FROM AIRFLOW IMPORT DAG

Airflow the perfect match in our Analytics Pipeline

Sergio Camilo Fandiño Hernández
Senior Business Intelligence Architect @LOVOO

Airflow Summit 2020

AGENDA

1. Why we met?
2. How we met?
3. The first date!
4. Fun dates!
5. Is there any dynamic in between?
6. Recap and conclusion

About LOVOO

- LOVOO is a dating and social app and the place for chatting, live streaming, watching streams and getting to know people.
- Germany - Dresden & Berlin - 2011
- Acquired by The Meet Group (NASDAQ:MEET) in 2017
- Top 3 Dating App in Europe
- + 280 TB of Data
- ~ 6 TB Monthly Growth
- + 3 TB daily total aggregated data
- + 36 TB Swipes (162,824,303,474)

Analytics

- 1 Head
- 6 Data Analysts
- 2 BI Architects

- Product
- Finance
- Marketing
- Talent Management
- Customer Insights
- CRM

What can you expect?

My main purpose today is to tell you about our journey with Airflow as well as a few different use cases that could also boost the work of your Analytics/BI team on a daily basis.

- Pieces of code (examples)
- Way too many screenshots

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On-premise

cloudera

tableau

hadoop

HIVE

OOZIE

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We went Cloud

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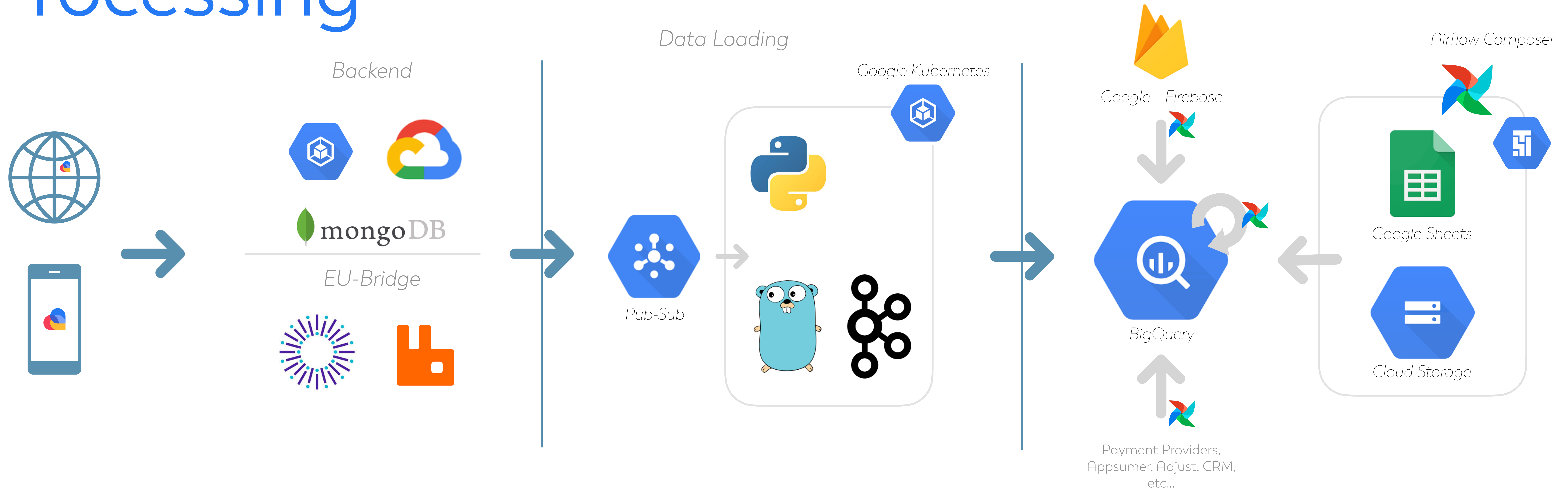
Data Processing



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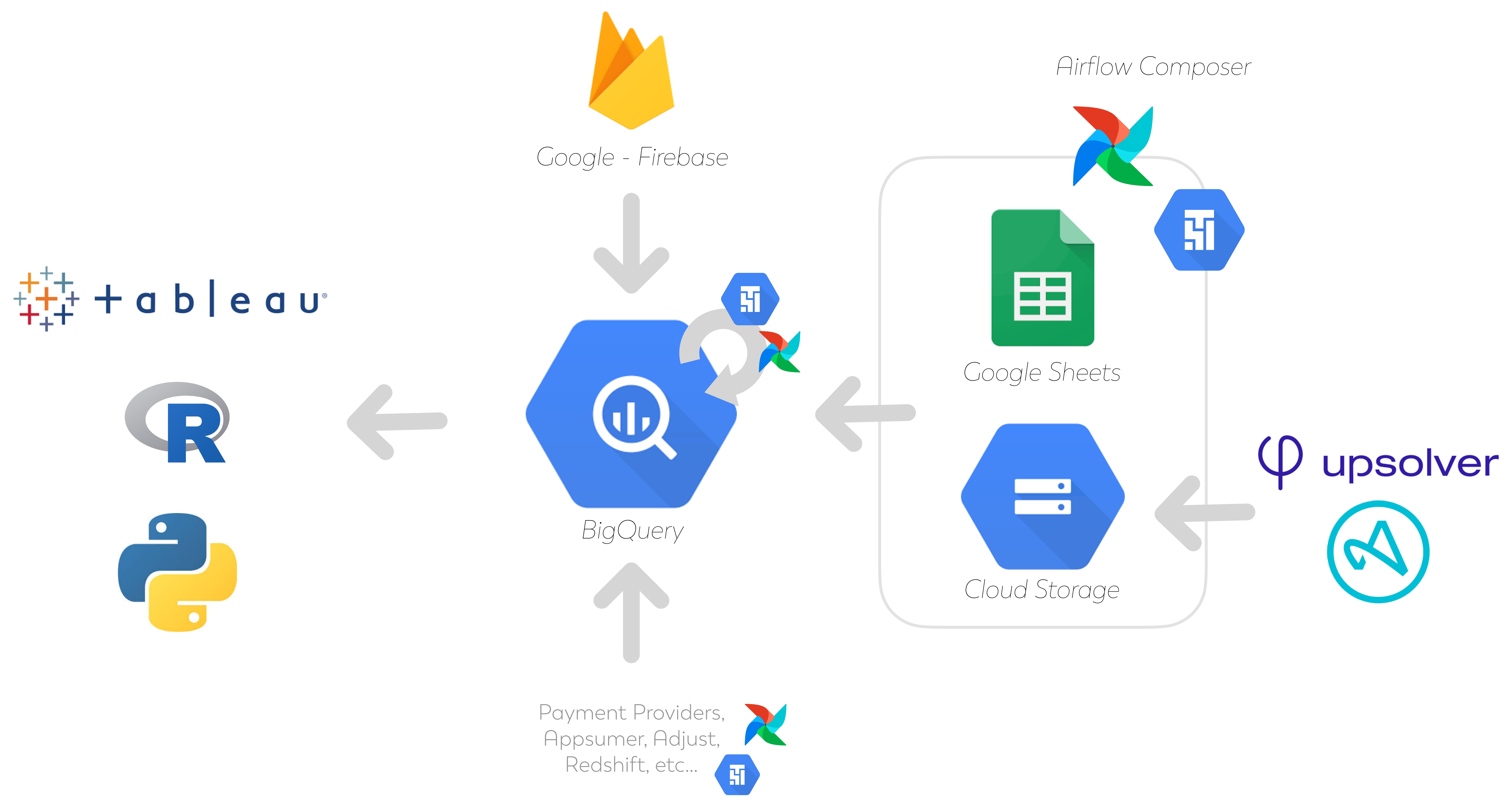
Analytics Data-Core



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Orchestration Tool

- Identify what is out there
- Costs?
- Scalability?
- Data sources compatibility?
- Knowledge/Human Resources?

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Airflow

- Great community
- Game changer
- Mobile App
- Python
- BigQuery

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Google Cloud Composer

- Fully Managed Airflow
- Scalable
- IAP - Secure
- Focus on building the Analytics data pipeline
- Ease of implementation

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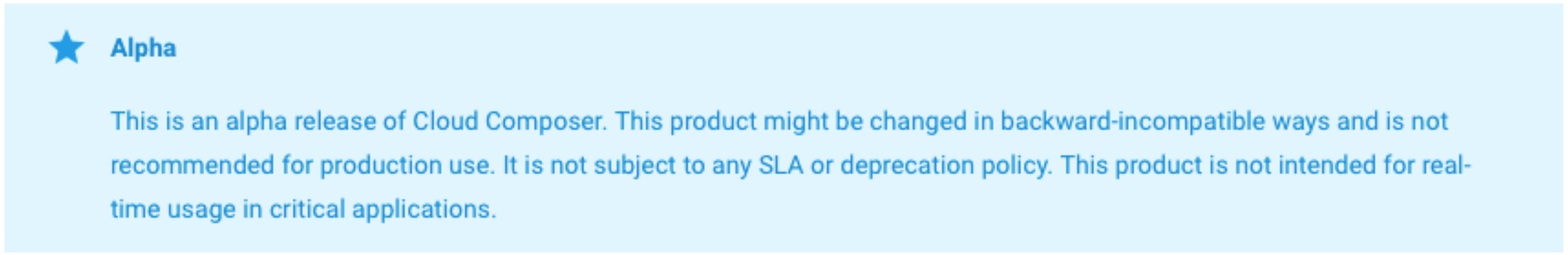
Google Cloud Composer

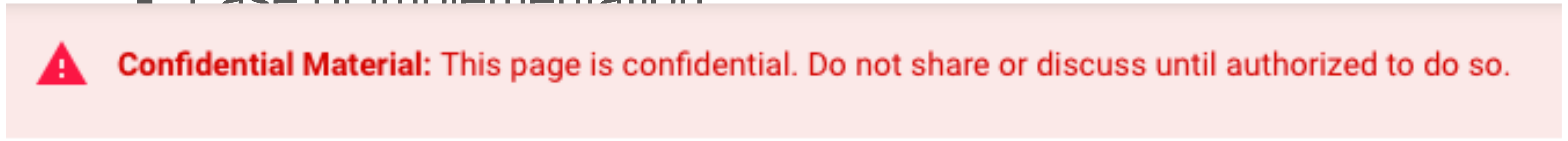
- Fully Managed Airflow



Alpha

This is an alpha release of Cloud Composer. This product might be changed in backward-incompatible ways and is not recommended for production use. It is not subject to any SLA or deprecation policy. This product is not intended for real-time usage in critical applications.

