DBT

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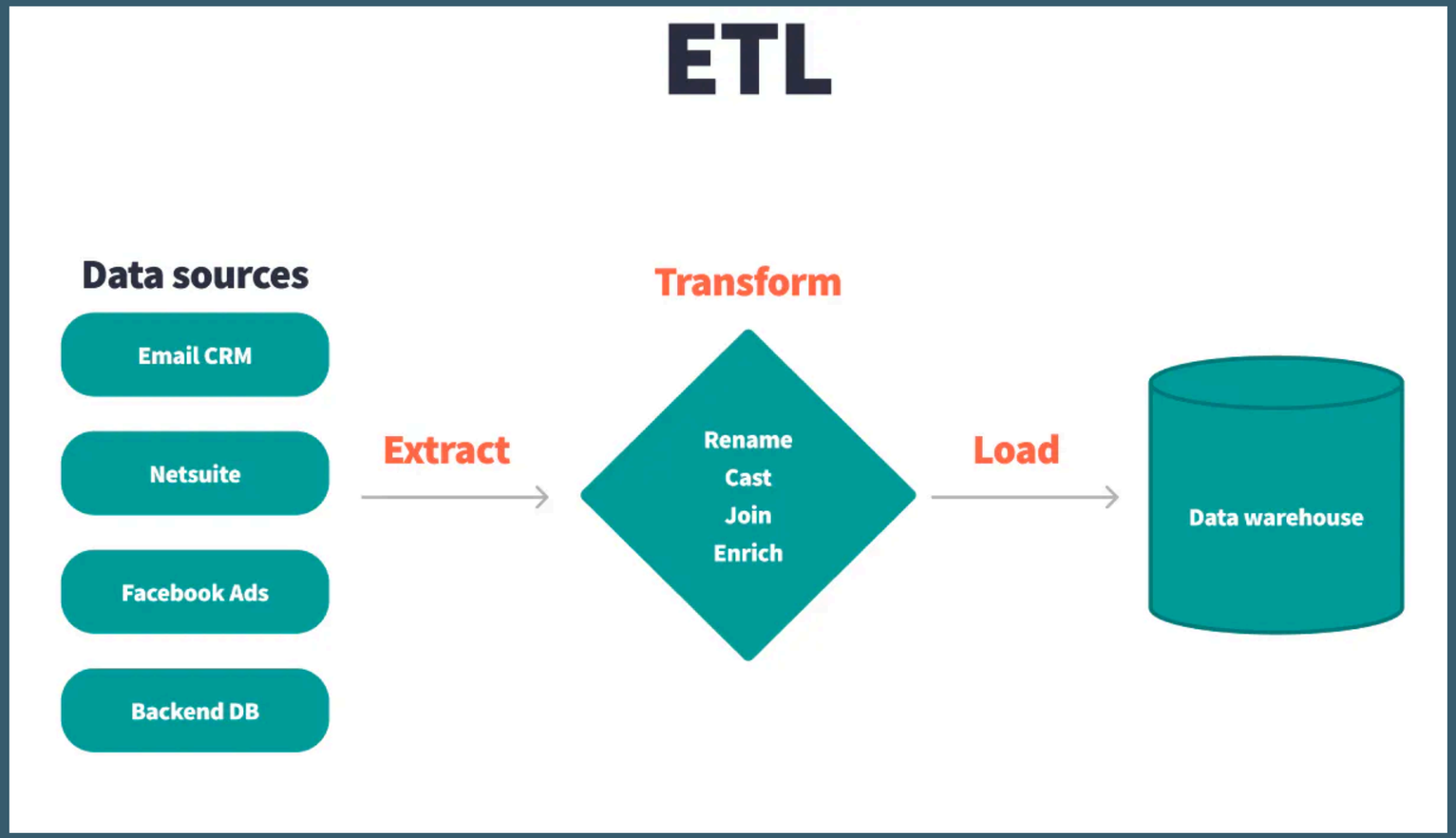
What, exactly, is dbt?

dbt Labs raises $222M in Series D funding at $4.2B valuation led by Altimeter with participation from Databricks and Snowflake

