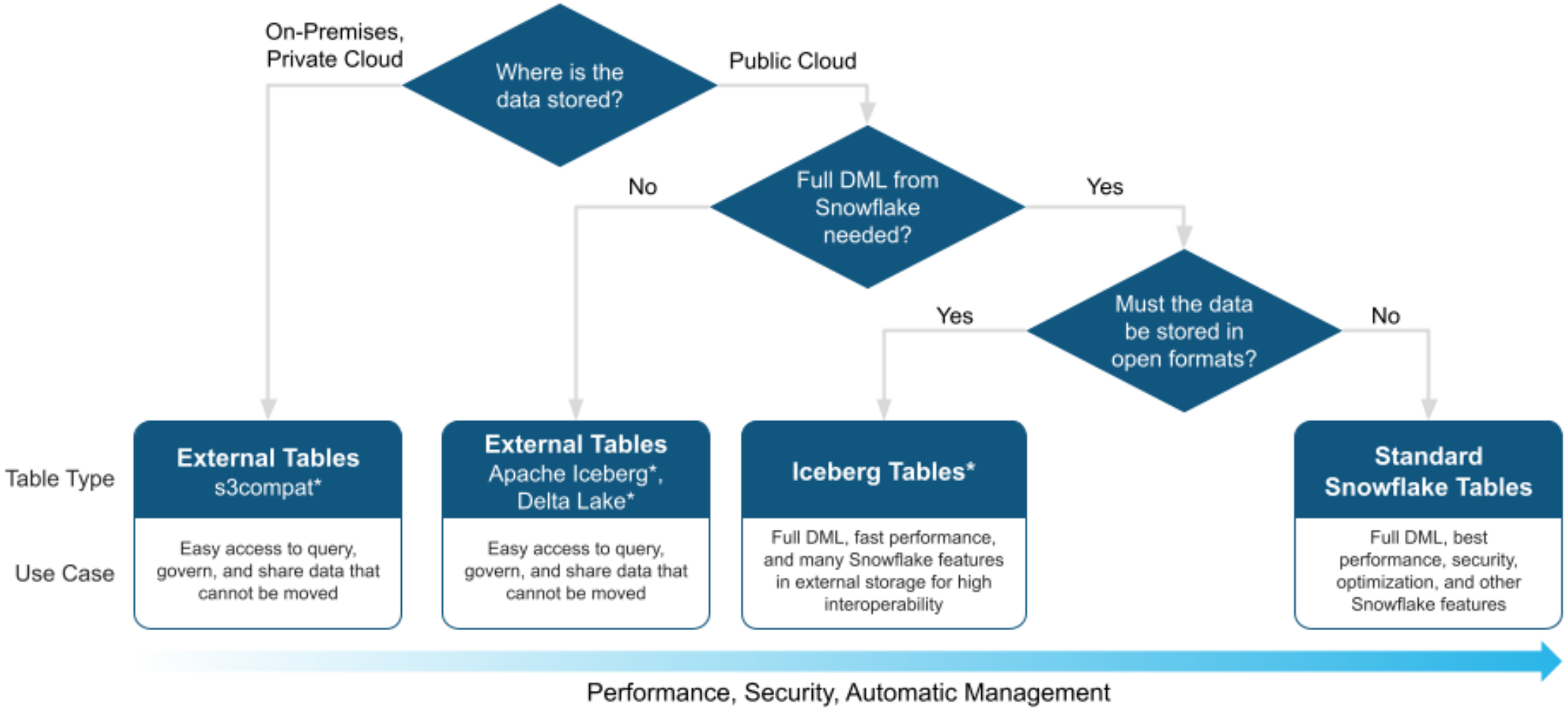
- Integration
- Stages
- External Tables
- Dynamic Tables
- Snowpipes
- Unistore