- Focus on building the Analytics data pipeline
- Ease of implementation



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TODO List

- SQL Scripts —> Data Modeling
- DAGs
- Permissions - Service Accounts
- Data Importers
- Create a Composer Environment
- How do we deploy? —> CI/CD

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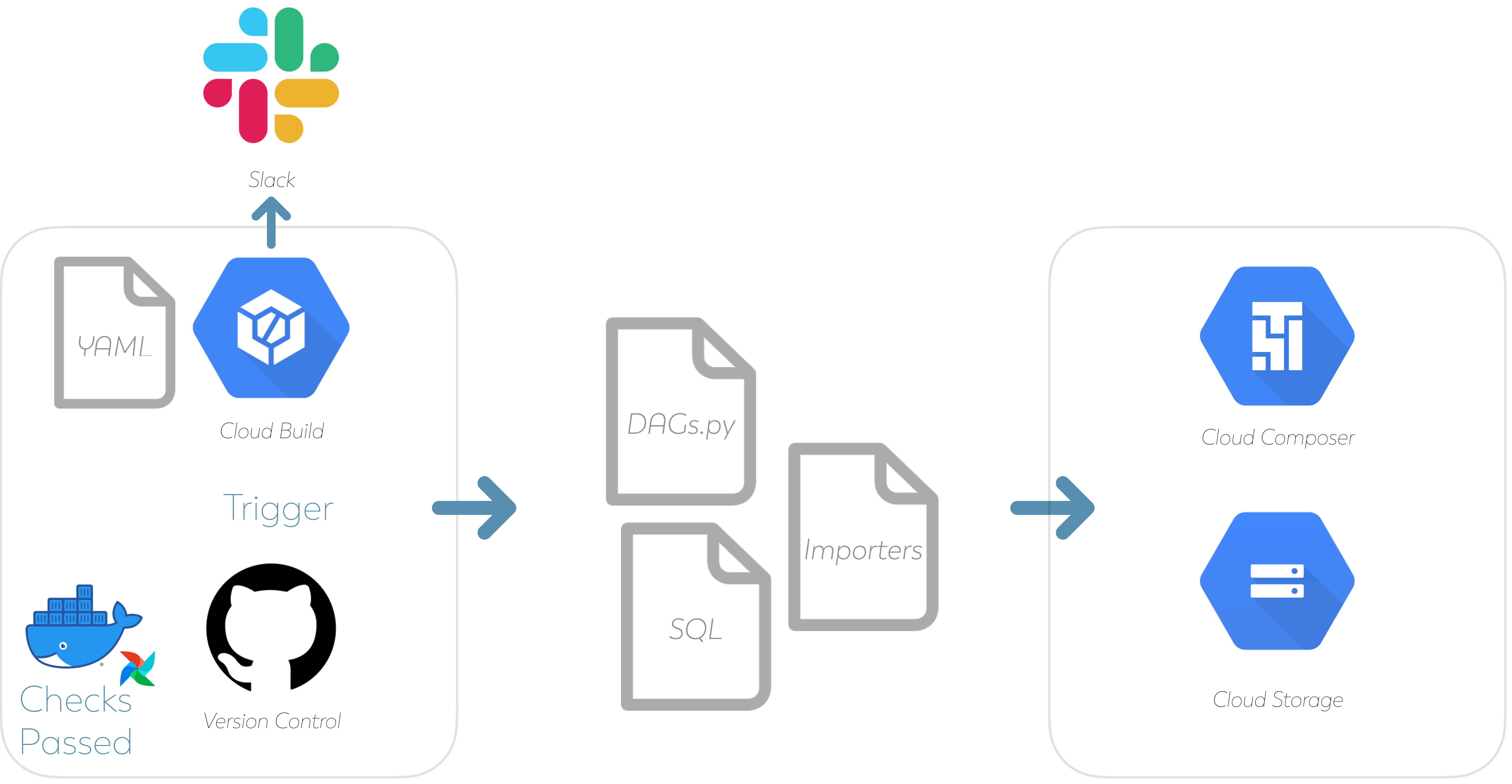
CI/CD



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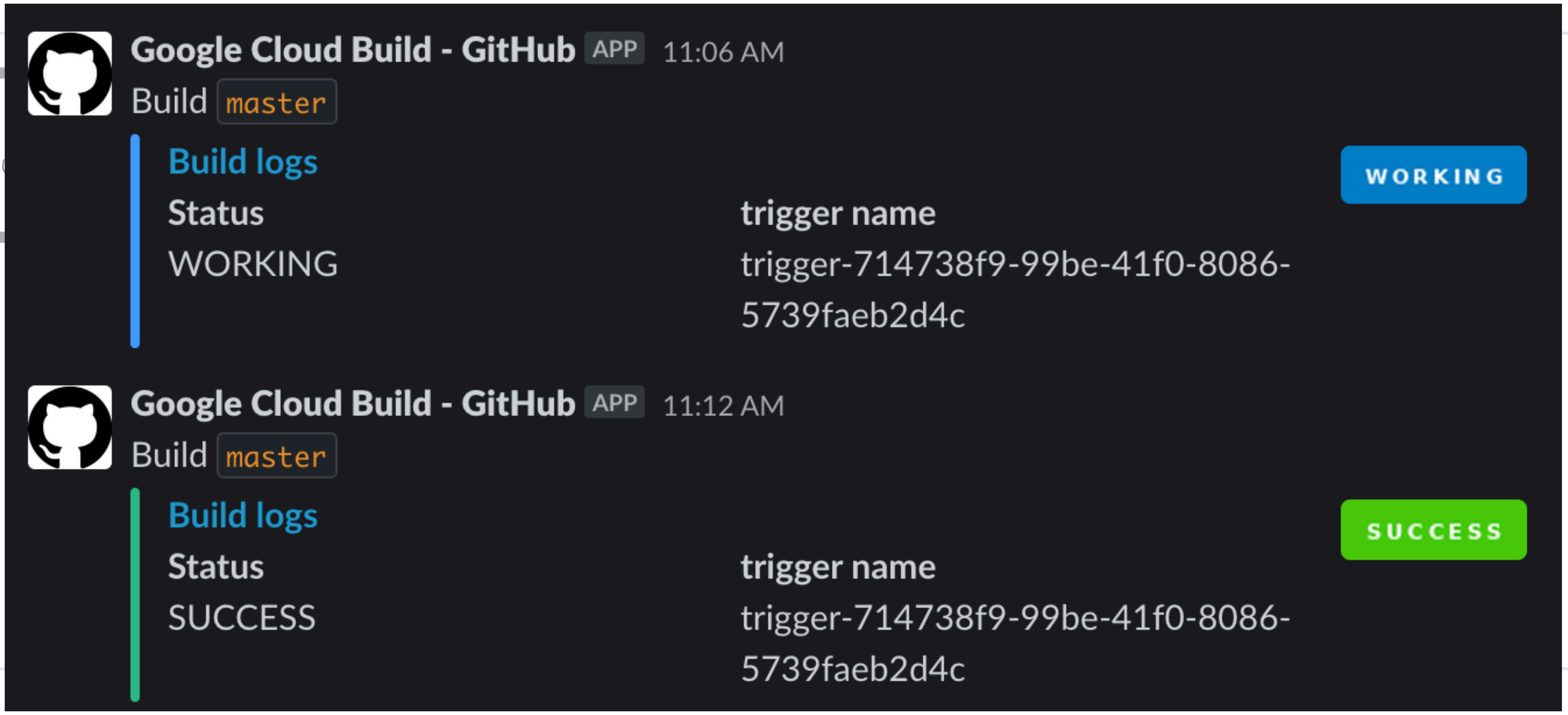
CI/CD

Slack



Google Cloud Build - GitHub APP 11:06 AM
Build `master`
Build logs
Status
WORKING
trigger name
trigger-714738f9-99be-41f0-8086-5739faeb2d4c

Google Cloud Build - GitHub APP 11:12 AM
Build `master`
Build logs
Status
SUCCESS
trigger name
trigger-714738f9-99be-41f0-8086-5739faeb2d4c

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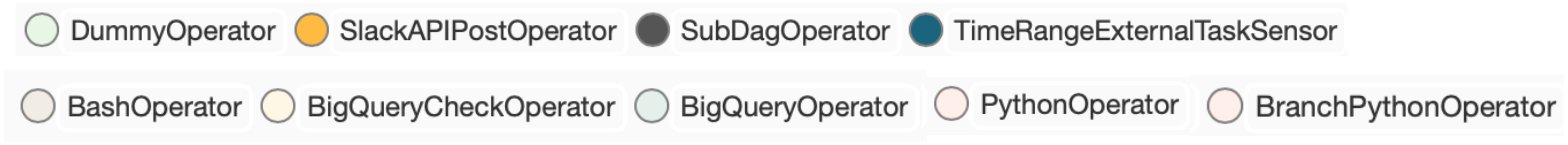
AGENDA