ETL vs ELT

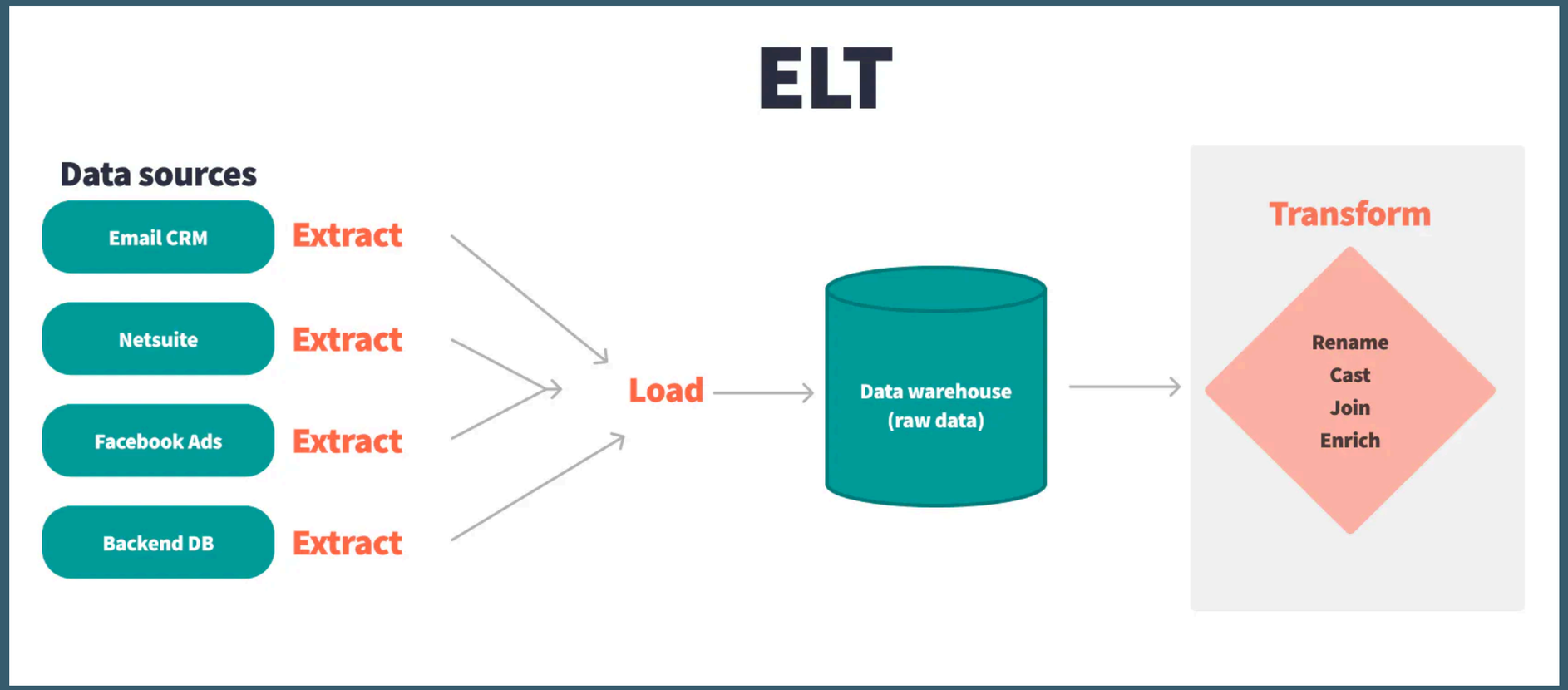
ETL

Extract Transform Load

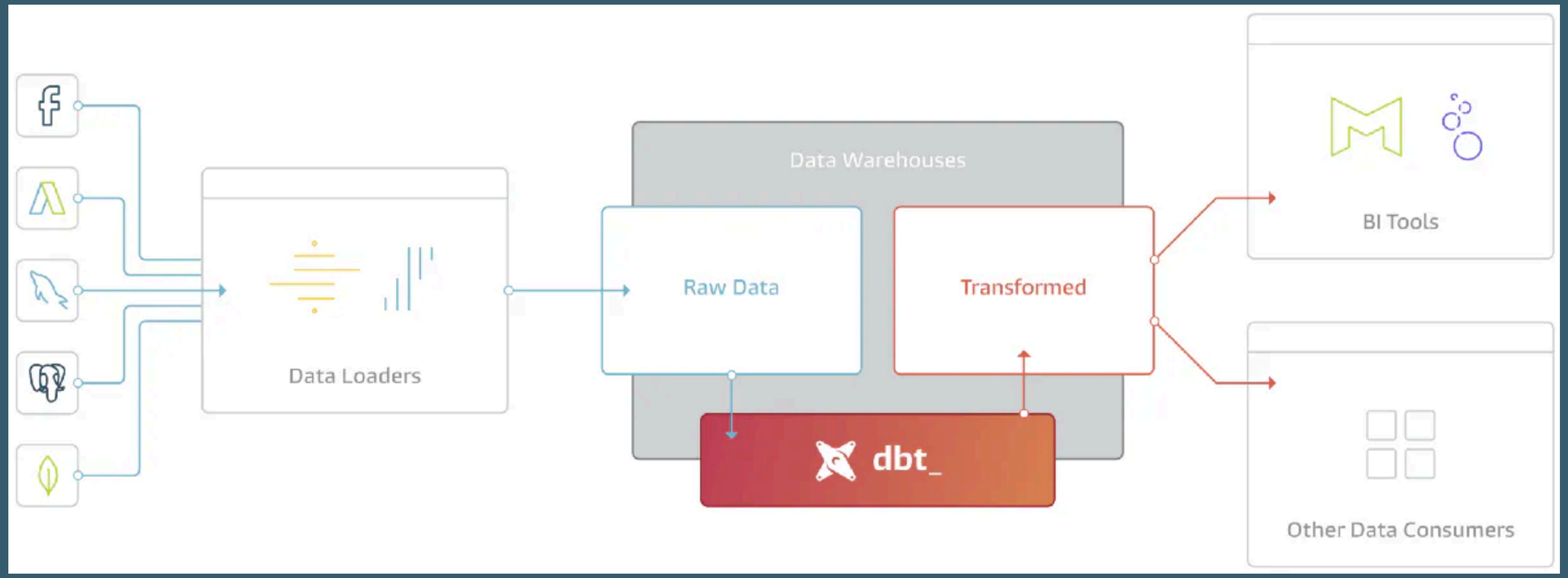


ELT

Extract Load Transform



DBT and the modern BI stack



Jinja

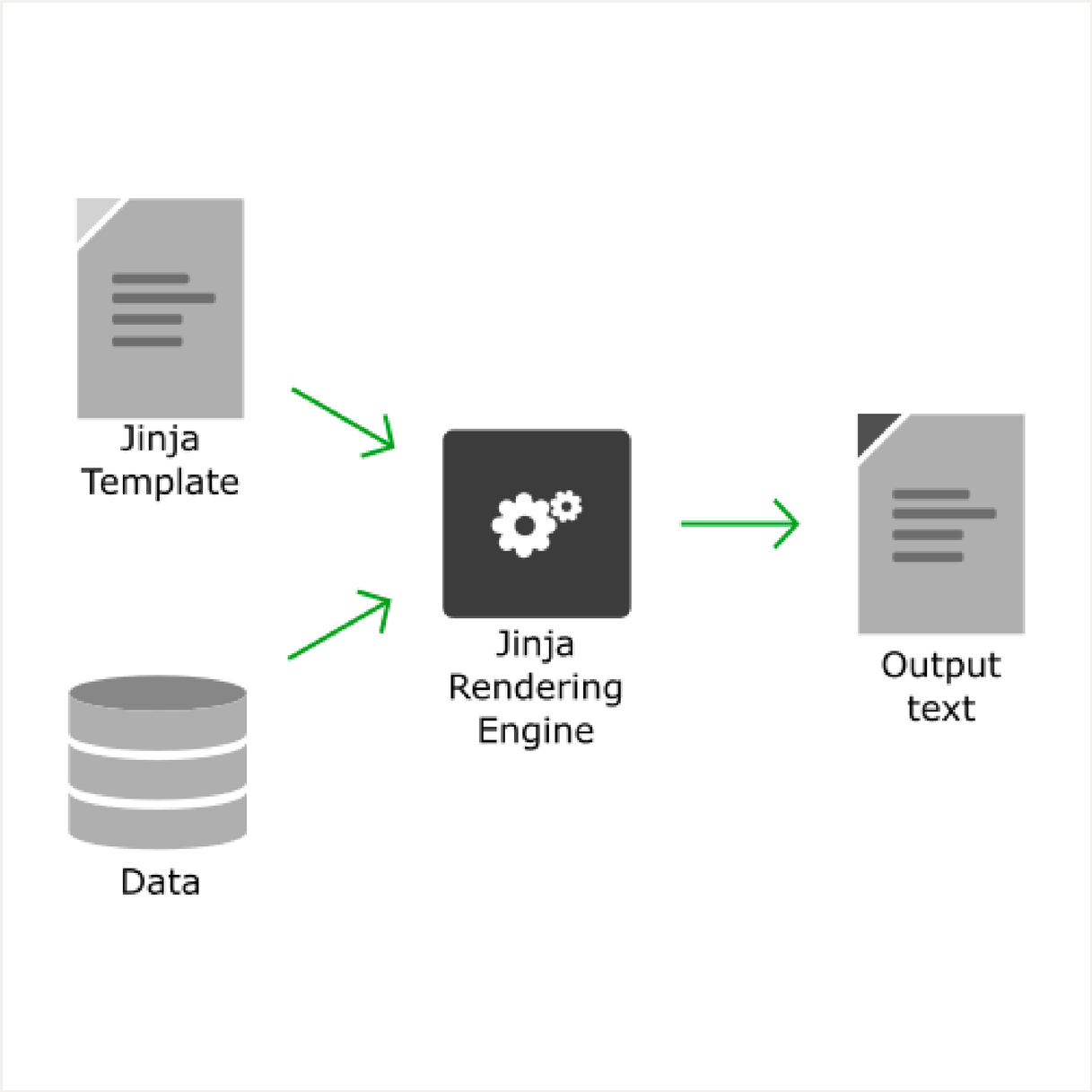
```python
import jinja2

# loading the environment
environment = jinja2.Environment()

# loading the template
template = environment.from_string("Hello, {{ name }}!")

# rendering the template and storing the resultant text in variable output
rendered = template.render(name="World")

# printing the output on screen
print(rendered)
```


