Reverse ETL With Airflow

Russell Dervay

Airflow Summit 2021

Intro Slide / Bio

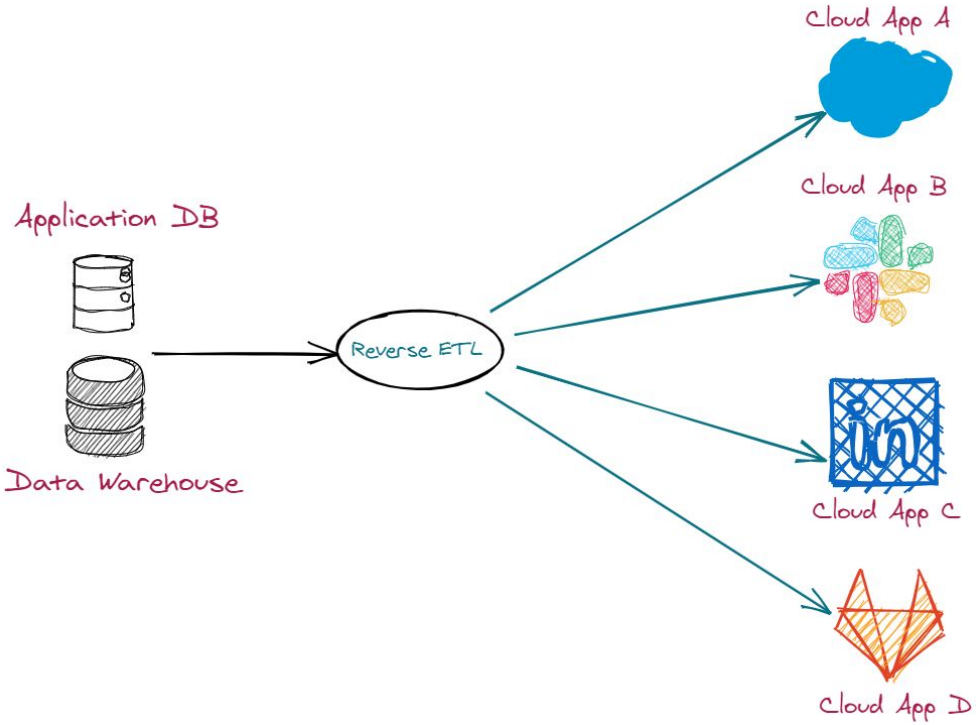
- Data Engineer @ Snowflake
- Focus on Data Transformation and reverse ETL
- Played Volleyball For Stanford

Agenda

- What Is Reverse ETL
  - Current Application Landscape
  - Data Architecture With Reverse ETL
  - Benefits
- Approach and Implementation
  - Design
  - Common Architecture
  - Configurations
- Example Account Scoring
  - Dag / Data Model
  - Example Update (SFDC)
- Considerations / Challenges

