



# The Single Product Approach

**Supporting Diverse Workloads in Snowflake**

Jiaqi Yan, Principal Software Engineer

# DISCLAIMER

Other than statements of historical fact, all information contained in the presentations and accompanying oral commentary made available as part of this event (collectively, the “Materials”), including statements regarding (i) Snowflake’s business strategy and plans, (ii) Snowflake’s new or enhanced products, services, and technology offerings, including those that are under development, (iii) market size and growth, trends, and competitive considerations, and (iv) the integration, interoperability, and availability of our products with and on third-party platforms, are forward-looking statements. These forward-looking statements are subject to a number of risks, uncertainties and assumptions, including those described under the heading “Risk Factors” and elsewhere in the Quarterly Reports on Form 10-Q and Annual Reports on Form 10-K that Snowflake files with the Securities and Exchange Commission. In light of these risks, uncertainties, and assumptions, the future events and trends discussed in the Materials may not occur, and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements. As a result, you should not rely on any forwarding-looking statements as predictions of future events.

Any future product or roadmap information (collectively, the “Roadmap”) is intended to outline general product direction; is not a commitment, promise, or legal obligation for Snowflake to deliver any future products, features, or functionality; and is not intended to be, and shall not be deemed to be, incorporated into any contract. The actual timing of any product, feature, or functionality that is ultimately made available may be different from what is presented in the Roadmap. The Roadmap information should not be used when making a purchasing decision. Further, note that Snowflake has made no determination as to whether separate fees will be charged for any future products, features, and/or functionality which may ultimately be made available.

The Materials may contain information provided by third-parties, including those participating in this event. Snowflake has not independently verified this information, and usage of this information does not mean or imply that Snowflake has adopted this information as its own or independently verified its accuracy.

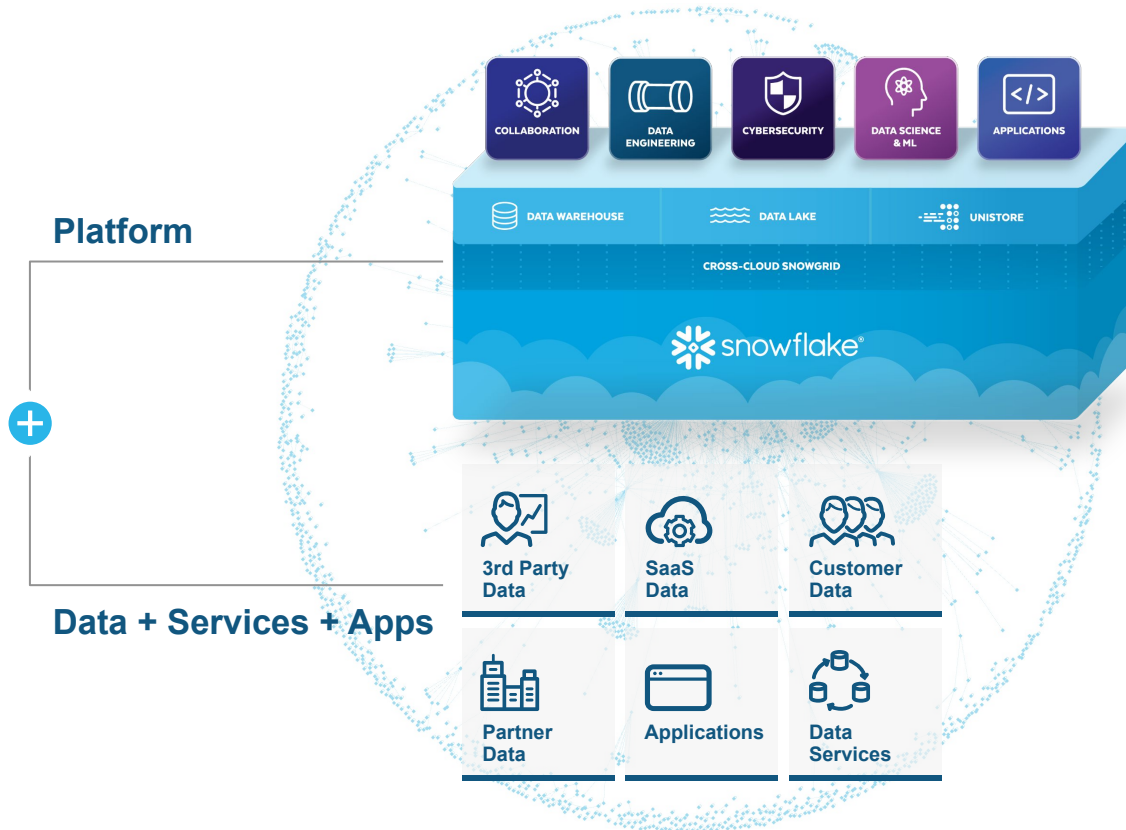
© 2022 Snowflake Inc. All rights reserved. Snowflake, the Snowflake logo, and all other Snowflake product, feature and service names mentioned in the Materials are registered trademarks or trademarks of Snowflake Inc. in the United States and other countries. All other brand names or logos mentioned or used in the Materials are for identification purposes only and may be the trademarks of their respective holder(s). Snowflake may not be associated with, or be sponsored or endorsed by, any such holder(s).