Jinja
Template
Data
Jinja
Rendering
Engine
Output
text

Delimiters

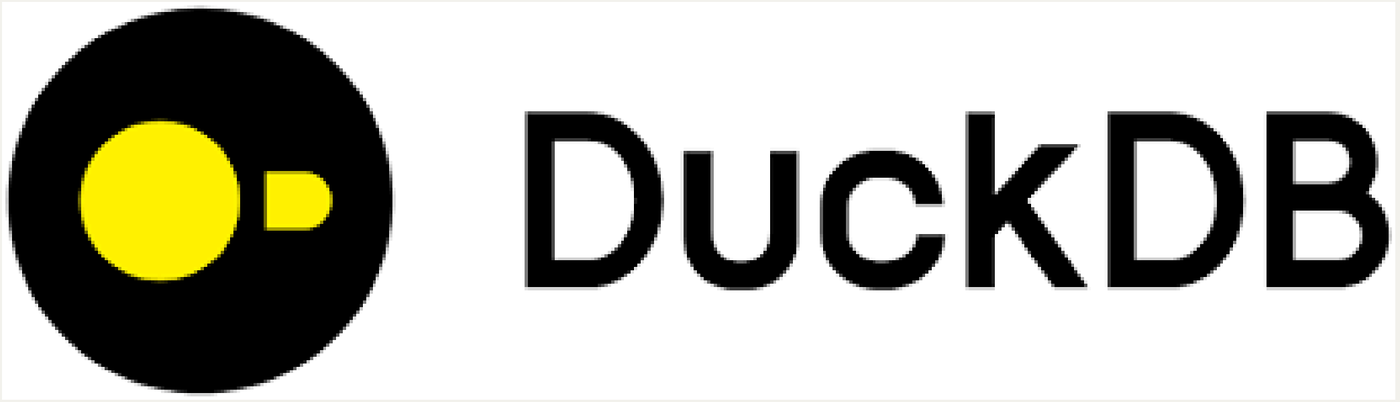
- {{ }} for expressions.
- {# #} for comments (even multiline) inside the template.
- {% %} for jinja statements (like loops, etc.)

Decisions

```
 % if <condition> %} <if block>
{% elif <condition2> %} <elif block>
<%else%> <else block
<% endif %>
```

Exercises

https://github.com/shanicohen1902/tikal-data-engineering-workshop


DuckDB

WHY DUckDB?

- Simple
- Feature Reach
- Free
- Fast

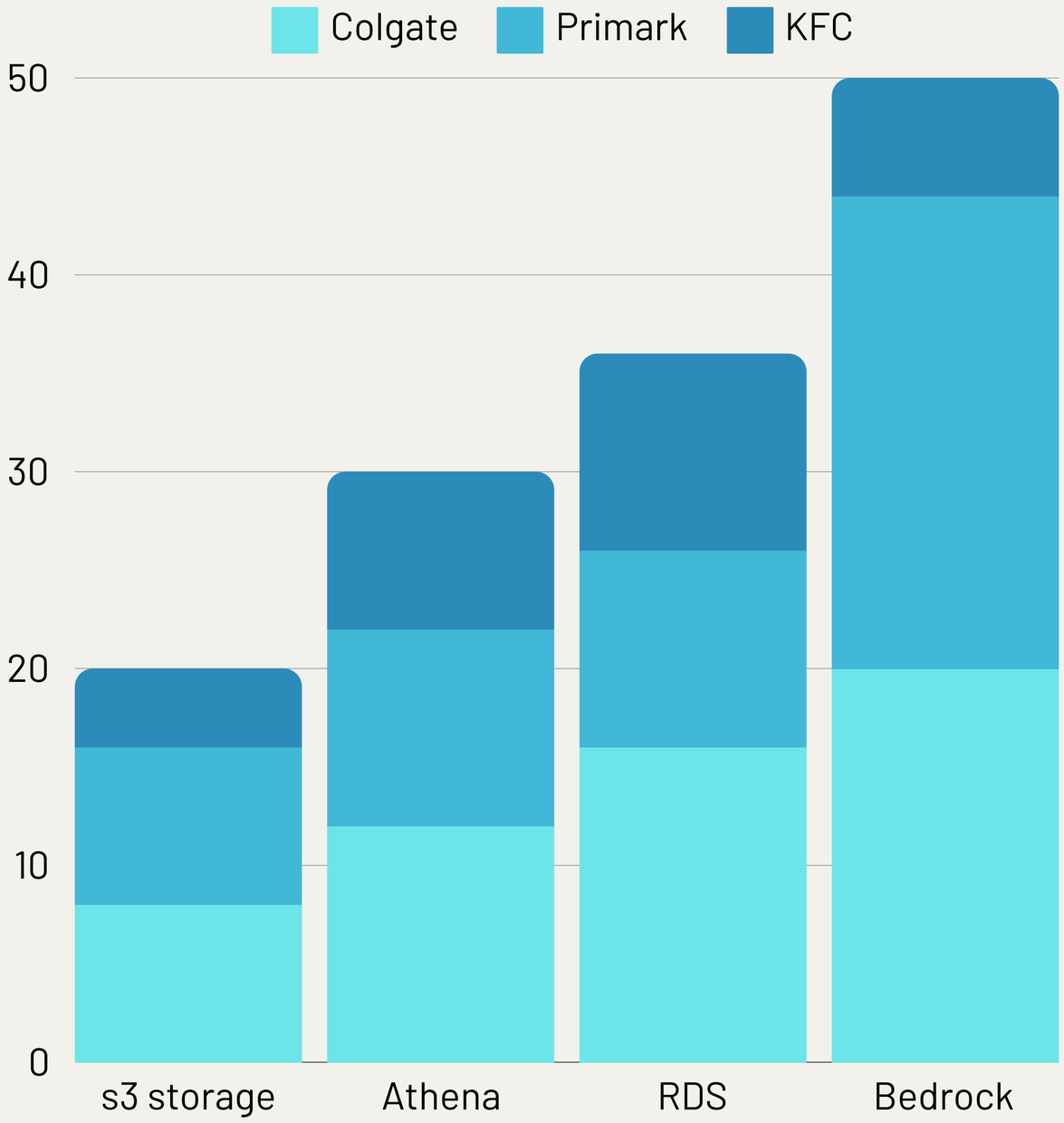
DuckDB CLI

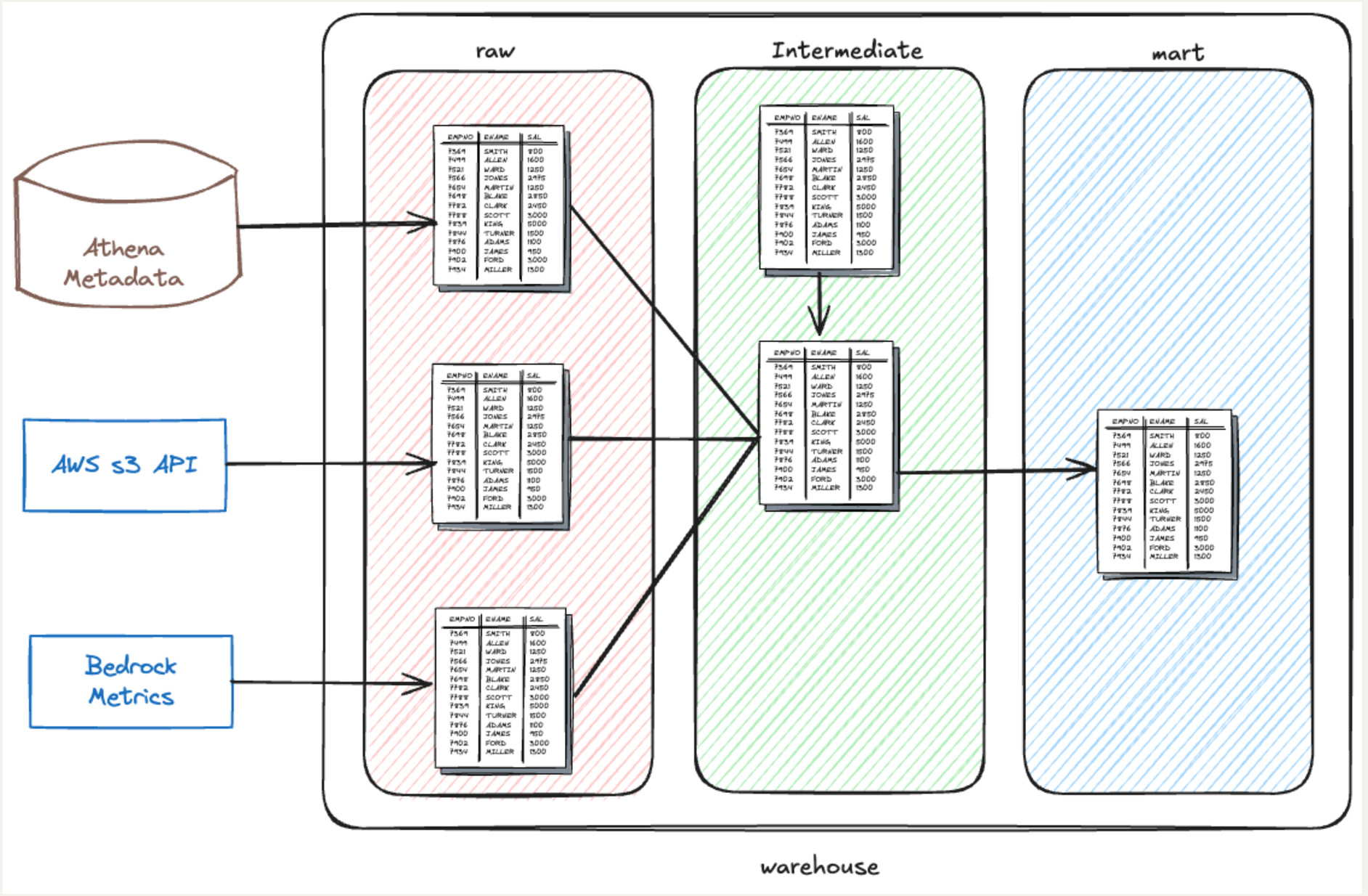
```
$ duckdb #In memory db
```

```
$ duckdb my_database.duckdb # persistent db
```

```
SELECT 'quack' AS my_column; # Running sql
```