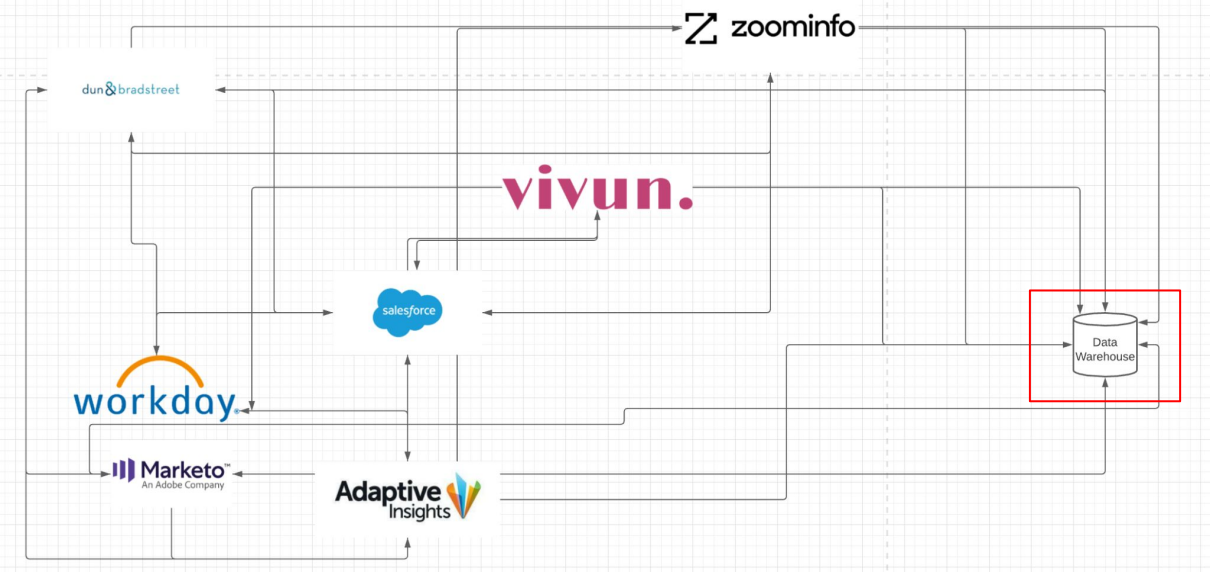
Reverse ETL

What Is Reverse ETL



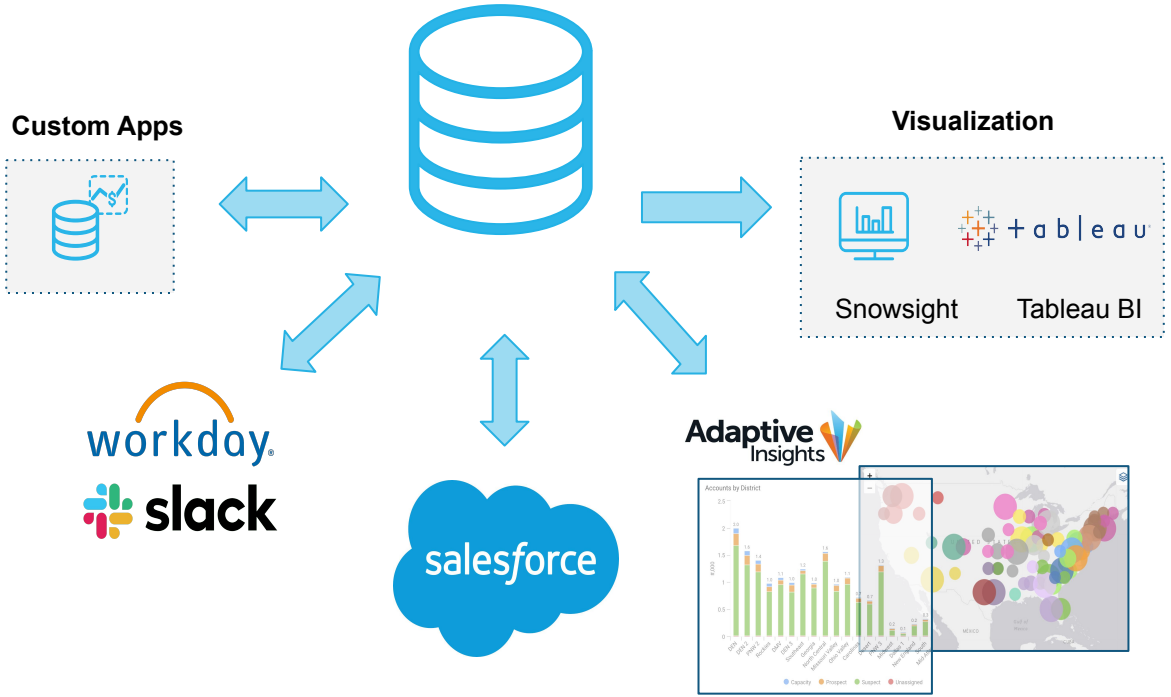
Data Architecture Before Reverse ETL

- No Single Source of Truth
- “Crossing Wires”
- Duplicate Calculations



Data Architecture With Reverse ETL

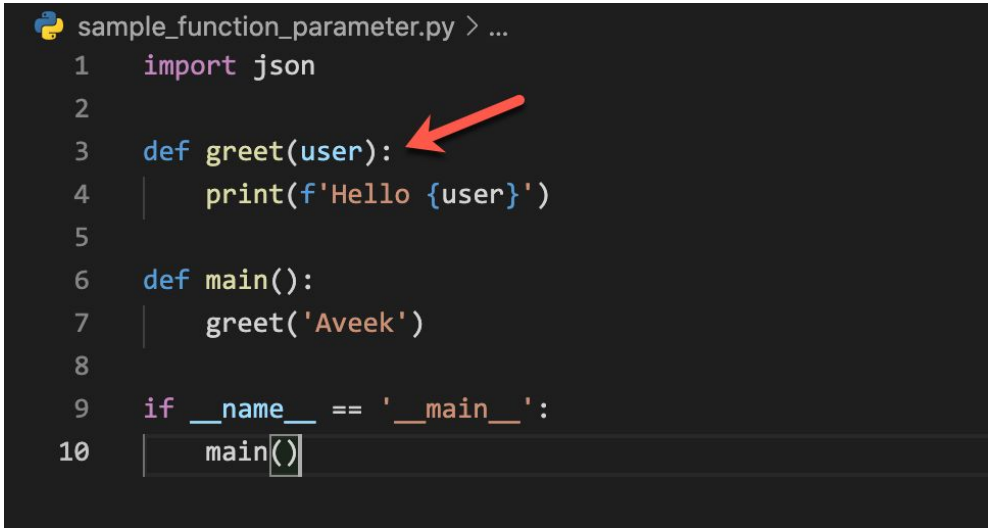
- Data Warehouse becomes center of your “data universe”
- Only 2 “integrations” per application
- Common “Back End” Shared Between Applications