# Agenda

- > Snowflake Overview
- > The Single Product Principle
- > Workload Deep Dives
- > Conclusion

# Elements of the Data Cloud



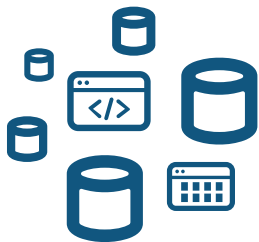
# The Single Product Principle

- Build a singular product, instead of multiple products
- Consistent User Interfaces and User Experience across product features
- Consistent Concepts and Syntaxes
- Consistent Globally, across all Clouds
- Unified Billing Model and Business Model
- Unified Data Governance and Security Model

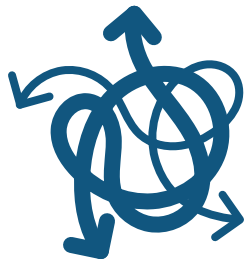


# Data Applications

# For Enterprise Architects, Platform Teams and App Developers Challenged by



**Too many  
disparate systems**



**Slow and painful  
data movement**



**Delayed access to data  
stunting innovation**

# Unistore

A modern approach to working with transactional and analytical data together in a single platform



**Single Dataset**



**Transactional Workloads**



**All in Snowflake**





# Hybrid Tables

New, Easy-to-Use Feature

```
CREATE HYBRID TABLE CustomerTable (  
  customer_id int primary key,  
  full_name varchar(256),  
  ...  
)
```