Snowflake Table Types

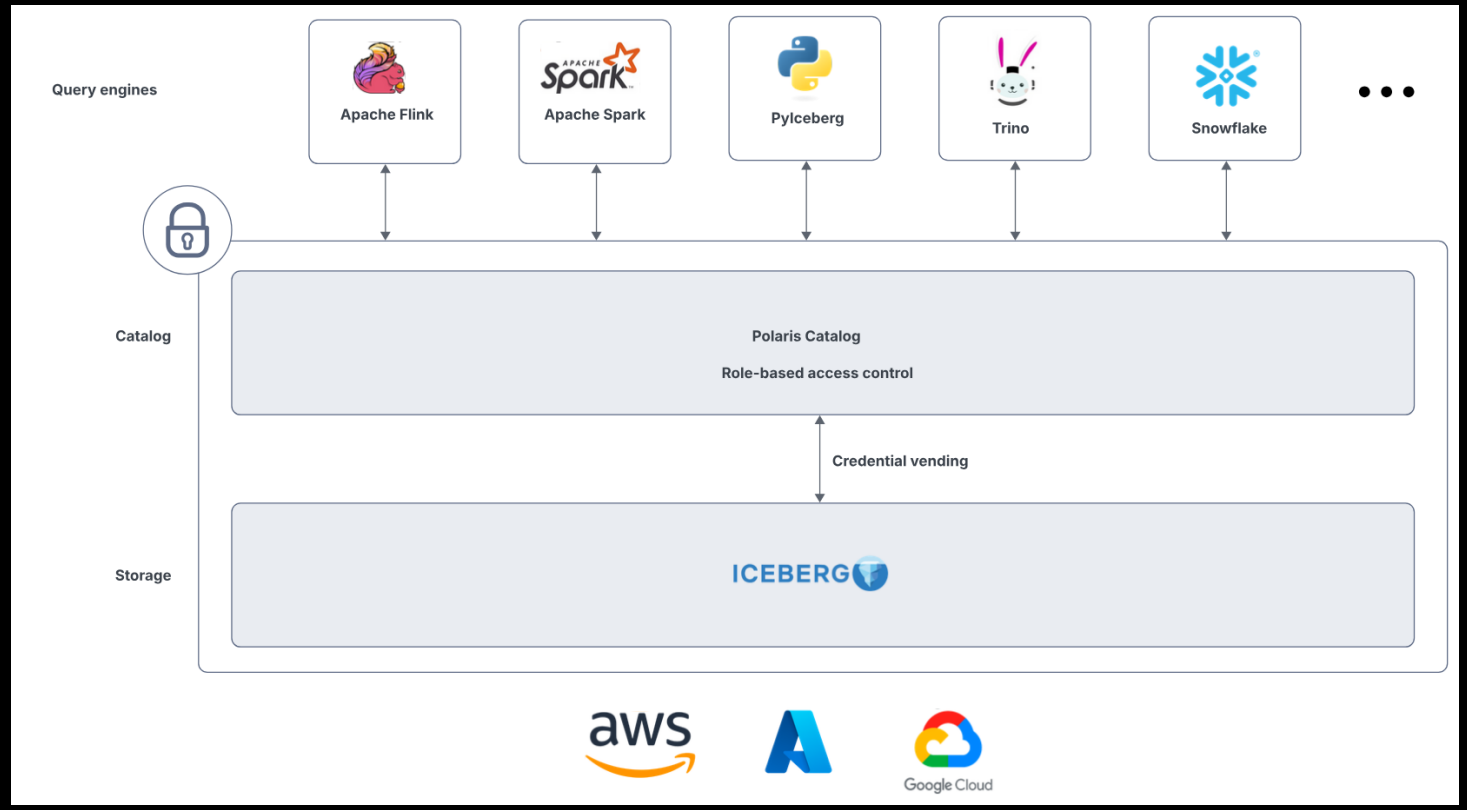
*Private Preview

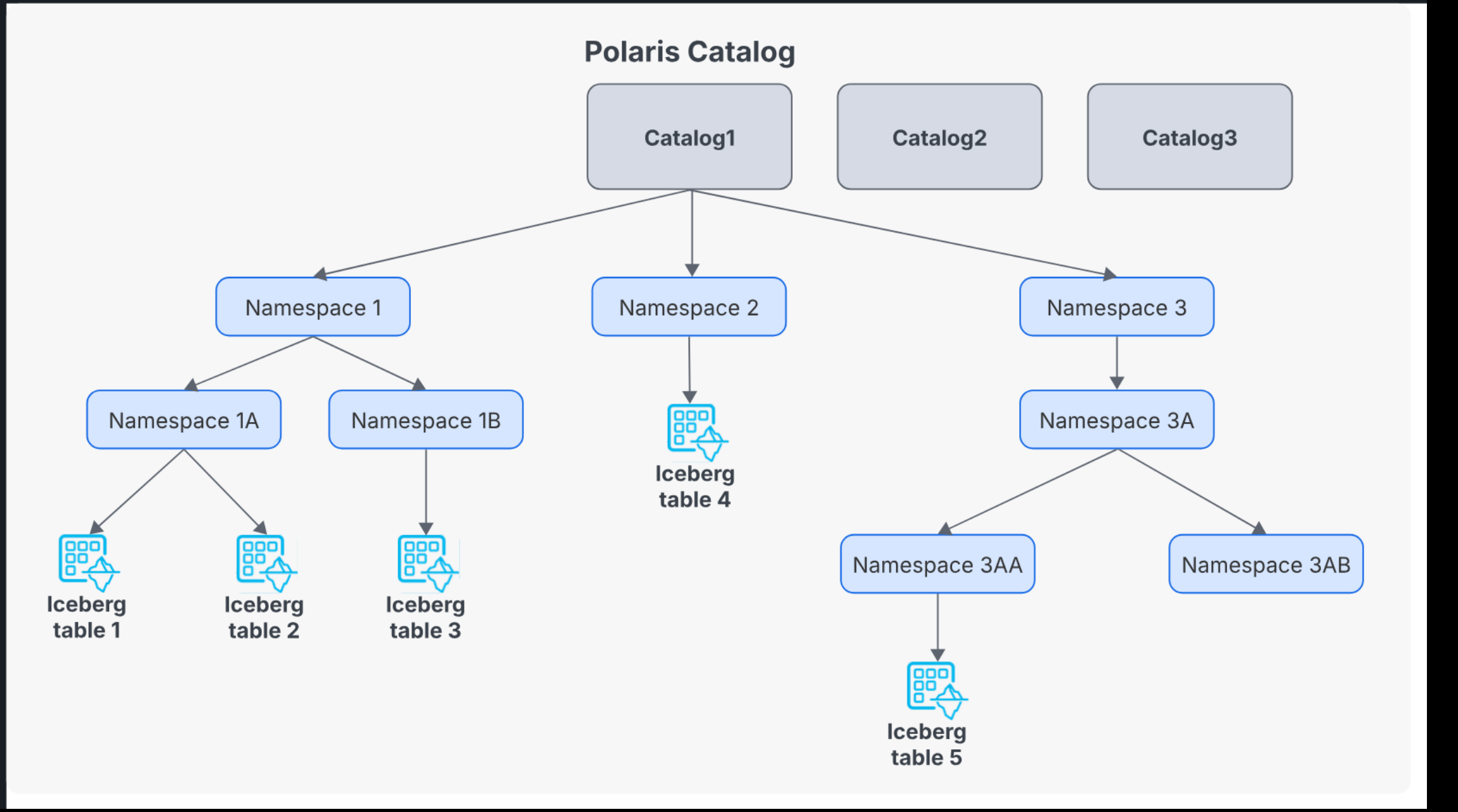
For Analytical Workloads



Polaris

- Metastore Open-sourced, announced in June
- Currently hosted on Snowflake infrastructure




Polaris Catalog
Catalog1
Catalog2
Catalog3
Namespace 1
Namespace 2
Namespace 3
Namespace 1A
Namespace 1B
Namespace 3A
Namespace 3AA
Namespace 3AB
Iceberg table 1
Iceberg table 2
Iceberg table 3
Iceberg table 4
Iceberg table 5