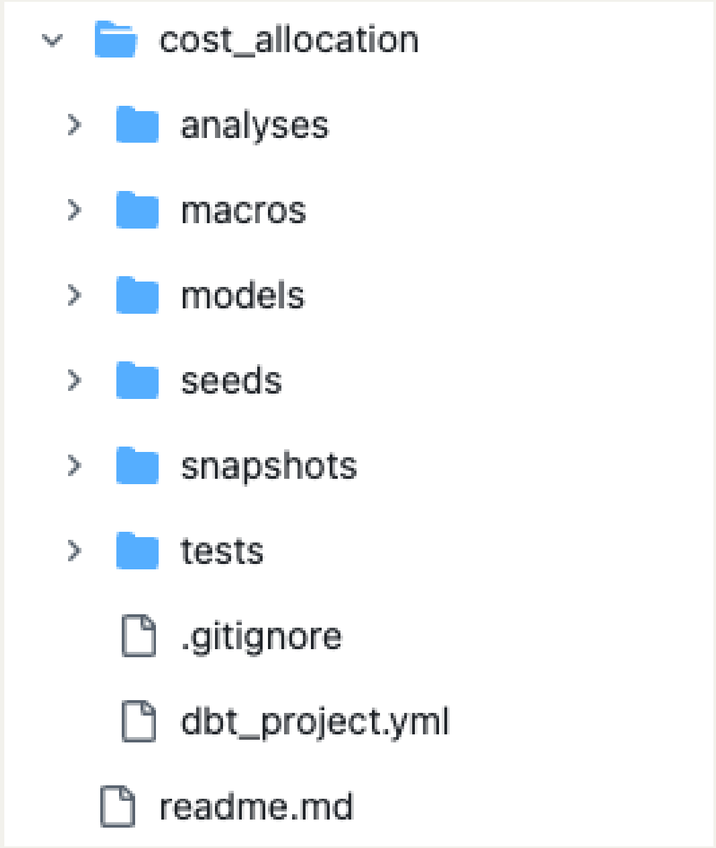

dbt
DuckDB


Colgate
Primark
KFC
50
40
30
20
10
0
s3 storage
Athena
RDS
Bedrock


raw
Intermediate
mart
Athena Metadata
AWS s3 API
Bedrock Metrics
warehouse

dbt_

DuckDB



DBT project structure

Write your first DBT Model

models/customers.sql

```sql
with customer_orders as (
    select
        customer_id,
        min(order_date) as first_order_date,
        max(order_date) as most_recent_order_date,
        count(order_id) as number_of_orders

    from jaffle_shop.orders

    group by 1
)

select
    customers.customer_id,
    customers.first_name,
    customers.last_name,
    customer_orders.first_order_date,
    customer_orders.most_recent_order_date,
    coalesce(customer_orders.number_of_orders, 0)

from jaffle_shop.customers

left join customer_orders using (customer_id)
```

Dependencies

```
{{ ref('service_usage') }}
```

dbt_project.yml

Every dbt project needs a dbt_project.yml file

DBT basic commands

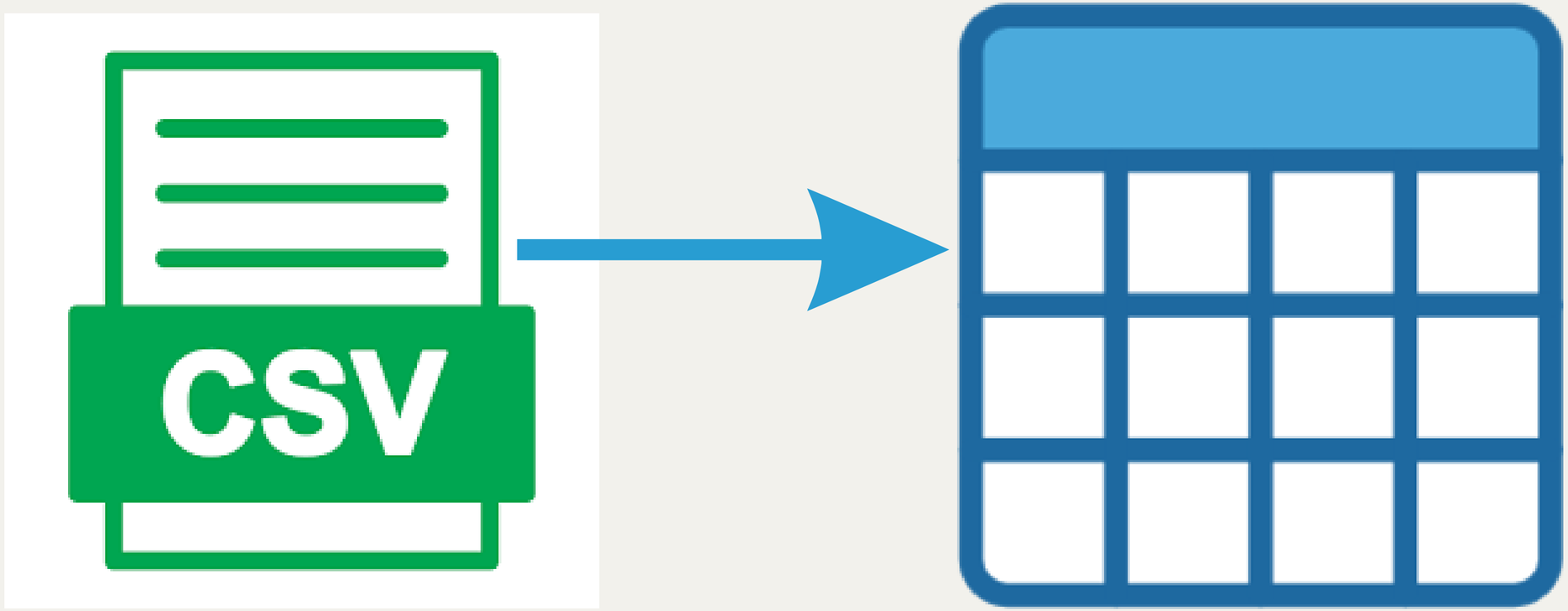
```
$ dbt comiple # models to sql
```

```
$ dbt run # run :)
```

```
$ dbt test # test :)
```