**Excellent performance** for both operational and analytical queries

**Supports critical OLTP features** including unique keys, indexes, & referential integrity constraints

**Integrates seamlessly** with existing Snowflake tables

**It just works!** Simple to use, while masking powerful functionality



# SNOWFLAKE ARCHITECTURE

## Cloud Services

### Authentication and Access Control



Infrastructure Manager



Optimizer



Security

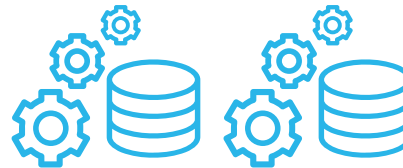


Metadata Manager

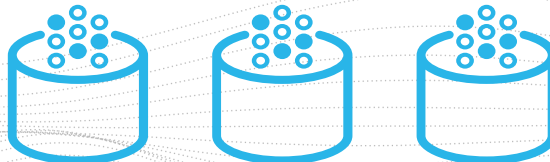
## Query Processing



### Virtual Warehouses



## Columnar Storage



# UNISTORE ARCHITECTURE

Cloud  
Services

## Authentication and Access Control



Infrastructure Manager



Optimizer



Security



Metadata Manager

Query  
Processing



Virtual  
Warehouses



Row  
Storage



# UNISTORE ARCHITECTURE

Cloud Services

## Authentication and Access Control



Infrastructure Manager



Optimizer



Security



Metadata Manager

Query Processing



Virtual Warehouses



Row Storage



Columnar Storage

# SINGLE PLATFORM

Change what's possible: transactional and analytical data together in one place



**Transactional Workloads**



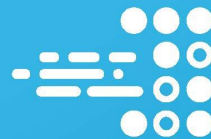
**Analytics on Transactional Data**



**All in Snowflake**



 snowflake®

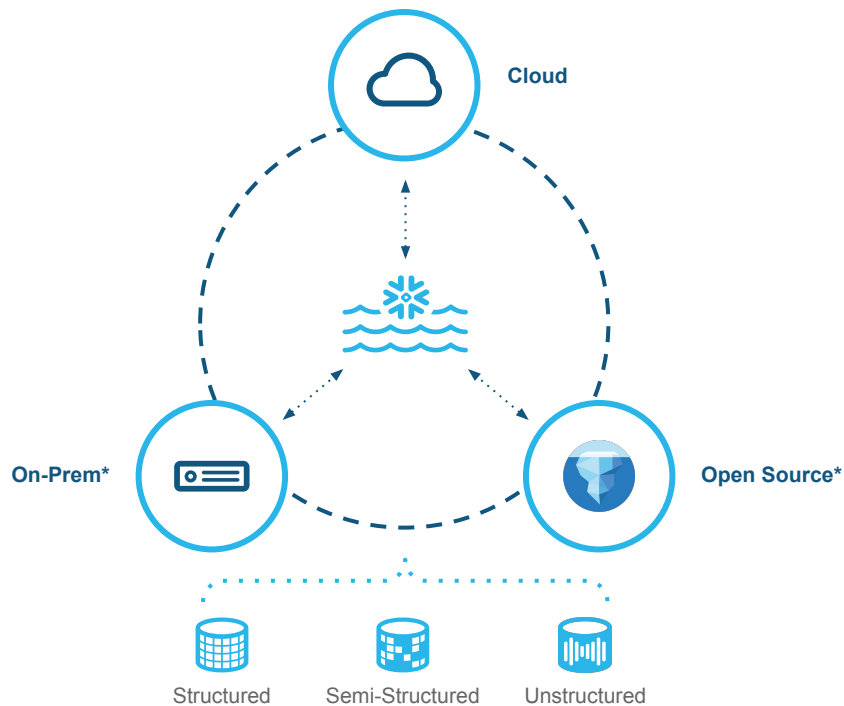


**UNISTORE**

Powered by a single dataset

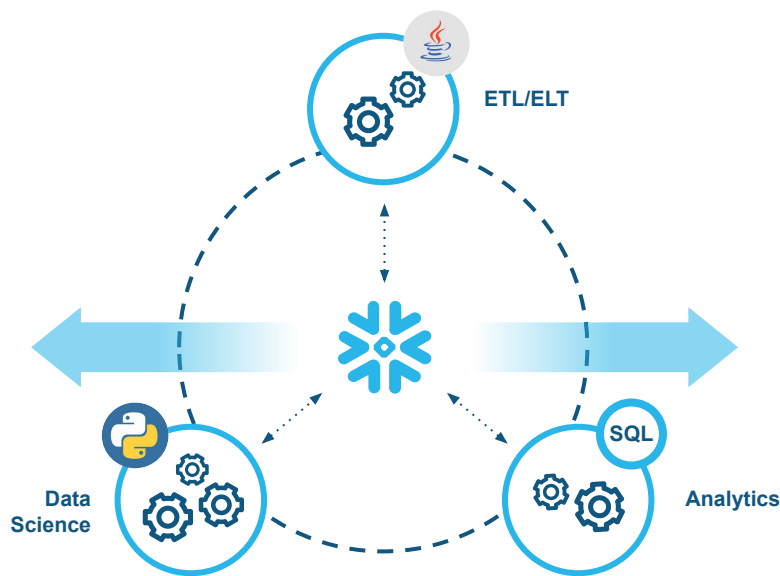
# Data Lake

# Seamlessly Bring Data Together in One Place



- **Un-siloed Access to Data**  
Bring together unstructured, semi-structured, and structured data and scale on demand to near-infinite data volumes.
- **Easily Manage Data at Scale**  
Automate micro-partitioning, clustering, compression, time travel, and encryption to ensure fast and efficient at any scale.
- **Flexibility & interoperability**  