DAGs

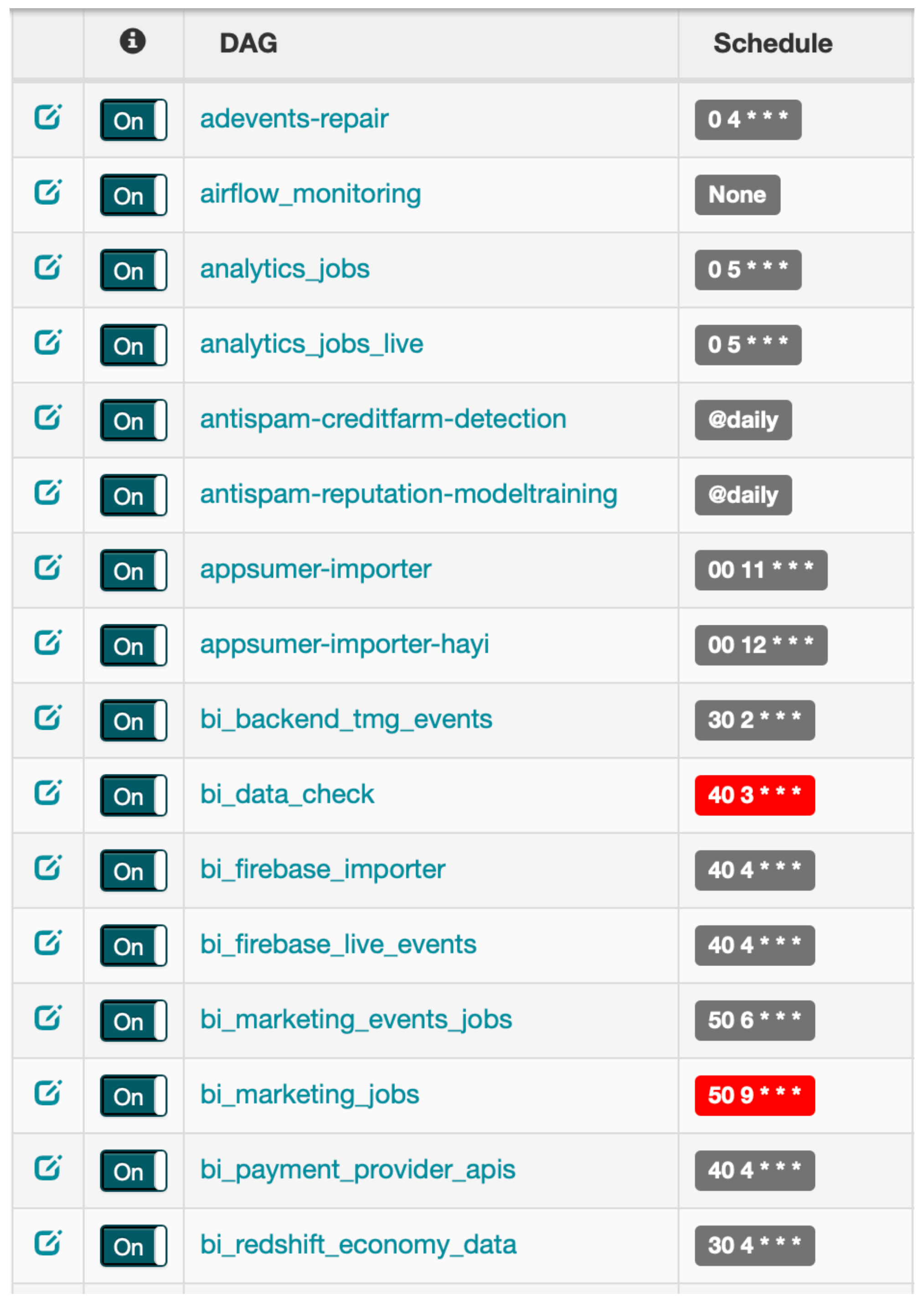


DummyOperator · SlackAPIPostOperator · SubDagOperator · TimeRangeExternalTaskSensor

BashOperator · BigQueryCheckOperator · BigQueryOperator · PythonOperator · BranchPythonOperator

Operators

- 26 DAGs
- Sub-DAGs
- Branching
- Jinja Templating
- Hooks
- Pools
- Trigger rules



		DAG	Schedule
	On	adevents-repair	0 4 * * *
	On	airflow_monitoring	None
	On	analytics_jobs	0 5 * * *
	On	analytics_jobs_live	0 5 * * *
	On	antispam-creditfarm-detection	@daily
	On	antispam-reputation-modeltraining	@daily
	On	appsumer-importer	00 11 * * *
	On	appsumer-importer-hayi	00 12 * * *
	On	bi_backend_tmg_events	30 2 * * *
	On	bi_data_check	40 3 * * *
	On	bi_firebase_importer	40 4 * * *
	On	bi_firebase_live_events	40 4 * * *
	On	bi_marketing_events_jobs	50 6 * * *
	On	bi_marketing_jobs	50 9 * * *
	On	bi_payment_provider_apis	40 4 * * *
	On	bi_redshift_economy_data	30 4 * * *

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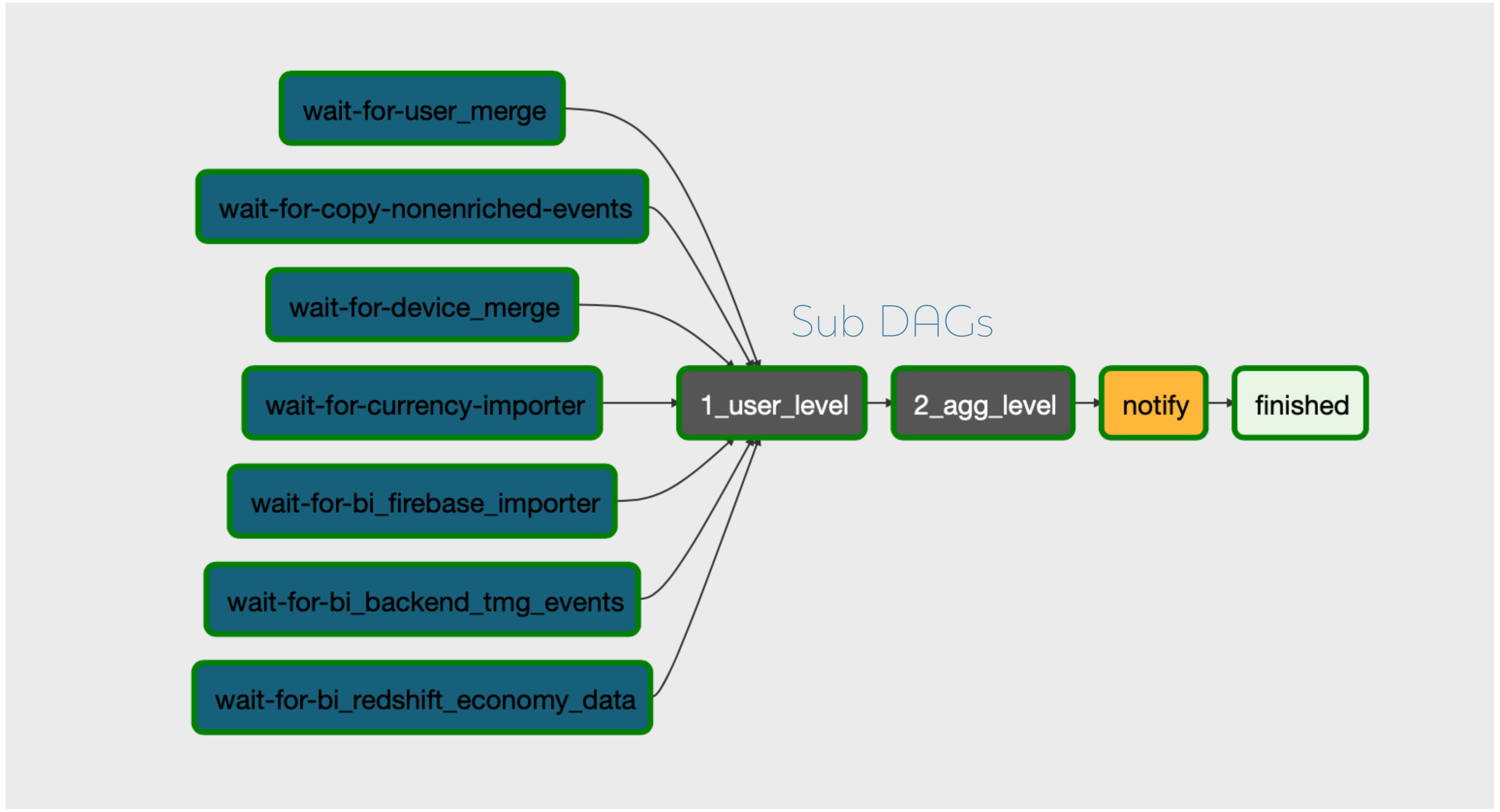
● TimeRangeExternalTaskSensor

● SubDagOperator

The Core

Analytics - Workflow


wait-for-user_merge
wait-for-copy-nonenriched-events
wait-for-device_merge
wait-for-currency-importer
wait-for-bi_firebase_importer
wait-for-bi_backend_tmg_events
wait-for-bi_redshift_economy_data
Sub DAGs
1_user_level
2_agg_level
notify
finished