Compile

Seeds



Seeds

```
$ dbt seed # csv to table
```

```
$ dbt seed --full-refresh
```

Exercise 1: DBT Seeds

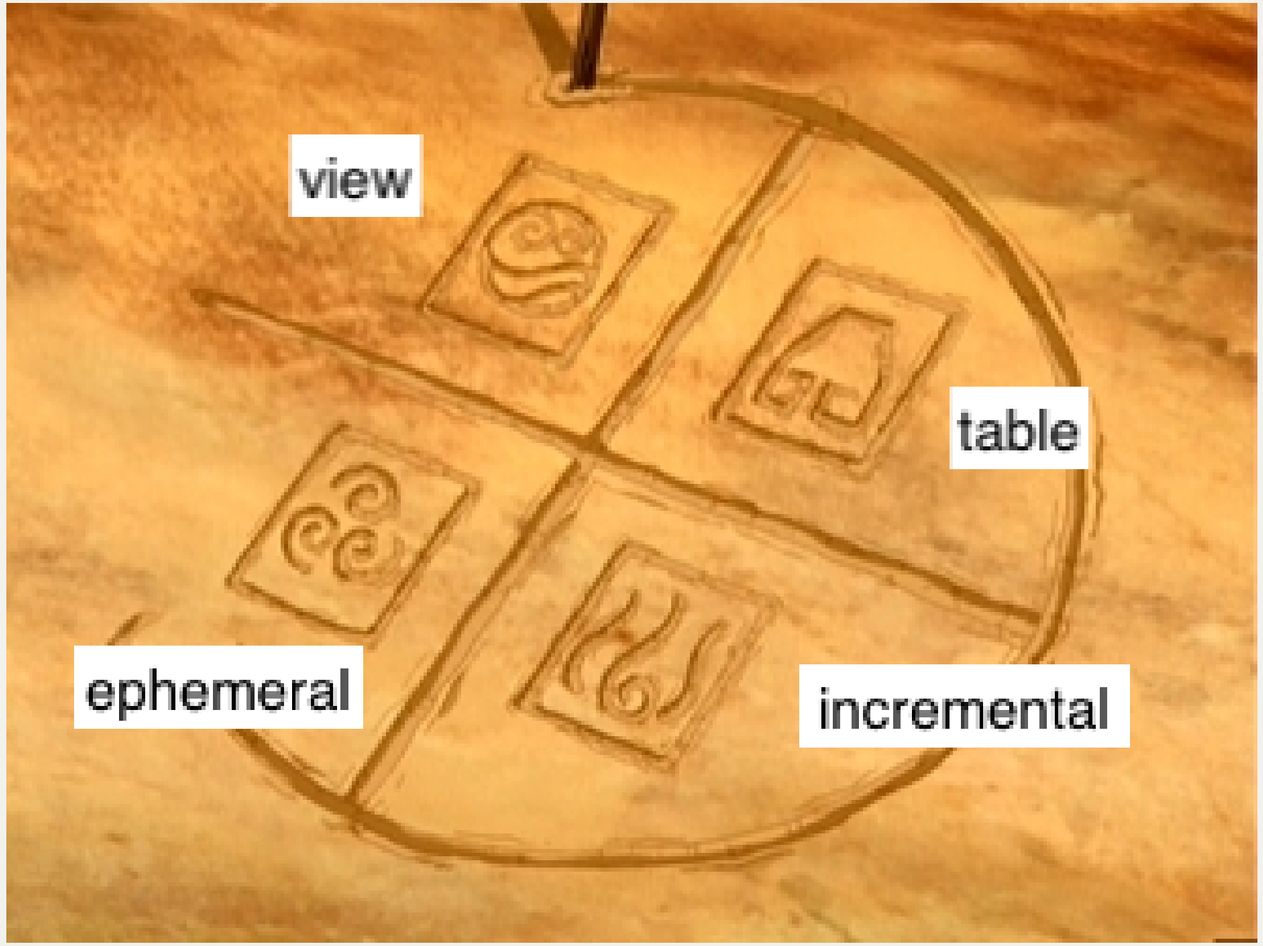
Instructions:

1. Run the command dbt seed to load the data into your dbt project.
2. Verify the data is loaded correctly by querying the tables in your database.

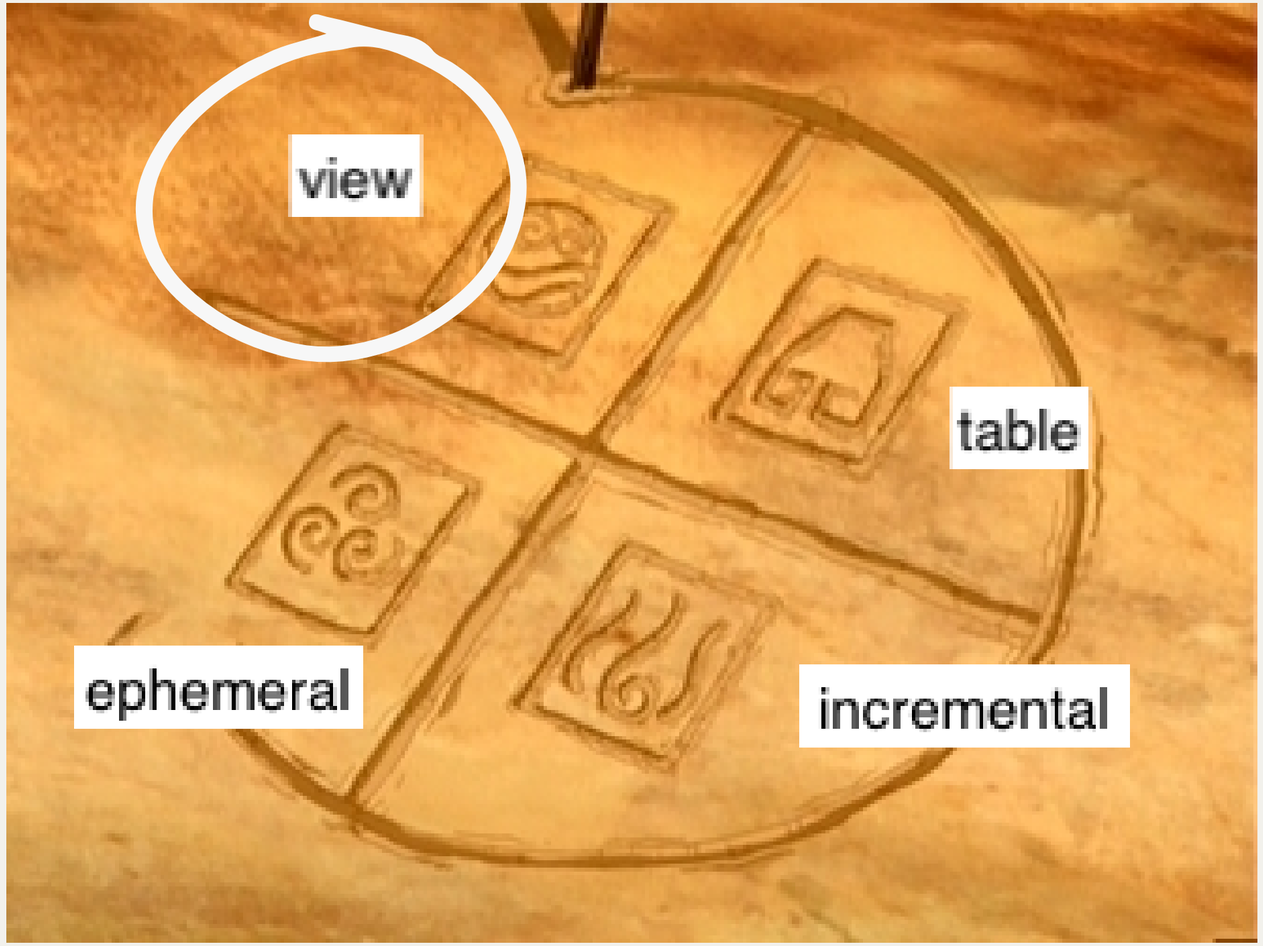
Answer the following questions using DuckDb cli:
Which tables created in the db?
How many lines in each table?