Adapt to changing architectural patterns, including data mesh, and seamlessly connect with data on-premises or in open table formats.

# Fast Processing Engine with No Operational Overhead



## > Scalable Compute

Support a virtually unlimited number of concurrent users and queries with near-unlimited, dedicated compute resources.

## > Reliable Pipelines

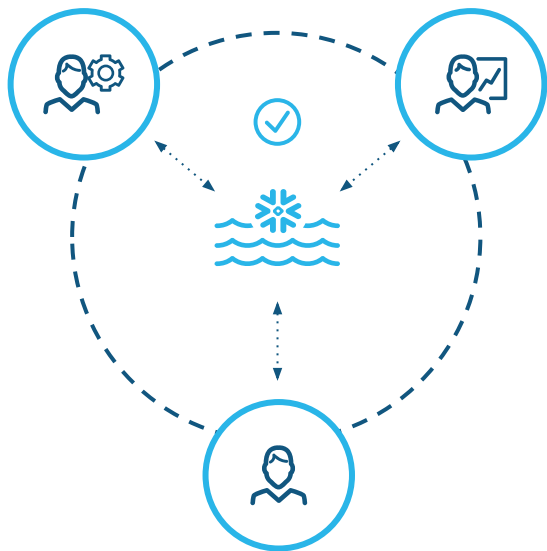
Run pipelines with Snowflake's elastic processing engine for reliable performance, cost savings, and near-zero maintenance

## > Language of Choice

Streamline pipeline development using SQL or customer's language of choice with Snowpark—no additional clusters, services, or copies of data to manage.



# Easily Govern All Data and Enable Secure Collaboration



- **Scale Governance Efforts**  
With flexible role-based policies, enforce row and column-level security dynamically, eliminating the need to manage multiple versions of the same data.
- **Confidently Protect Sensitive Data**  
Track sensitive data for compliance with Object Tagging and Access History. Protect sensitive data with Dynamic Data Masking.
- **Enrich Your Data Lake**  
Enable collaboration among internal and external stakeholders, and even enrich your data lake, with live, secure data sharing.



# Data File Formats



Storage formats store data, in files somewhere, in a specific way.

## Pros

- Easy to read and write
- Compressed for optimized storage cost
- Use with any tools & clouds
- Describes what is in the file (not CSV)

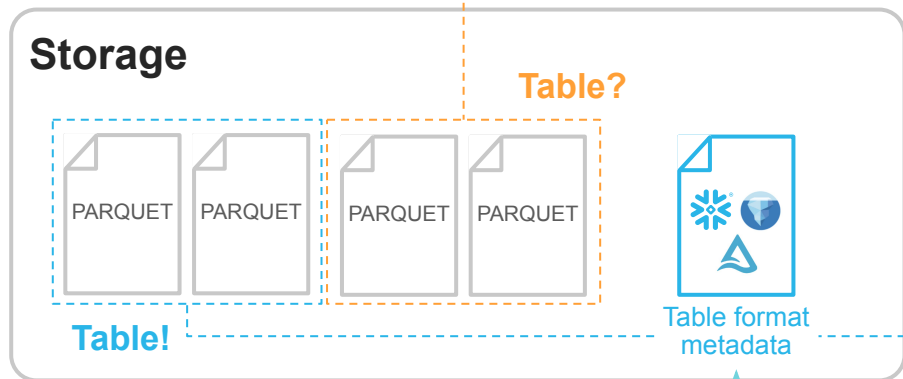
## Cons

- Can be messy to manage
- Takes time to import and export into structure / tables
- Different tools may work with the files differently
- File formats **do not**:
  - Describe how the files fit together
  - Support ACID\*



# What are table formats?

Provide data warehouse capabilities to files



Compute



## The Challenges

Tools need to know which files correspond to which tables.