The Snowflake Eco-system

- Snowpark
- Streamlit

Snowpark

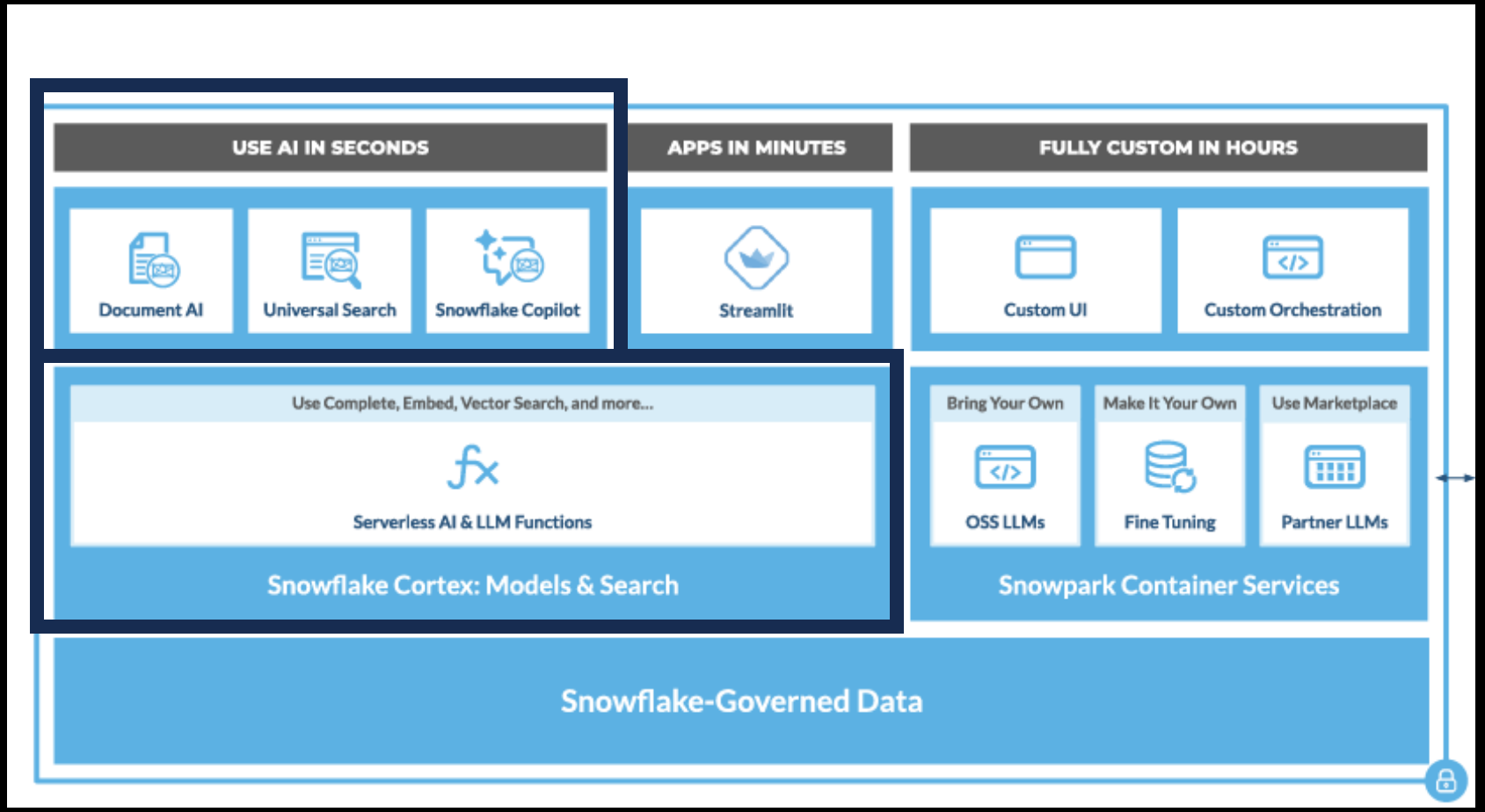
- Expands Snowflake from traditional RDBMS
- Python – offers traditional dataframe APIs
- Also ML modelling and operations APIs
- Can run inside warehouses
- Can run on containers (Snowpark Container Services)
- Now also notebook experience

Streamlit

- Company aqcuired by Snowflake 2022
- Build interactive apps with Python that runs on Snowflake
- Web apps, widgets – with unique URLs that can be shared

But what about Gen AI?