DATA ENGINEER
SANTA
STAKEHOLDER
SANTA
I NEED THE DATA BY 9 AM
imgflip.com

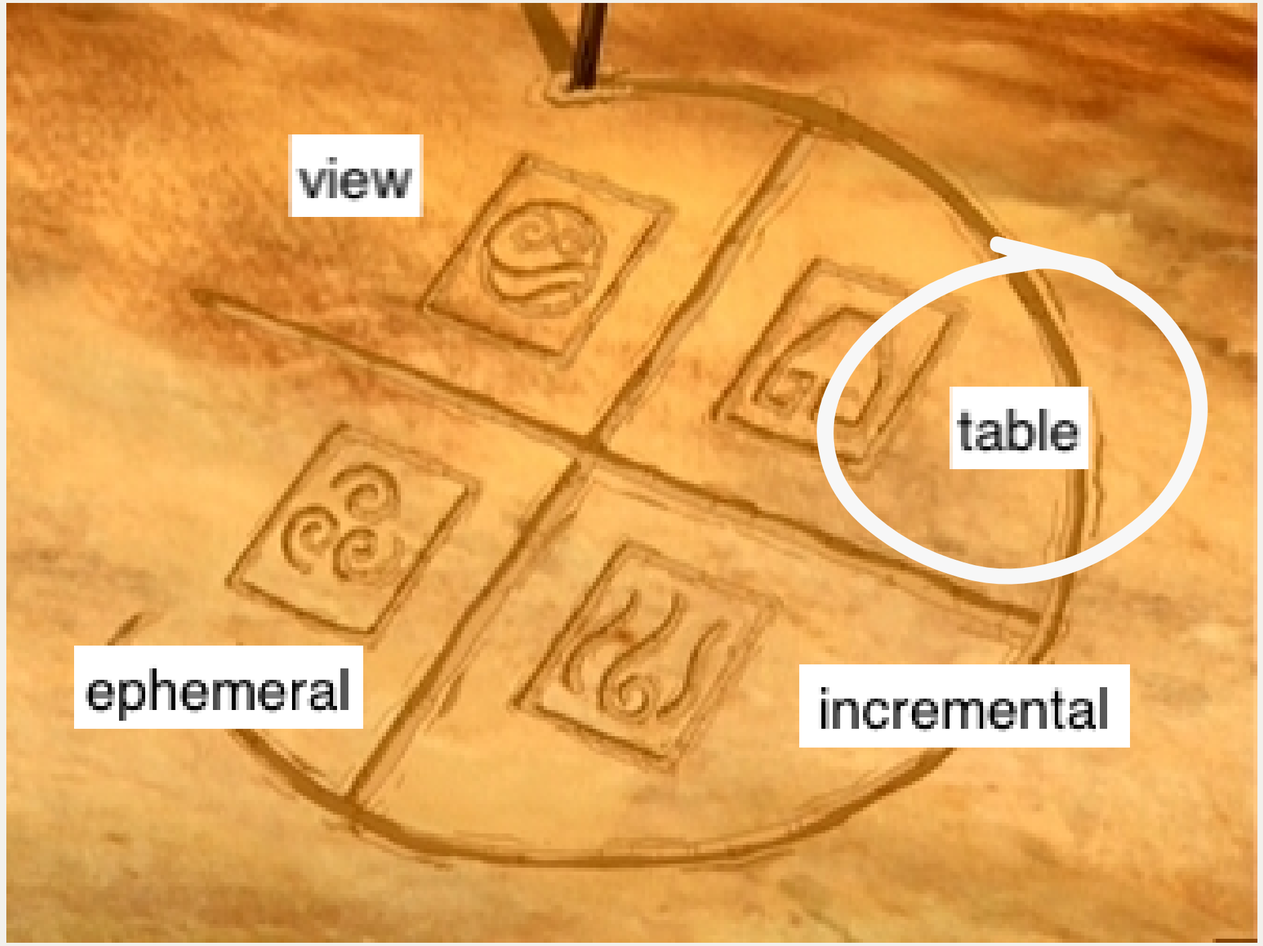
Exploring DBT Materialization Strategies



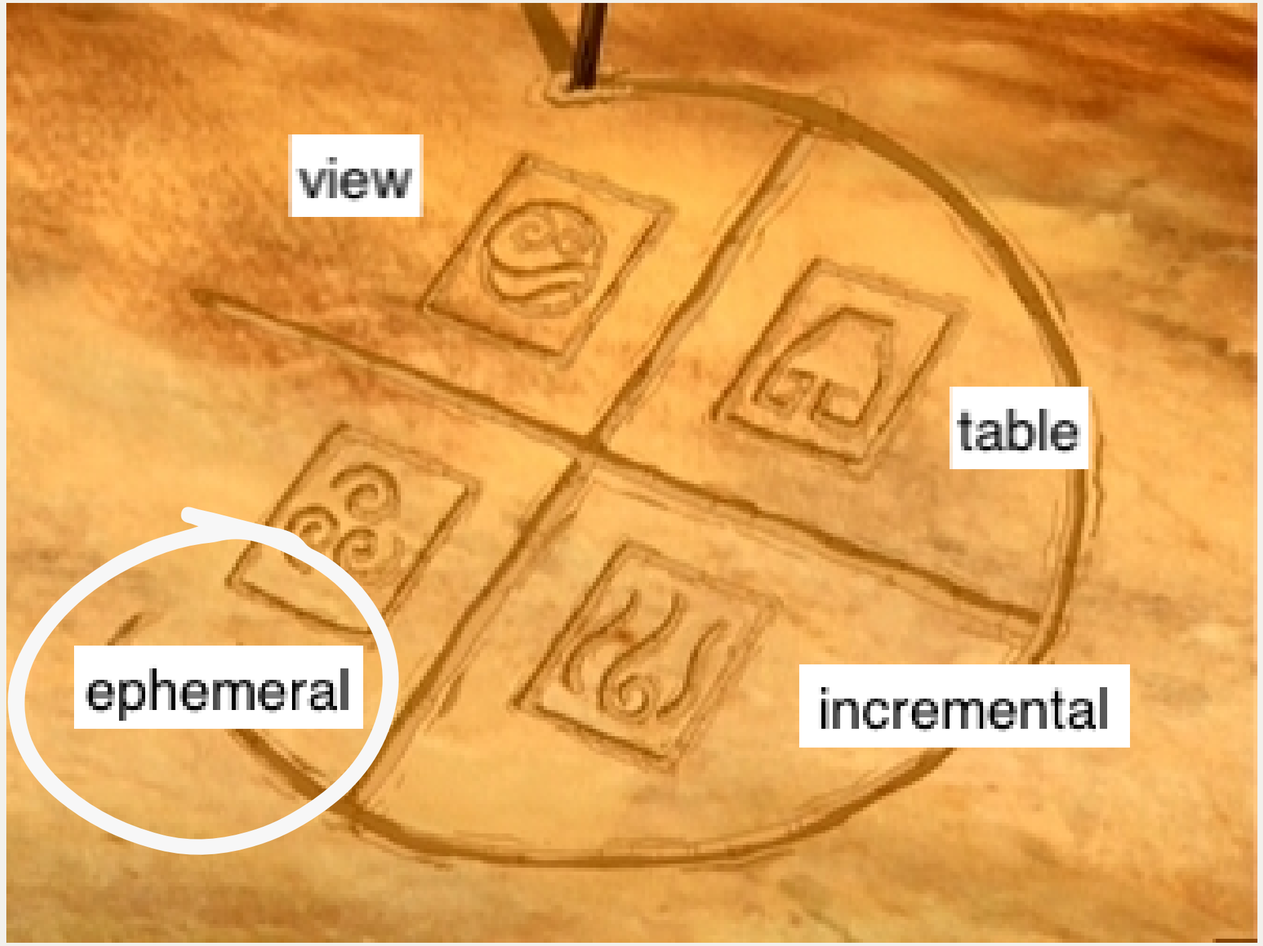
Exploring DBT Materialization Strategies