Users want good performance, and to know how tables change over time.

## Table Formats Help

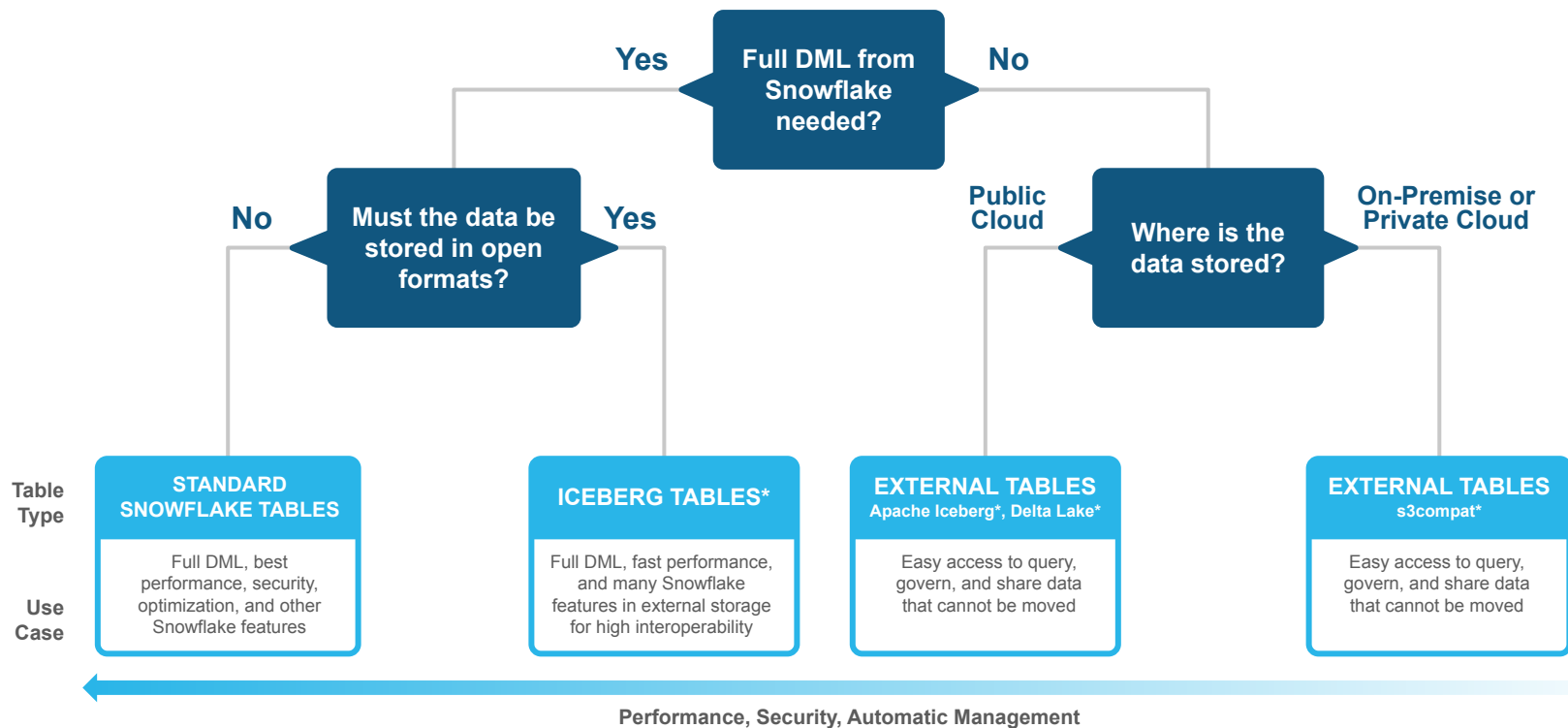
Table formats define the schema and metadata of a table along with the list of files inside of a table.