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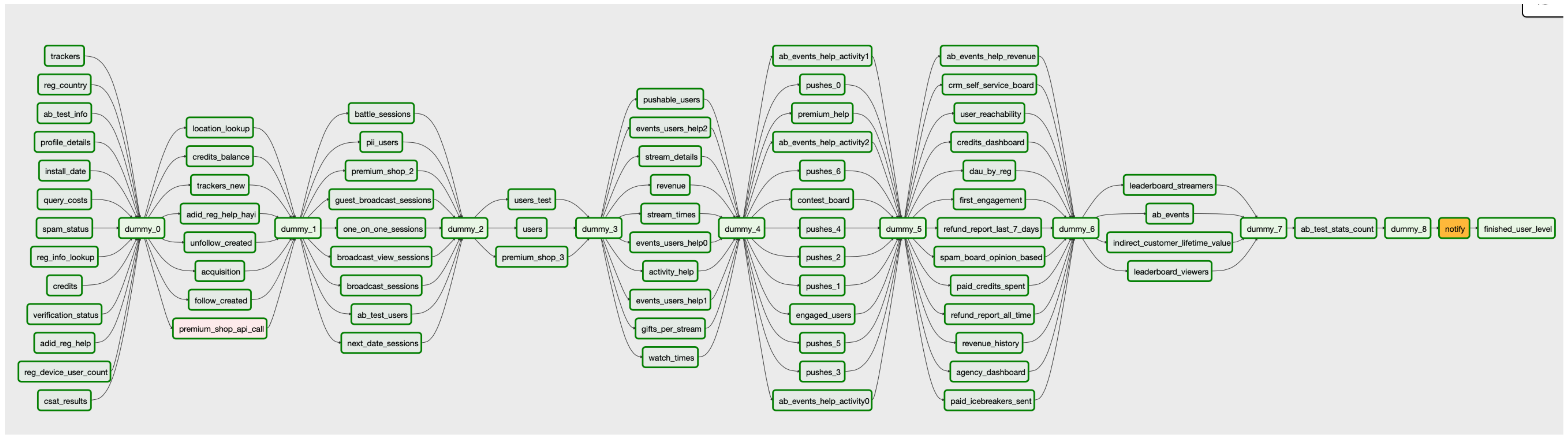
BigQueryOperator

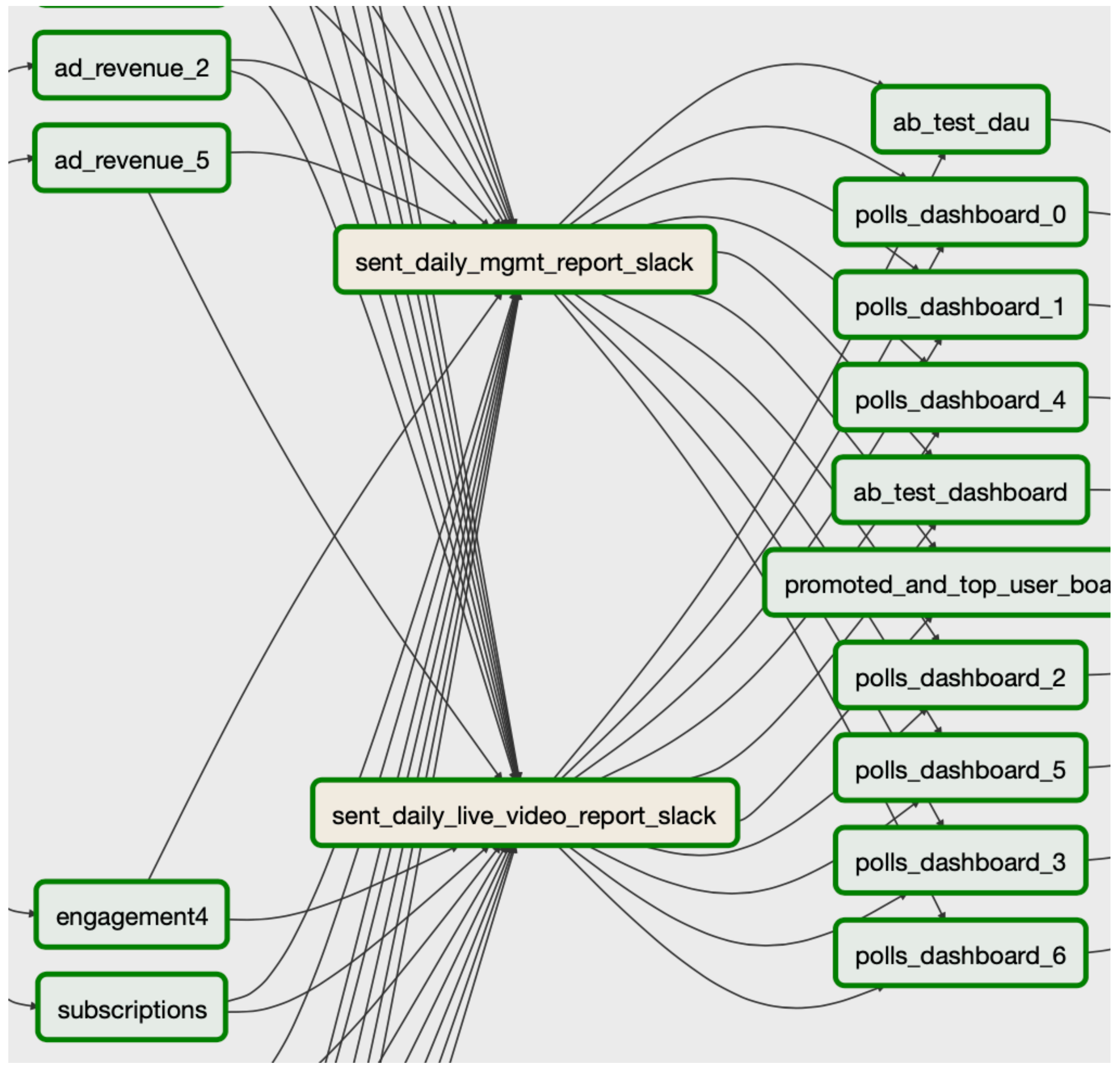
The Core

Sub DAG

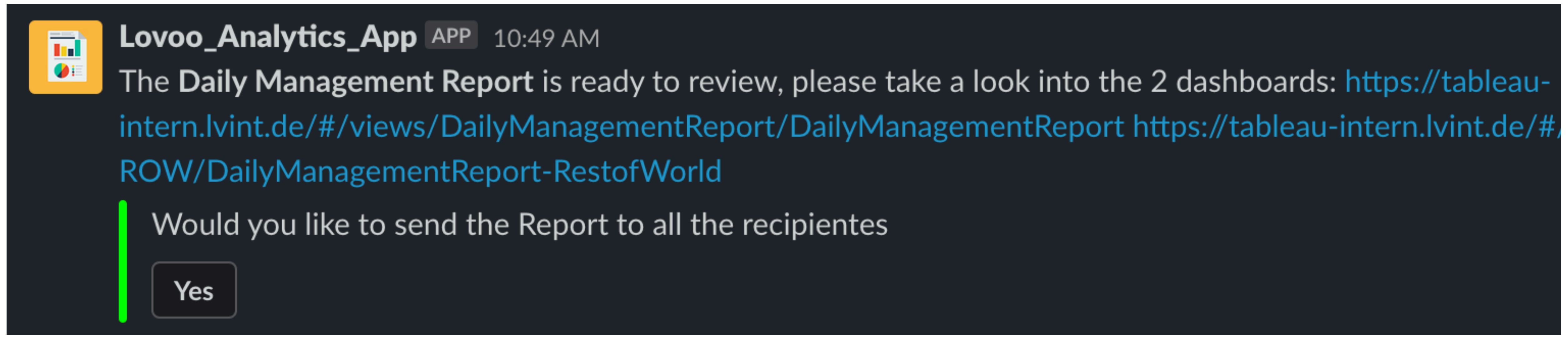


BashOperator

Reports!



Slack Webhook

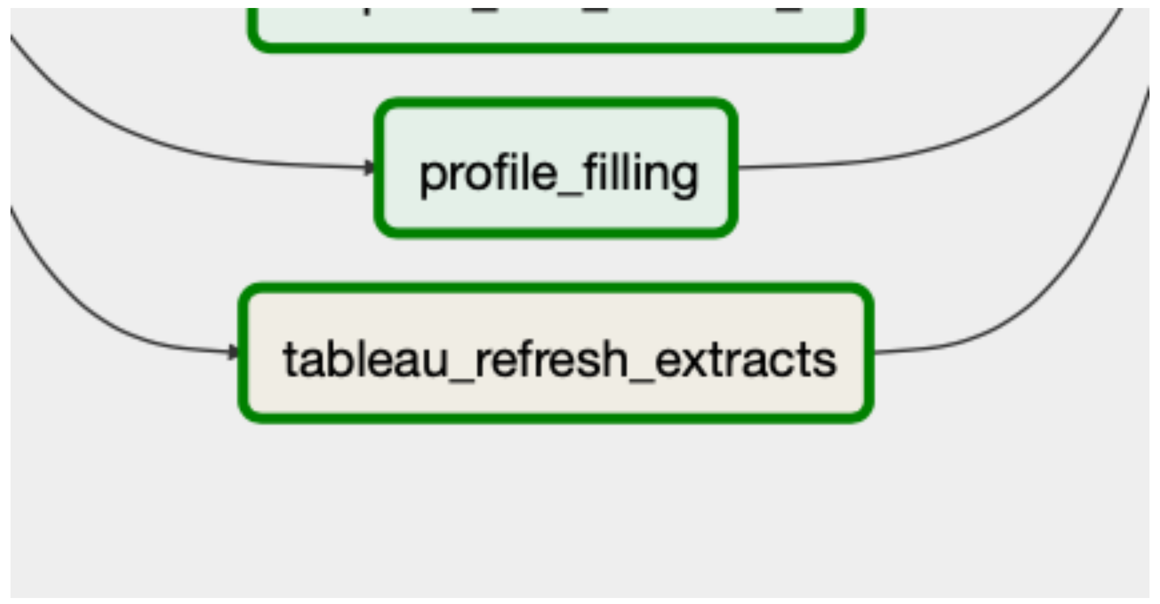

Lovoo_Analytics_App APP 10:49 AM
The **Daily Management Report** is ready to review, please take a look into the 2 dashboards: https://tableau-intern.lvint.de/#/views/DailyManagementReport/DailyManagementReport https://tableau-intern.lvint.de/#/ROW/DailyManagementReport-RestofWorld