- Cortex
- Fully managed service for building and running AI applications
- Llama + Snowflake LLMs
- Vector functionality



The Snowflake Marketplace

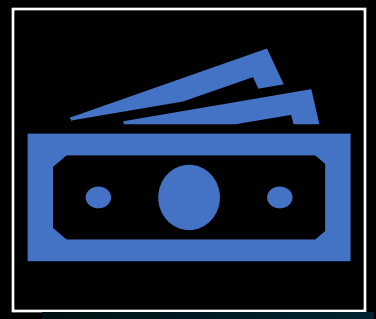
- From the consumer
  - Search, discover and sample datasets globally
  - Access datasets – some free, some commercial
  - No need to run ETL processes to fetch data
  - Directly start querying the data inside own account
  - Can combine internal and marketplace data

The Snowflake Marketplace

- From the producer
  - Share data with users outside your organization
  - This done through listings
  - Listings can be global or limited to select users/organizations
  - Datasets can be a one-off, an update or stream.
  - No special development needed
  - Listings can be private, free or paid

So what about cost?

- Pricing tiers
- Pricing models



Pricing tiers

Standard

Enterprise

Business Critical

Virtual Private Snowflake

Your standard service – single cluster, multi-warehouse
1 day time travel
data marketplace and exchange

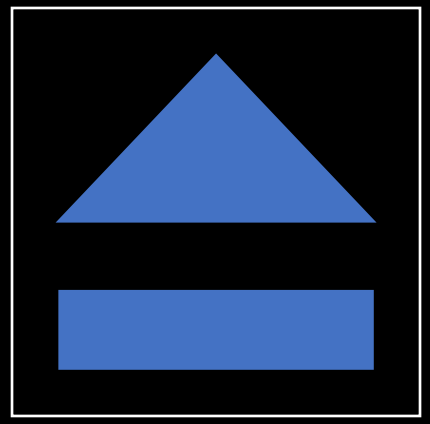
Standard+ Multi-cluster warehouse
90 day time travel
Annual rekey of encrypted data
Materialized views, Dynamic Datamasking, Search Optimization

Enterprise+ HIPAA support, PCI Compliance
Tri-Secret Secure w/CMK
AWS Private Link support
DB Failover and Failback, AWS API Gw Private Endpoint support

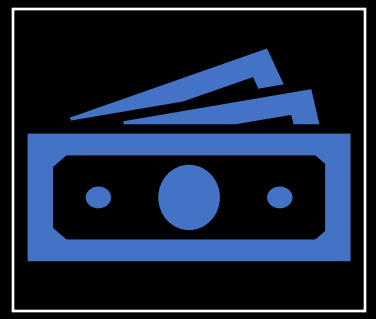
Business Critical+
Customer Dedicated Virtual Servers w/encryption key in memory
Customer Dedicated Metadata store

Pricing

Pay as you go



Pre-purchased



Pricing model

Snowflake Credit – the base of cost in Snowflake pricing.
Real price depends on pricing tier ($2.6/$3.9/$5.2)

Separate pricing for storage, compute and Cloud Services.

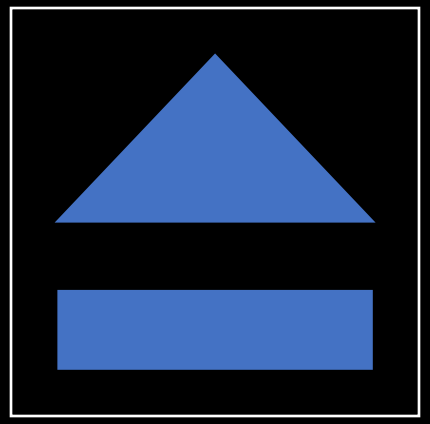
Storage - $40 per Terabyte per Month

Compute starts at 1 credit for XS Warehouse -> 512 Credits for 6XL
Snowpark Optimized starts at 6 for M Warehouse -> 786 Credis for 6XL

Cloud Services based on workload – but up to 10% of daily credits included free

Additional prices for data transfer to other cloud providers or within same provider but different country or continent

Prices shown are guidance only – based on Snowflake list prices for Azure West-Europe pr November 2023



Pre-purchased

Capacity Storage is at $23 per Terabyte / Month

Compute & Cloud Service price depends on size of commitment + time of purchase ++

Prices shown are guidance only – based on Snowflake list prices for Azure West-Europe pr November 2023

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Session Feedback

Event Feedback

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President – MDPUG Oslo
Frequent voulenteer in general

When not geeking out over new tech

Teaching coeliacs how to bake gluten free
Baking
Hiking
Gardening