## Unlocks Use

Multiple tools get ACID-compliant transactions for DML operations on tables inside of cloud object storage along with time travel and schema evolution.

# Snowflake Table Types

For analytical workloads



# Iceberg Tables in Snowflake

New table type in Snowflake that combines the Snowflake platform with Apache Iceberg



## 1<sup>st</sup> CLASS TABLE

Iceberg tables offer the same management, DML, and CRUD as internal tables with similar performance



## FULL PLATFORM

Snowflake platform features just work (encryption, replication, governance, compaction, marketplace, clustering etc.)

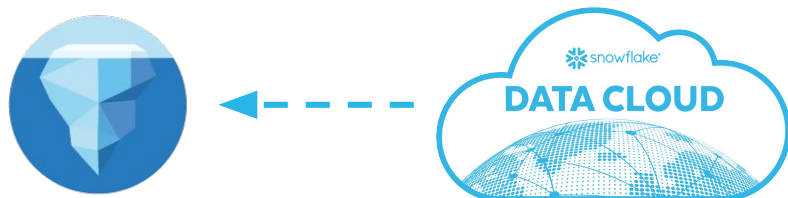


## INTEROPERABLE

Iceberg tables use Iceberg metadata and Parquet file data inside of customer storage buckets

# External Tables For Apache Iceberg

Easily query Iceberg tables with  
Snowflake External Tables



Snowflake can query data in place,  
*without* moving the table data or  
existing metadata

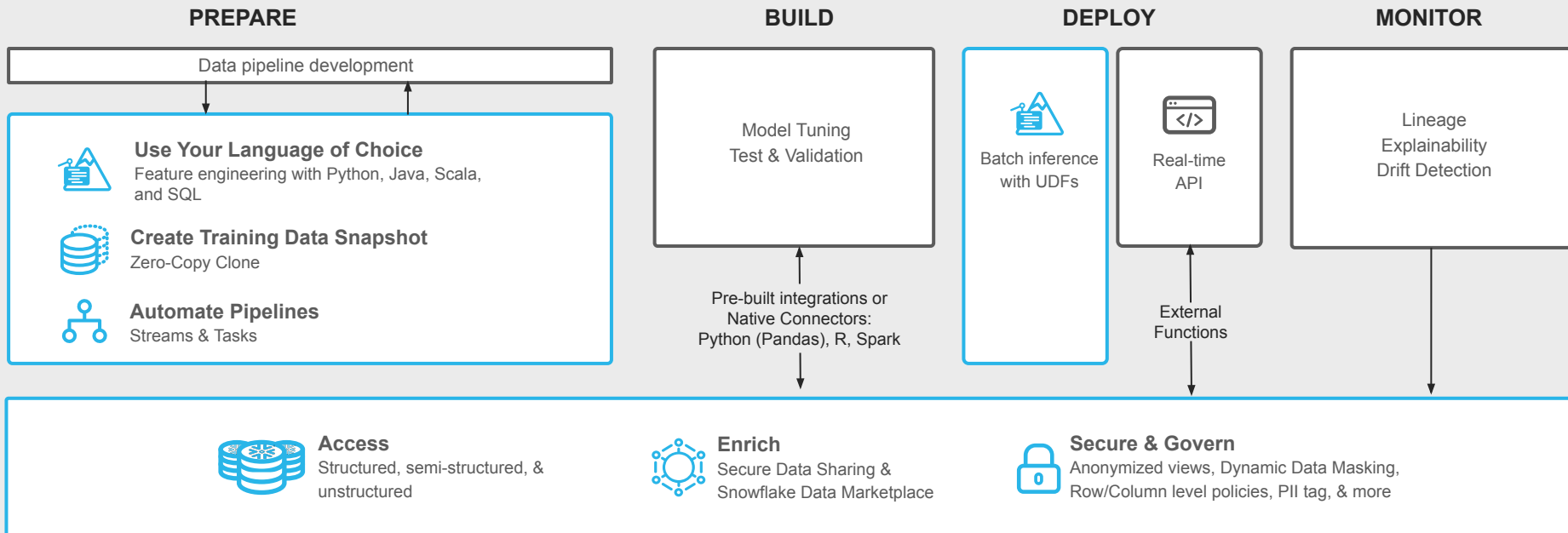
Enables easy access to tables  
with data in customer-supplied  
storage buckets