Would you like to send the Report to all the recipientes

Yes

BashOperator

Tableau Extracts



bash_command

```
curl -X POST http://35.205.226.12:8007
```

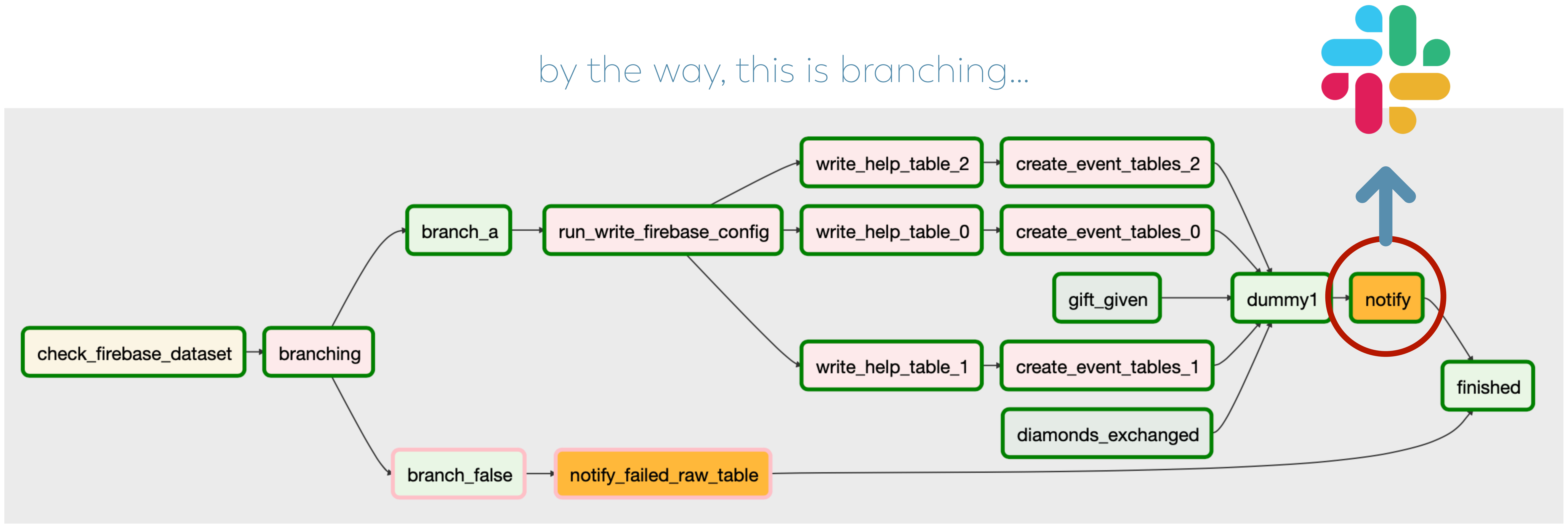
+ a b | e a u

```
$tabcmd runschedule "Daily Extract Refreshes (9:00 AM)"
```

SlackAPIPostOperator

Is Airflow finished?

by the way, this is branching...



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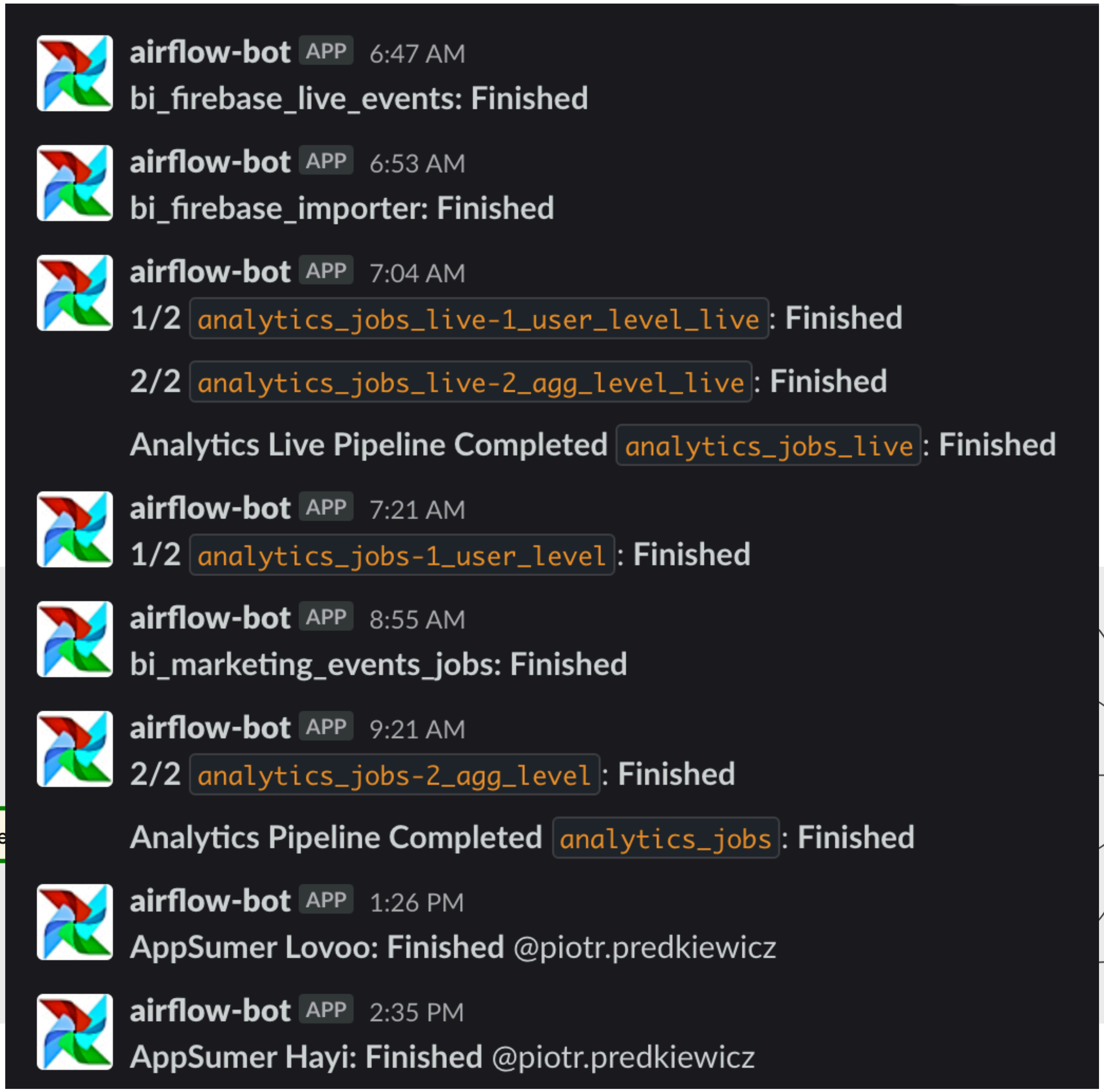
SlackAPIPostOperator

Is Airflow finished?



airflow-bot APP 6:47 AM
bi_firebase_live_events: Finished

airflow-bot APP 6:53 AM
bi_firebase_importer: Finished

airflow-bot APP 7:04 AM
1/2 `analytics_jobs_live-1_user_level_live`: Finished
2/2 `analytics_jobs_live-2_agg_level_live`: Finished
Analytics Live Pipeline Completed `analytics_jobs_live`: Finished

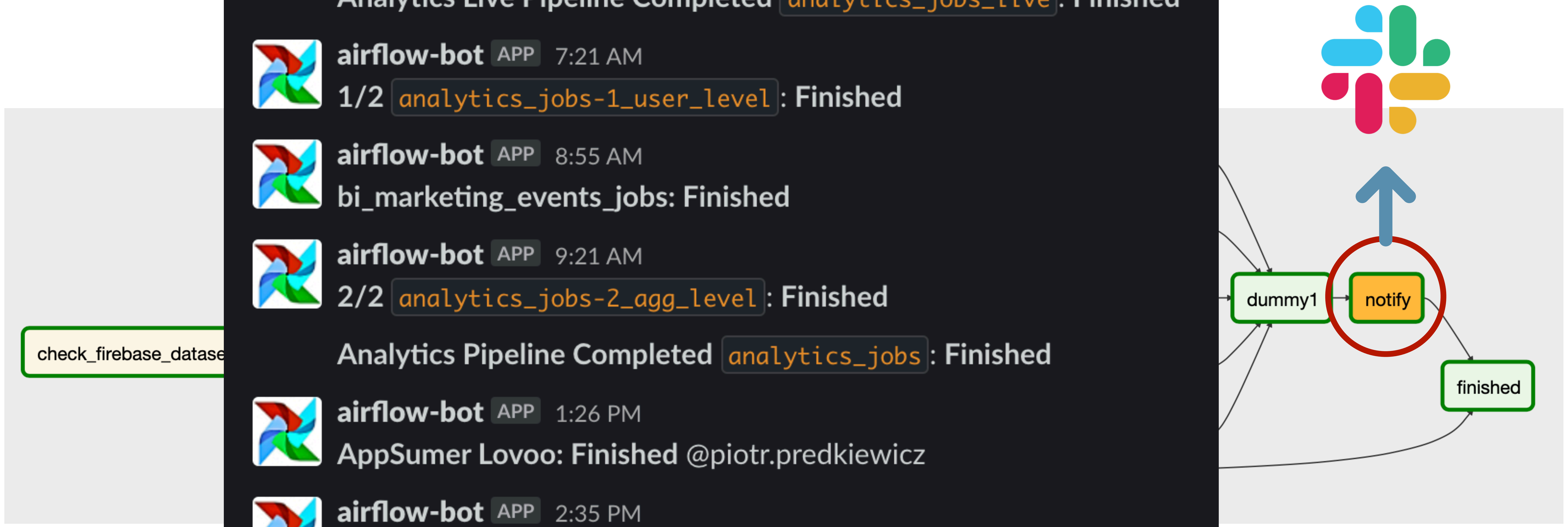
airflow-bot APP 7:21 AM
1/2 `analytics_jobs-1_user_level`: Finished