Benefits: Compute Once

- All Metrics Run on the same Data Set

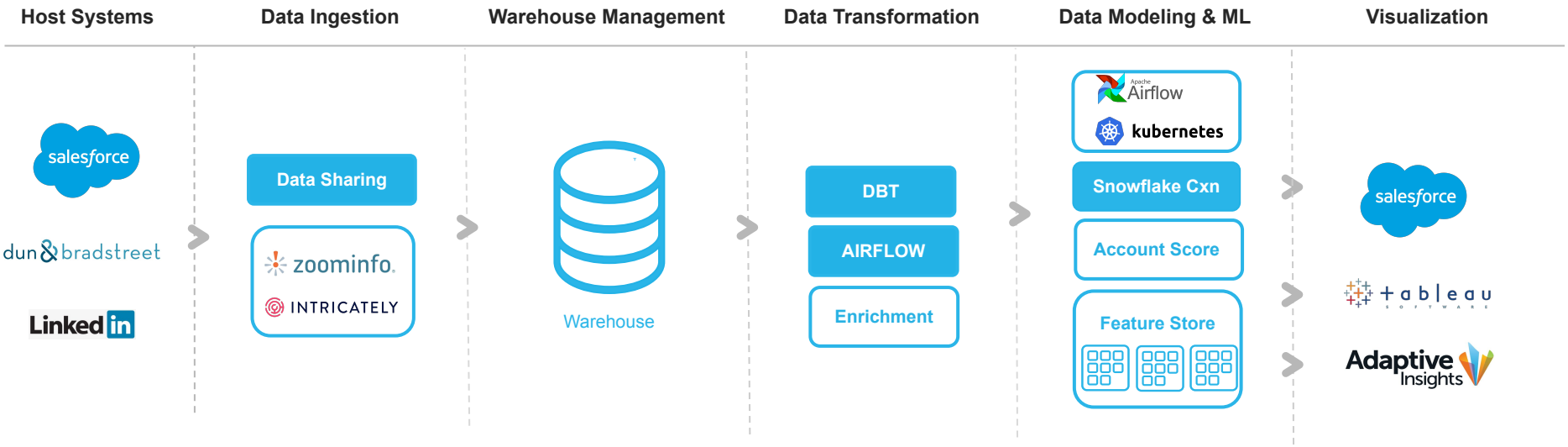
- Removes the possibility of deviant metrics



Benefits: Data Visibility

- Data Consumers have all relevant data in their “primary application”
- Cross Departmental Metrics can easily be shared with little to no lift

Architecture: Account Scoring



Implementation

Approach

- Airflow Based Approach
- “Just Works”
- Easy and accessible

Design

- Python Based Packages Per App
- End User Configurable
- Create, Update, Delete, Insert Operations supported on most applications