Utilizes Iceberg metadata for efficient  
pruning to improve performance

# Data Science

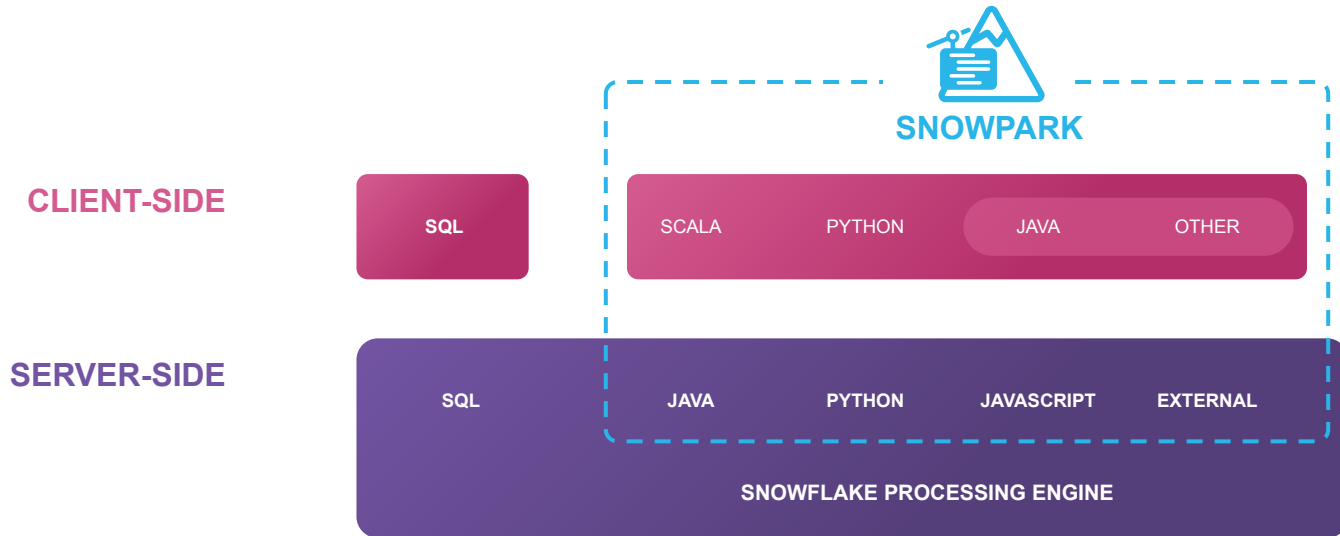


# MACHINE LEARNING WITH SNOWFLAKE





# CODE THE SAME WAY, EXECUTE FASTER WITH SNOWPARK



# SNOWPARK FOR PYTHON



## Familiar programming constructs

---

Use familiar syntax with DataFrame abstraction



## Rich ecosystem

---

Easy access to hundreds of packages with automated dependency management



## Secure processing

---

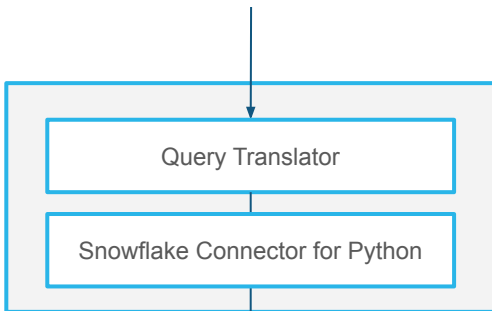
Build with confidence in a highly secure, sandboxed environment