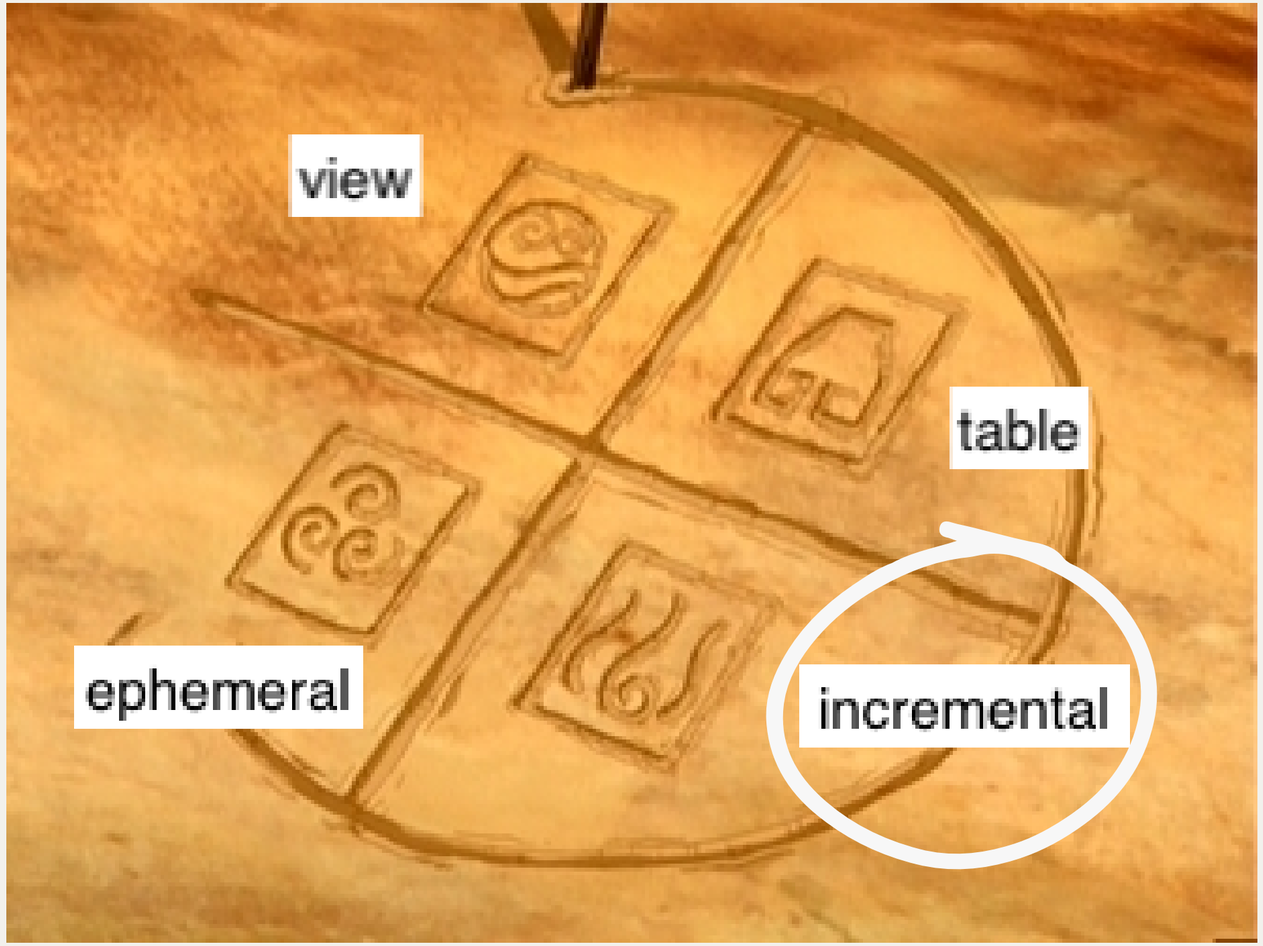
Exploring DBT Materialization Strategies



Exploring DBT Materialization Strategies



Exploring DBT Materialization Strategies



DBT Materialization - Incremental

cost_allocation.sql

```
{{ config(
    materialized='incremental',
    unique_key=['service_id', 'date']
) }}
```

DBT Materialization - Incremental

dbt_project.yml

```
models:
  cost_allocation:
    enrichment:
      +materialized: view

 # Config indicated by + and applies to all files under
models/enrichment/
```

DBT Materialization - Incremental

How can we ensure incremental update using sql?

DBT Materialization - Incremental

```
{% if is_incremental() %}
-- this filter will only be applied on an incremental run
where event_time > (select max(event_time) from {{ this }})
{% endif %}


 # is_incremental() macro
```