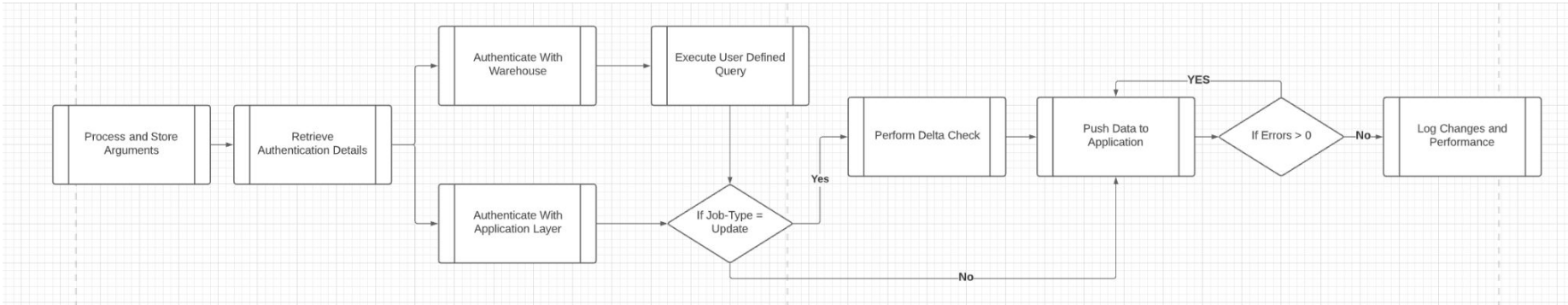
```
from airflow.models.baseoperator import BaseOperator

class HelloOperator(BaseOperator):

    def __init__(
            self,
            name: str,
            **kwargs) -> None:
        super().__init__(**kwargs)
        self.name = name

    def execute(self, context):
        message = "Hello {}".format(self.name)
        print(message)
        return message
```

End User Configuration

- **Query** - Represents the set of data you want to upload
- **Object / End Point** - Represents the endpoint or api you will be calling
- **Fields** - Columns to update in source
- **Job Type** - What operation the job should perform in source system

```
task_id="run_aps",
query="""
    select account_id
         , aps
    from database.schema.table
""",
object="account",
fields=["aps__c"],
job_type="update",
batch_size=10000,
```

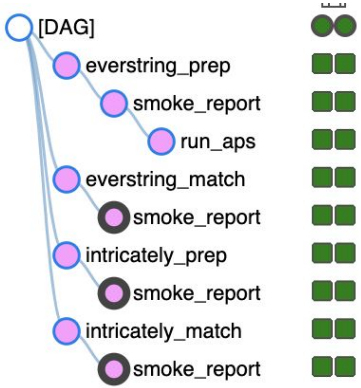
Under The Hood



Account Scoring Example

Account Scoring Example (DAG)