airflow-bot APP 8:55 AM
bi_marketing_events_jobs: Finished

airflow-bot APP 9:21 AM
2/2 `analytics_jobs-2_agg_level`: Finished
Analytics Pipeline Completed `analytics_jobs`: Finished

airflow-bot APP 1:26 PM
AppSumer Lovoo: Finished @piotr.predkiewicz

airflow-bot APP 2:35 PM
AppSumer Hayi: Finished @piotr.predkiewicz



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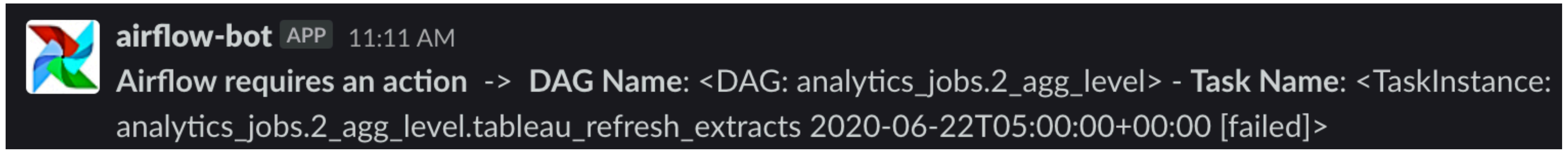
Error Alerting

```
'on_failure_callback': on_failure_callback,
```



airflow-bot APP 11:11 AM
Airflow requires an action -> **DAG Name**: <DAG: analytics_jobs.2_agg_level> - **Task Name**: <TaskInstance: analytics_jobs.2_agg_level.tableau_refresh_extracts 2020-06-22T05:00:00+00:00 [failed]>

```
def on_failure_callback(context):
    operator = SlackAPIPostOperator(
        task_id='notify_fail',
        channel="#the_channel",
        token='your_Slack_bot_token',
        username='airflow-bot',
        text= str('*Airflow requires an action* {} Task: {}').format(
            str(context['dag']), str(context['task_instance']))
    )
    return operator.execute(context=context)
```

PythonOperator

Integrating Data Sources

this code belongs to the DAG.py file

```
t1a = PythonOperator(
    task_id='load_table_lovoo_transaction_groups_{}'.format(i),
    python_callable=import_day_callable,
    provide_context=True,
    templates_dict={'exec_date': exec_date, 'table_name':'lovoo_transaction_groups'},
    dag=dag)
```

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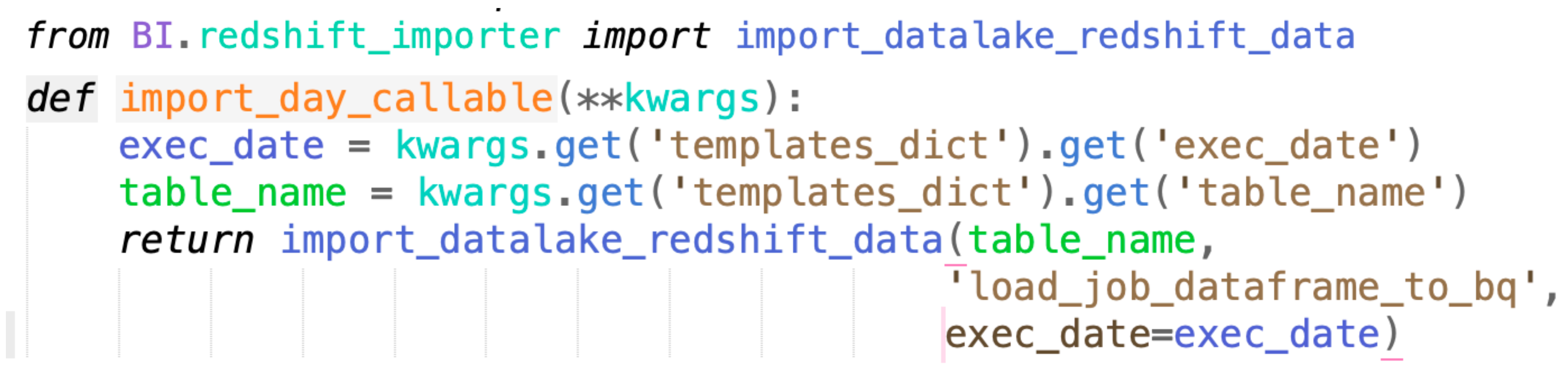
PythonOperator

Integrating Data Sources

this code belongs to the DAG.py file



```python
from BI.redshift_importer import import_datalake_redshift_data

def import_day_callable(**kwargs):
    exec_date = kwargs.get('templates_dict').get('exec_date')
    table_name = kwargs.get('templates_dict').get('table_name')
    return import_datalake_redshift_data(table_name,
                                         'load_job_dataframe_to_bq',
                                         exec_date=exec_date)
```

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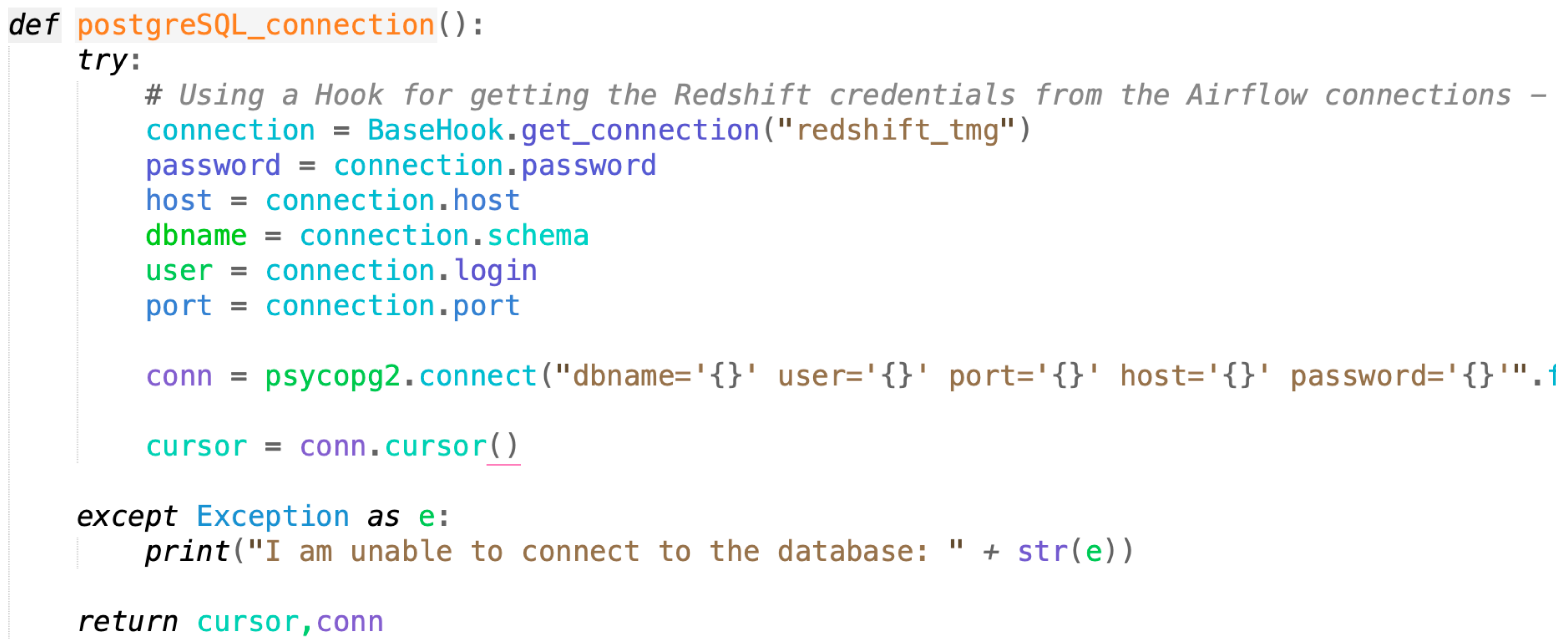
PythonOperator

Integrating Data Sources

this code belongs to the importer.py file



```
def postgreSQL_connection():
    try:
        # Using a Hook for getting the Redshift credentials from the Airflow connections –
        connection = BaseHook.get_connection("redshift_tmg")
        password = connection.password
        host = connection.host
        dbname = connection.schema
        user = connection.login
        port = connection.port

        conn = psycopg2.connect("dbname='{}' user='{}' port='{}' host='{}' password='{}'".f

        cursor = conn.cursor()

    except Exception as e:
        print("I am unable to connect to the database: " + str(e))

    return cursor,conn
```