## DataFrame API Query

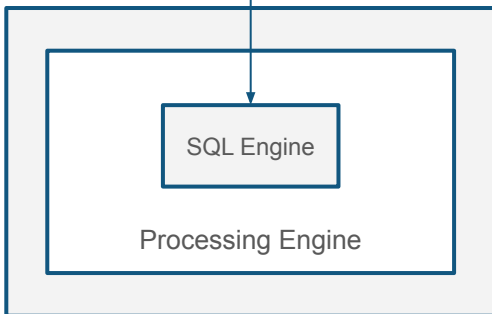
```
df.filter(df.state == 'WA')  
  .avg(df.amount)
```

SNOWPARK  
CLIENT API



{...} SQL Query

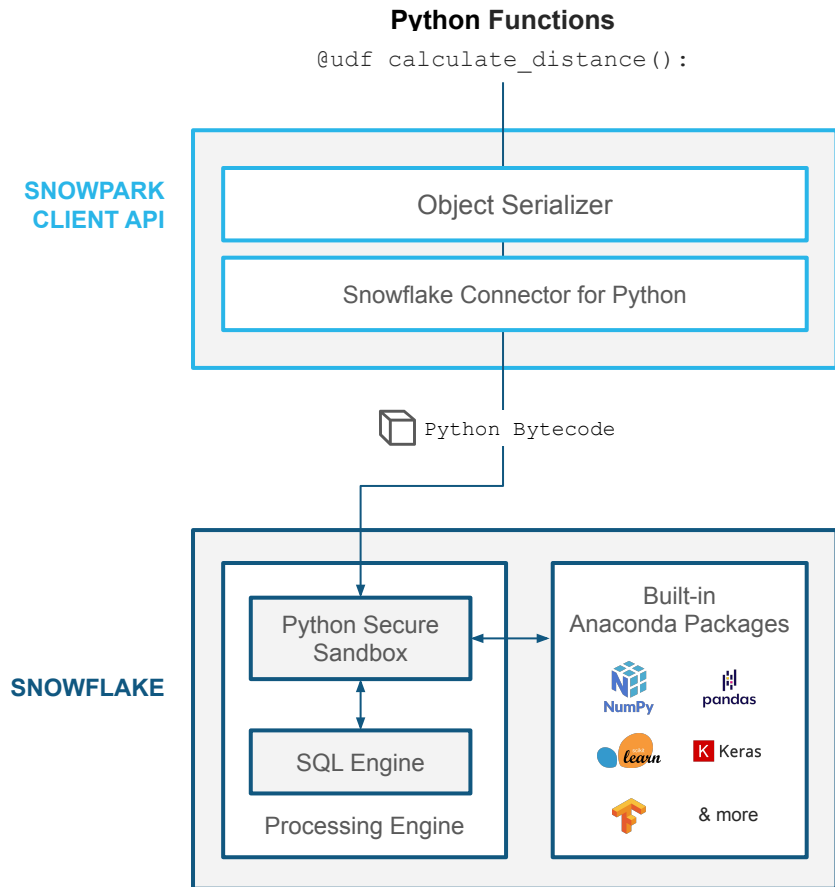
SNOWFLAKE



# DataFrame API

- Query Snowflake data with Python
- Familiar DataFrame API
- 100% push-down to Snowflake
- Native Snowflake performance and scale





# Python Functions

- Bring custom Python code to Snowflake as User Defined Functions (UDFs)
- Code is serialized and pushed down to run in a secure sandboxed environment
- Seamlessly access third-party packages with Anaconda integration



# Conclusions

# Single Product Benefits

- Customer Benefits
  - Reduce complexity and and customer cognitive load
  - Minimizes learning curve and onboarding time
  - Seamless moving and sharing Data globally across Clouds
  - Directly benefits from all future innovations from Snowflake
- Snowflake Benefits
  - Effectively scale and support more diverse use cases and workloads

# THANK YOU



© 2022 Snowflake Inc. All Rights Reserved