- Last Step Operation
- Many Tasks Needed For Many Systems

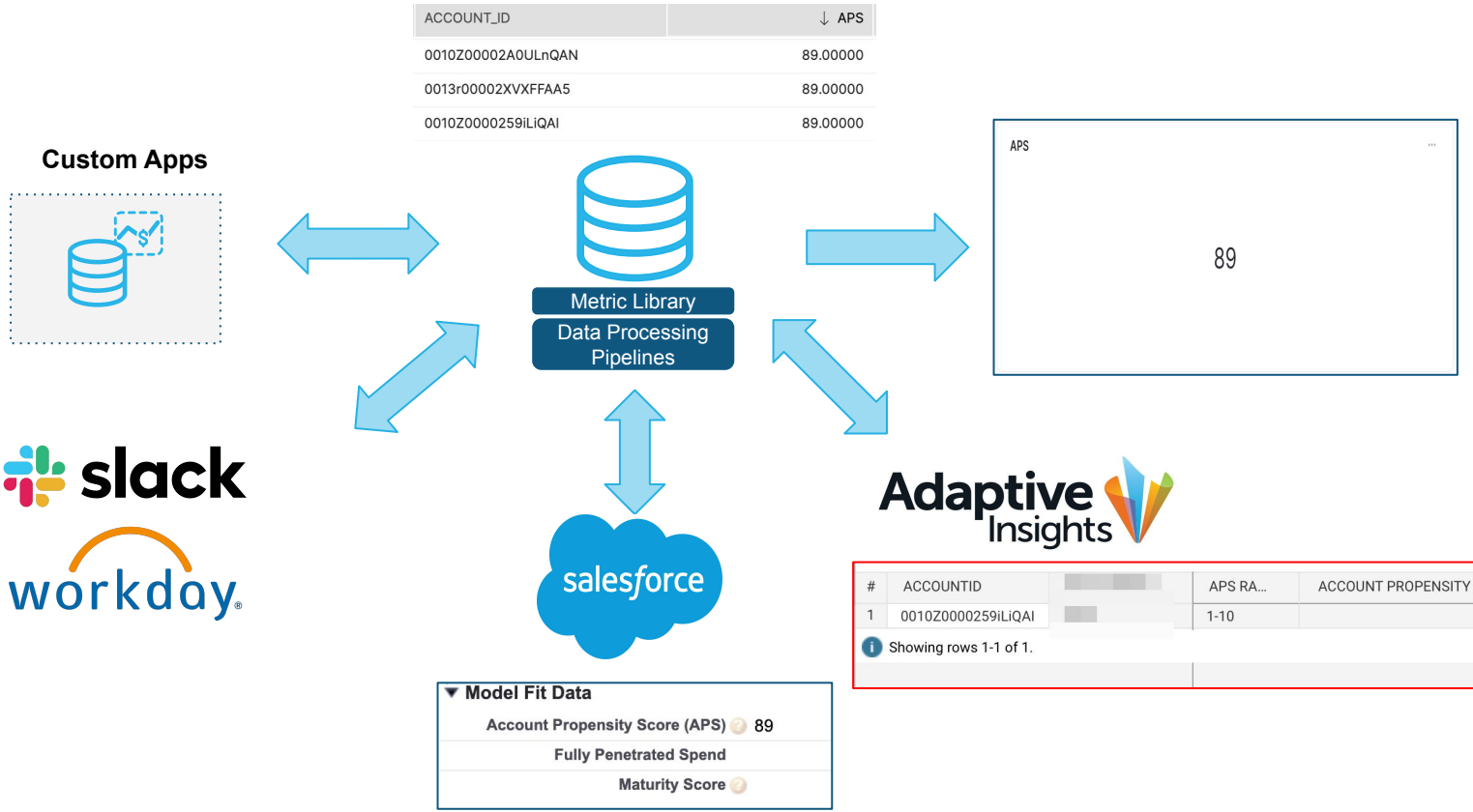


ACCOUNT_ID	↓ APS
0010Z000023qiRbQAI	94.00000
0010Z00002A0JwPQAV	94.00000
0010Z000025AlRzQAK	93.00000
0013r00002EFENAAA5	93.00000
0010Z0000295QrnQAE	92.00000
0010Z000029ztNQQAY	90.00000
0010Z00002D3gqFQAR	90.00000
0010Z0000259iLiQAI	89.00000
0013r00002PaG2MAAV	88.00000

Account Scoring Example (SFDC)

- Application Change alongside your model
- Business users always see the freshest data

Single Source Of Truth



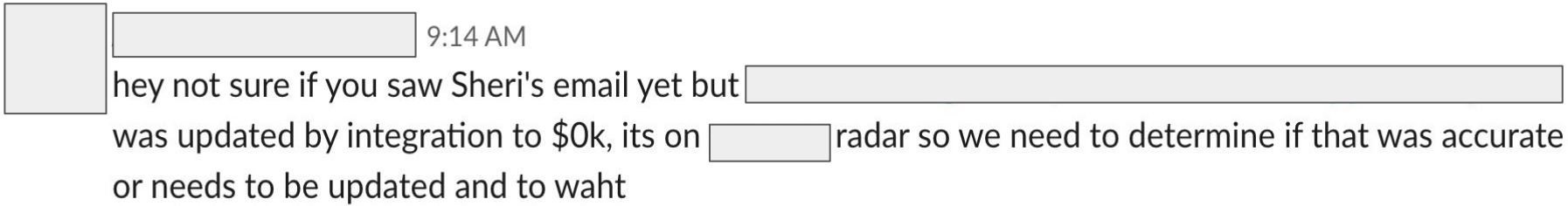
Challenges

Challenges (Compliance / Control)

- “Connectors” Are Widely Accessible
- New Jobs Added Frequently
- QA Testing Not Always Followed
- Requires Good Cross Departmental Communication

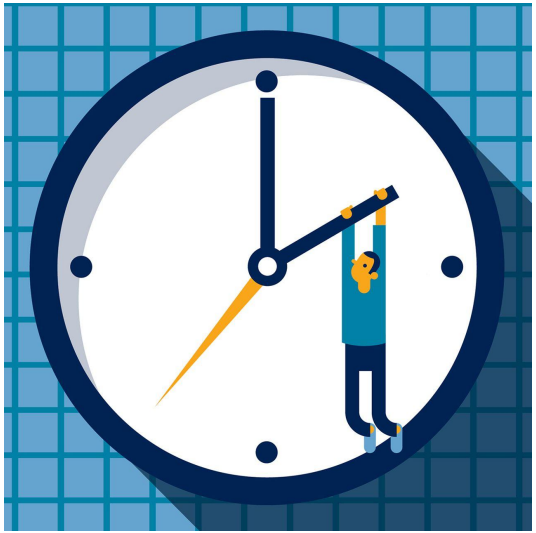
Challenges (Infectious Data)

- Garbage In Garbage Out
- Incorrect data in the source table or pipeline will flow downstream impacting all other applications



Challenges (Lift)

- Engineering Time Can Be Considerable
- Some APIs are more complex than others
- Maintenance can take some cycles away from development



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Questions?