Seminar

July 25th, 2020

DATA SCIENCE INDONESIA

Data Science Indonesia
East Java Region

JATIM CAMP #5

Build Data Ecosystem for Better Analytics

Data Pipelining for Creating Great Data Ecosystem

with

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Supported by

holistics

Enjoyable Data Pipeline

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About

Rendy Bambang Junior

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2019 - now : Senior Data Manager at Ruangguru

2014 - 2019 : Data Engineering Lead, Data System Architect at Traveloka

Google Developer Expert - Cloud (Big Data Specialization)

Let’s start with **why**,
why we need a **data pipeline**?

Common Issues on Using Data

Common Issues to Use Data

- **Data in many places**: Need to collect data into one place (MySQL, Postgres, log files, CSV, etc.)
- **Many joins**: Need to join data from several places, including asking what the data definition is
- **Dirty data**: testing account, different format across app version, duplicates
- **Don’t know which data should we use**: payment data or transaction data?
- **Unclear definition**: what is a customer?
- **Duplicate effort on processing**: I clean and join that data, you join that too?

Examples of Dirty Data

- Pattern does not match, e.g. email “asep@gmail”, missing “.com”
- Has weird characters, e.g. phone number “081-234-5-67-89”
- Outlier unexpected values, e.g. sales date 1900-01-01
- Need to be parsed, e.g. tags “023-JABAR-022” → str.split(“-”)[1] → “JABAR”
- Duplicates of data, e.g. retries, only the last is success

Data pipeline, as **foundation**
of Data Ecosystem,
“tries” to solve those problems

Data pipeline “tries” to create

1. **One environment**: collect data from various sources into one place

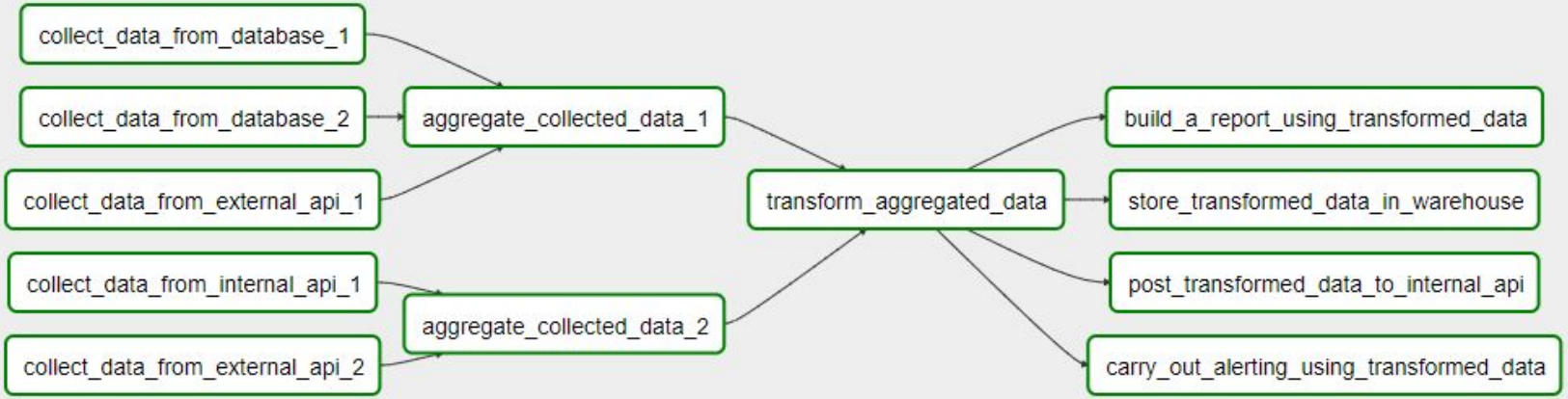
Airflow DAGs Data Profiling Browse Admin Docs About

On DAG: example_dag

Graph View | Tree View | Task Duration | Task Tries | Landing Times | Gantt | Details | Code | Refresh | Delete

running Base date: 2019-10-22 12:06:01 Number of runs: 5 Run: scheduled__2019-10-22T12:06:00+00:00 Layout: Left->Right Go