PythonOperator

Integrating Data Sources

this pseudo-code belongs to the importer.py file

```
def import_datalake_redshift_data(table_name, method_type, exec_date, **kwargs):

    # Cursor & Connection
    cursor,conn = postgreSQL_connection()

    - Create dynamically a SQL query using the input parameters table_name and exec_date
    query = "select * from a_datalake.{} where data_updated_at::date >= '{}'".format(table_name, exec_date)

    - Use the query to request the data using the cursor
    cursor.execute(query)

    - use any method to upload the data to BigQuery
    df = cursor.fetchall()
    df = pd.DataFrame(df)
    job = client.load_table_from_dataframe(
    df, table_name, job_config=job_config
    )
    return whether it was successful or not
```

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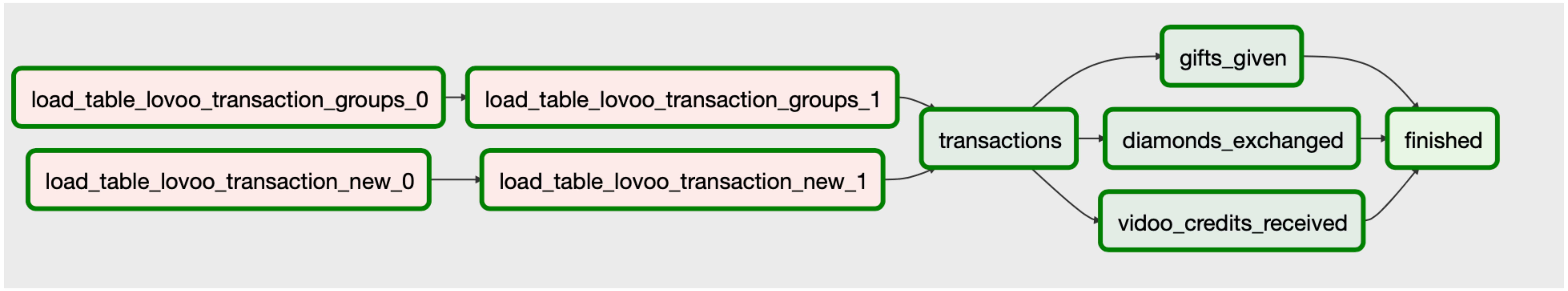
PythonOperator

Integrating Data Sources

2 Tables - 2 Days -> ELT in BQ


load_table_lovoo_transaction_groups_0
load_table_lovoo_transaction_groups_1
load_table_lovoo_transaction_new_0
load_table_lovoo_transaction_new_1
transactions
gifts_given
diamonds_exchanged
vidoo_credits_received
finished

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PythonOperator

Data Importers

- Redshift
- Firebase (very dynamic)
- Google Cloud Storage (Adjust, Merger)
- Appsumer, Shopify, Paypal, AppStore, Adyen
- S3 Storage

AGENDA

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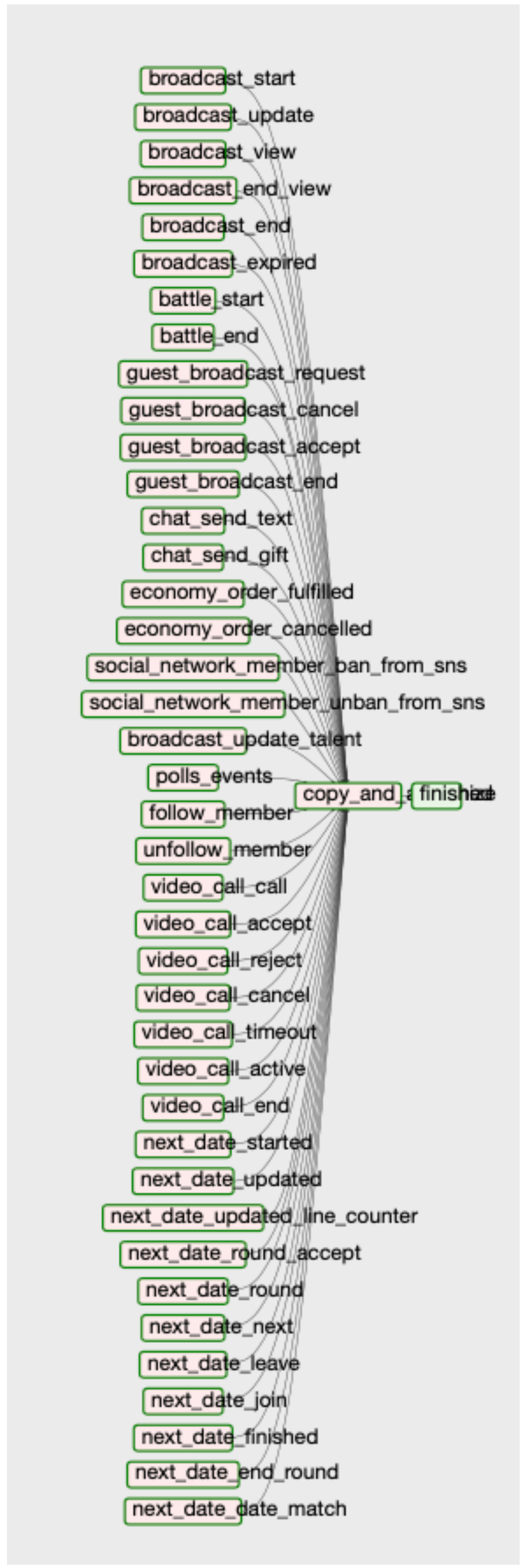
PythonOperator

Creating Tasks Dynamically



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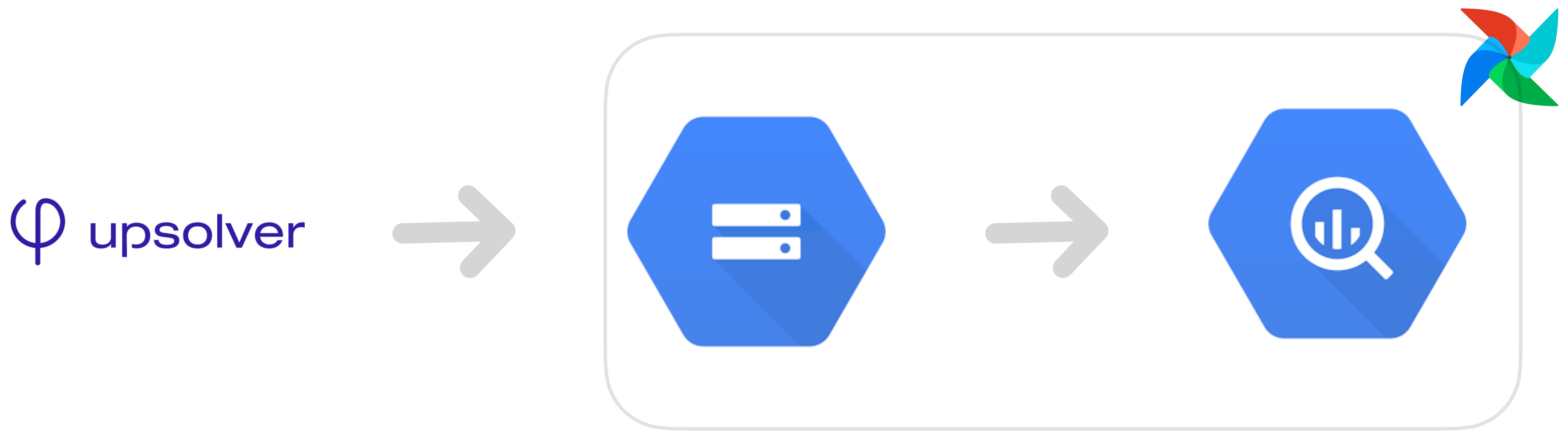
PythonOperator

Creating Tasks Dynamically

1. Creating a plain text with meaningful structure
2. Create a task based on a PythonOperator
3. Define and write your Callable (your custom code)



PythonOperator

JSON File

Creating Tasks Dynamically

```
{
  "broadcast_start": {
    "id": "81ce53e3-2ca6-48a2-88f7-493f7fc2c364",
    "format": "json"
  },
  "broadcast_update": {
    "id": "de7cbe04-9b53-4b4c-bc18-4d065ed3830e",
    "format": "json"
  },
  "broadcast_view": {
    "id": "2a4a0093-baee-47a2-8817-aebdb469b1b1",
    "format": "json"
  },
  "broadcast_end_view": {
    "id": "3af65f80-94a3-42c4-8ed9-502134605d27",
    "format": "json"
  },
  "broadcast_end": {
    "id": "37fa9fdf-8384-41a7-83aa-1263814b3585",
    "format": "json"
  },
```

PythonOperator

Creating Tasks Dynamically

this code belongs to the DAG.py file

```
# Iterates over all the Mapping file and extracts the event name for generating all the task-events
for event_name in event_mapping:
    event_name_task = PythonOperator(
        task_id=str(event_name),
        provide_context=True,
        python_callable=run_import_day,
        templates_dict={'exec_date': exec_date,'event_name': event_name,
                        'dataset': dataset, 'bucket_name': bucket_name},
        dag=dag)
```