DBT Materialization - Incremental

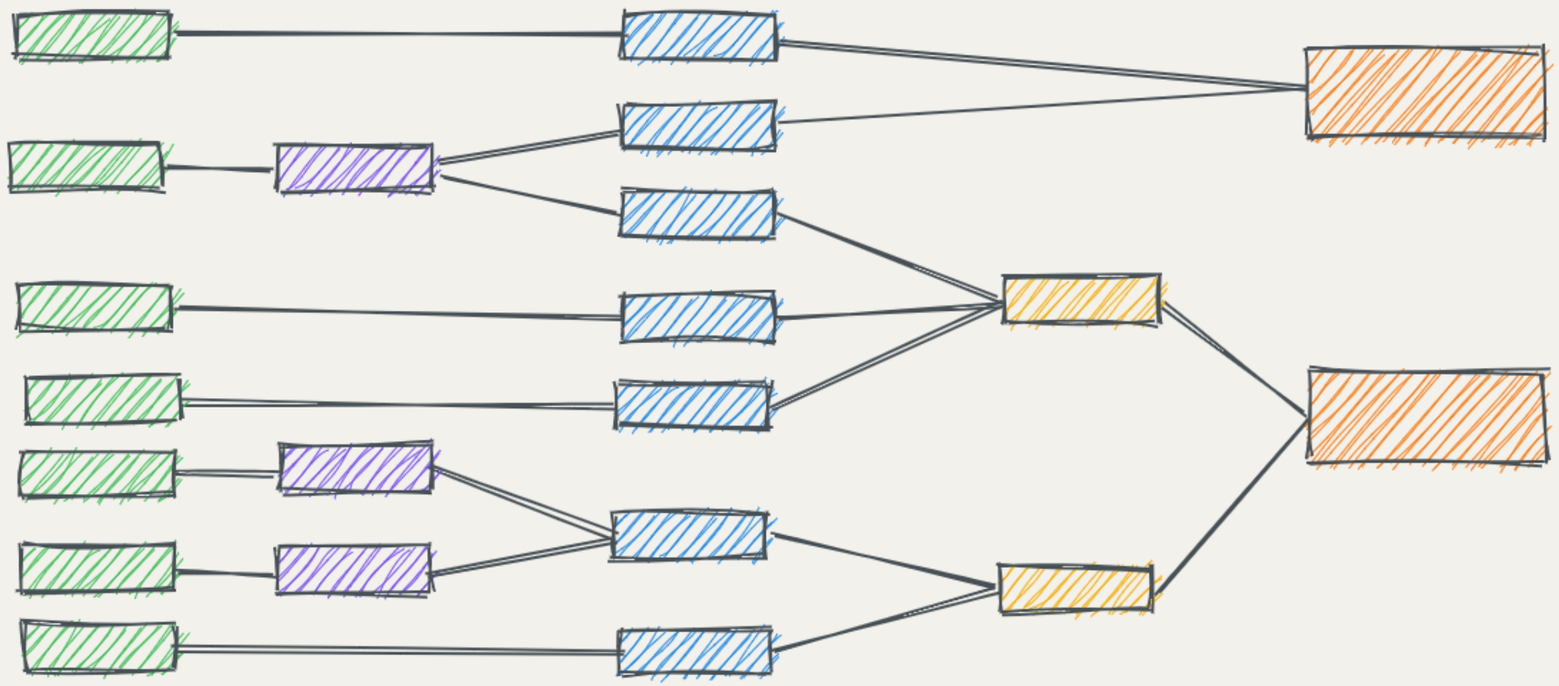
```
$ dbt run select cost_allocation_incremental --full-fresh
```

Exercise 2

Exercise Instructions:

1. Create a new model ‘cost_allocation_incremental.
2. join service_costs and service_usage tables by service_name
3. aggregate the data monthly
4. calculate total_cost - total usage costs **(cost_per_unit * total_used)**
5. **Make this model to be updated incrementally**
6. Think - how would you test that kind of model?

Modular Data Modeling



DBT Docs

https://models.opensource.observer/

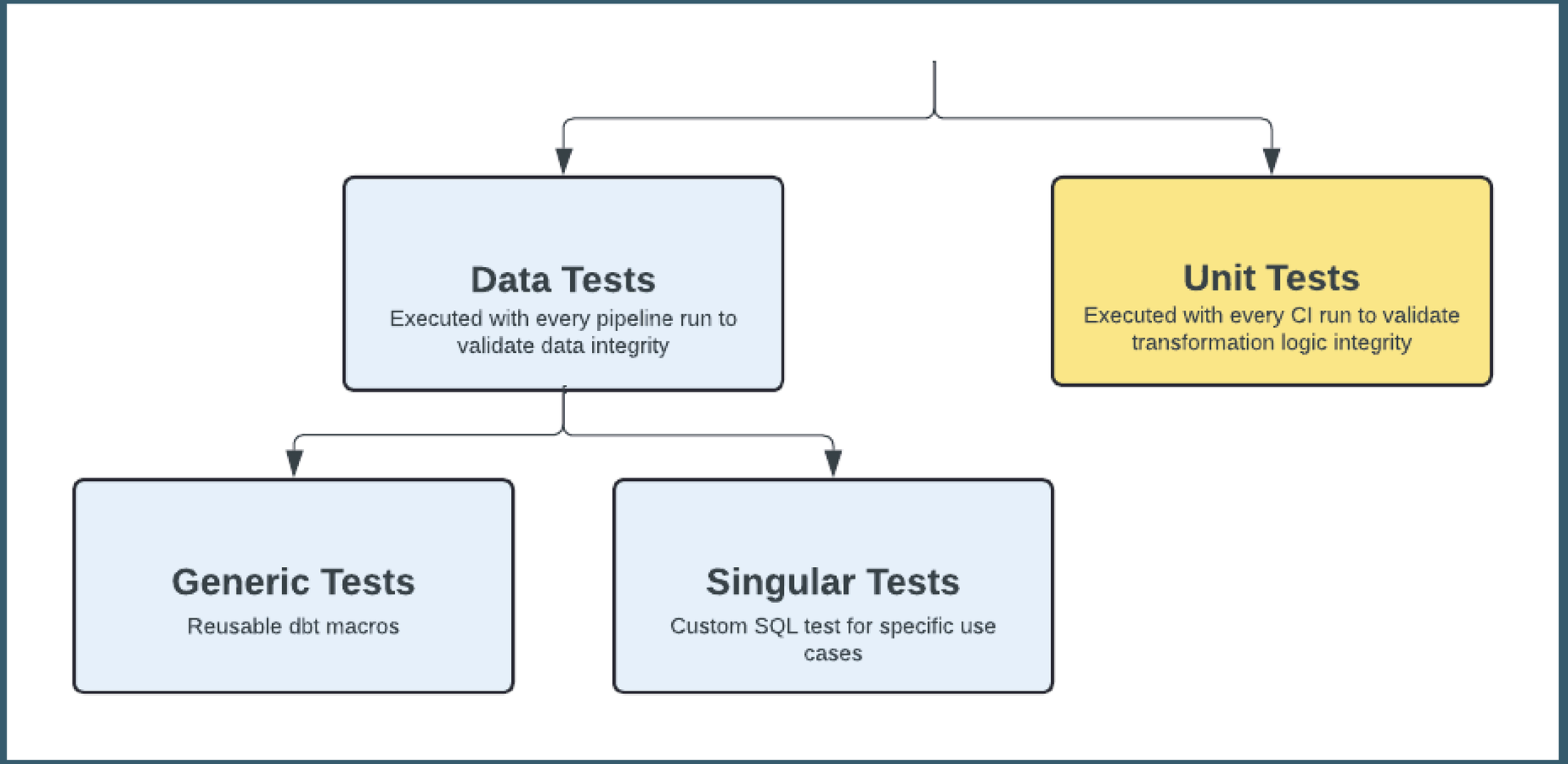
Exercise 3

Exercise Instructions:

1. Add descriptions to your models and columns in the schema file.
2. Run dbt docs generate.
3. Serve the documentation using dbt docs serve.


TEST
TEST
memeshappen.com

DBT test types



Exercise 4

Exercise Instructions:

1. **Create tests for cost_allocation_incremental to check for valid resource_type values.**
2. **Run dbt test to validate your data.**

Agnostic Pipeline

```
{% macro cents_to_dollars(column_name, scale=2) %}
    ({{ column_name }} / 100)::numeric(16, {{ scale }})
{% endmacro %}
```

Jinja Macros

Exercise 5

Create a macro that convert a string to upper case

1. Use this macro in your model to add a new column - ‘upper_case_service_name‘ that contains service_name value in upper case
2. Document your macro and provide examples of how to use it in your models.

Packages

https://hub.getdbt.com

Quizzzzzz

What is the primary purpose of dbt?

A) Data visualization
B) Data transformation
C) Data storage
D) Data ingestion

What is the primary benefit of using dbt for data transformation?

A) Improved data visualization
B) Faster data ingestion
C) Easier collaboration and version control
D) More efficient data storage
E) Reduced data processing costs

Which materialization strategy would you use to only process new records in a model?

A) Table
B) View
C) Incremental
D) Ephemeral

What does the Jinja templating language allow you to do in dbt?

A) Write Python code
B) Create dynamic SQL queries
C) Generate documentation
D) Load CSV files

WHY DBT?

- Open Source
- SQL
- Data Platform Agnostic
- Software development cycle features – VC, testing, documatation generation and data lineage

The END