PythonOperator

Creating Tasks Dynamically

this code belongs to the DAG.py file

```
# Function that will be called by the Python operator and will write a table partition in BQ
def run_import_day(**kwargs):
    dataset = 'events_input_analytics_tmg_backend'
    bucket_name = 'lovoo-tmg-transfer'
    import_gcs_to_bq(exec_date=kwargs.get('templates_dict').get('exec_date'),
                     event_name=kwargs.get('templates_dict').get('event_name'),
                     dataset=kwargs.get('templates_dict').get('dataset'),
                     bucket_name=kwargs.get('templates_dict').get('bucket_name'),
    )
```

PythonOperator

Creating Tasks Dynamically

this is your custom code (Pseudo-Code)

```
def import_gcs_to_bq(exec_date, event_name, dataset, bucket_name,**op_kwargs):

    # read the structured JSON file
    event_mapping = json.load(read_file)

    # mapping the id and the event_name
    id_event = event_mapping[event_name]['id']

    # gathering the blobs inside the bucket - array of paths
    path_array.append('gs://{0}/{1}/exec_date_file.json'.format(bucket_name, id_event))

    # BigQuery Job to Load the JSON files to a table
    load_job = bq_client.load_table_from_uri(
        tuple(path path_array), table_dest, job_config=job_config
    )
```

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PythonOperator

Creating Tasks Dynamically

this i seudo-Code)

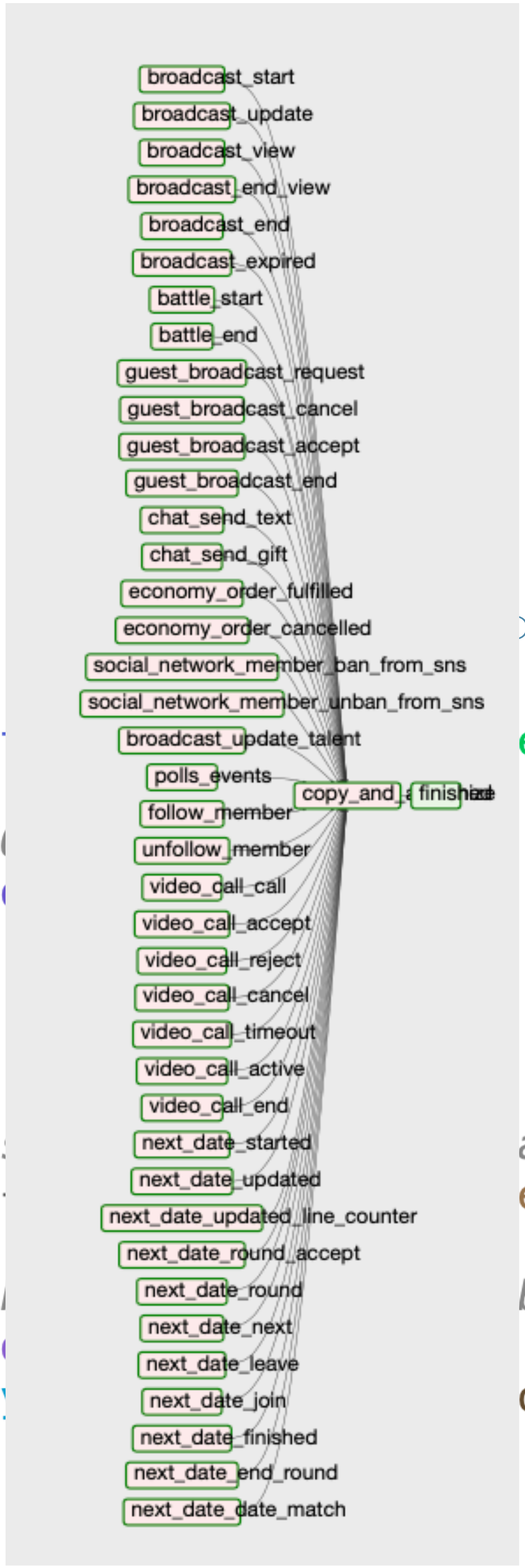
```
def import_gcs_to_bq(exec_da et, bucket_name,**op_kwargs):

    # read the structured JS
    event_mapping = json.loa

    # mapping the id and the
    id_event = event_mapping

    # gathering the blobs in ay of paths
    path_array.append('gs:// e.json'.format(bucket_name, id_event))

    # BigQuery Job to Load t ble
    load_job = bq_client.loa
        tuple(path path_array onfig=job_config
    )
```



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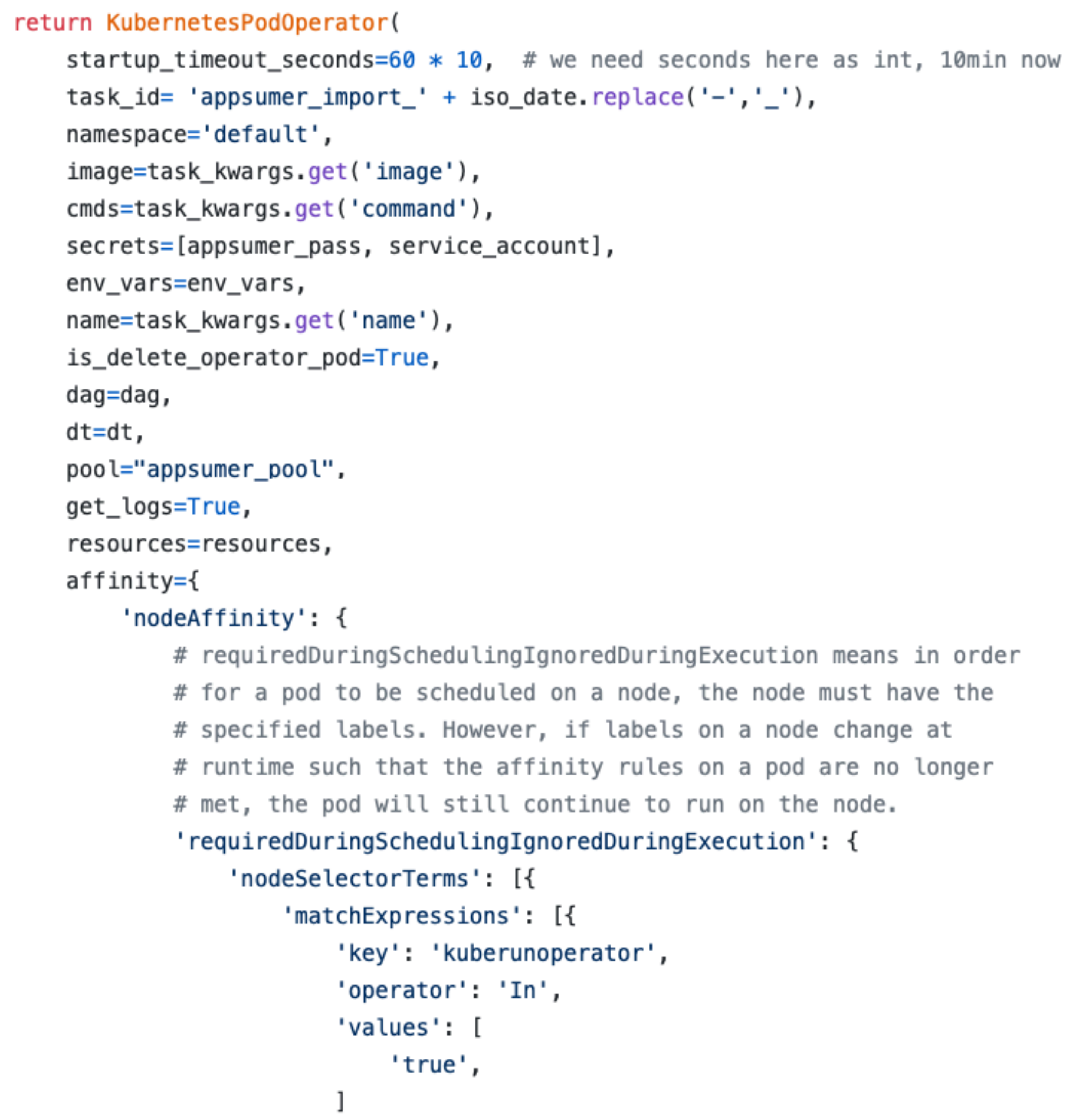
Recap and Conclusion



```
return KubernetesPodOperator(
    startup_timeout_seconds=60 * 10,  # we need seconds here as int, 10min now
    task_id= 'appsumer_import_' + iso_date.replace('-','_'),
    namespace='default',
    image=task_kwargs.get('image'),
    cmds=task_kwargs.get('command'),
    secrets=[appsumer_pass, service_account],
    env_vars=env_vars,
    name=task_kwargs.get('name'),
    is_delete_operator_pod=True,
    dag=dag,
    dt=dt,
    pool="appsumer_pool",
    get_logs=True,
    resources=resources,
    affinity={
        'nodeAffinity': {
            # requiredDuringSchedulingIgnoredDuringExecution means in order
            # for a pod to be scheduled on a node, the node must have the
            # specified labels. However, if labels on a node change at
            # runtime such that the affinity rules on a pod are no longer
            # met, the pod will still continue to run on the node.
            'requiredDuringSchedulingIgnoredDuringExecution': {
                'nodeSelectorTerms': [{
                    'matchExpressions': [{
                        'key': 'kuberunoperator',
                        'operator': 'In',
                        'values': [
                            'true',
                        ]
```

kubernetes

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Senior Business Intelligence Architect @LOVOO

Recap and Conclusion

- Using an Alpha version (Google Composer) in Production was challenging!
- Focus on what’s important - Google Cloud Composer
- Airflow leverages a bunch of Operators OOTB
- Always room for improvement
- No magic recipe to use - stay flexible

Gracias.

Feedback and Questions

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July 16, 2020 Berlin - Germany

THE MEET GROUP LOVOO Airflow Summit 2020