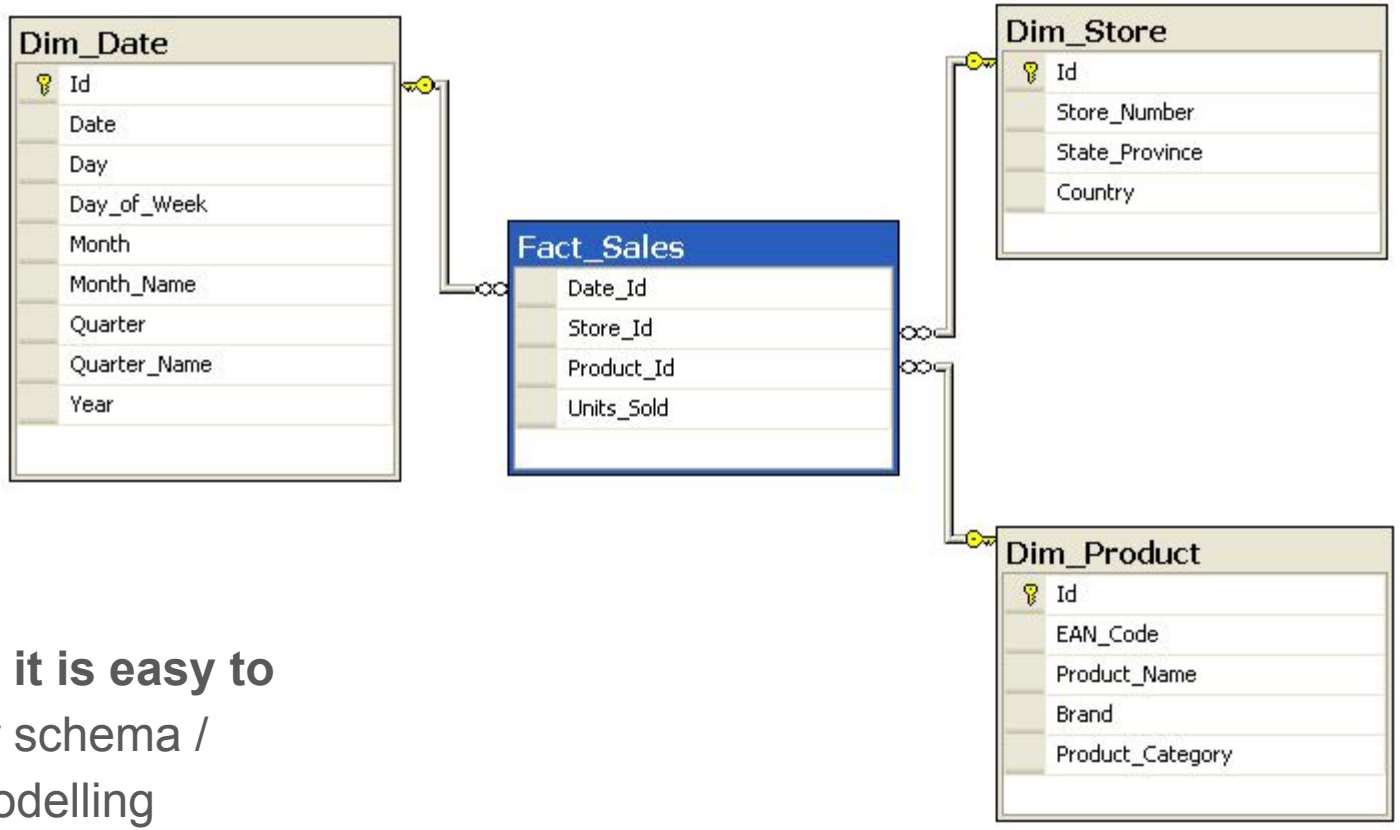
PythonProgramOperator



From Aakash Pydi's Medium Post : Building a Production-Level ETL Pipeline Platform Using Apache Airflow

Data pipeline “tries” to create

1. **One environment:** collect data from various sources into one place
2. **Easier to use data**: pre-joined, transformed, using patterns (star schema / dimensional model, snowflake, data vault, ...)
3. **Single-source-of-truth**: Single table as reference for specific definition



Model data so it is easy to analyze: a star schema / dimensional modelling

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4. **Cleansed data**: exclude testing data, handle different format, deduplicate

Cleanse data so it is easy to use.

Example: cleanse dirty character, make data uniform

```
SELECT
    REGEXP_REPLACE(phone,'[^0-9]','') AS phone,
    LOWER(email) AS email,
FROM table
```

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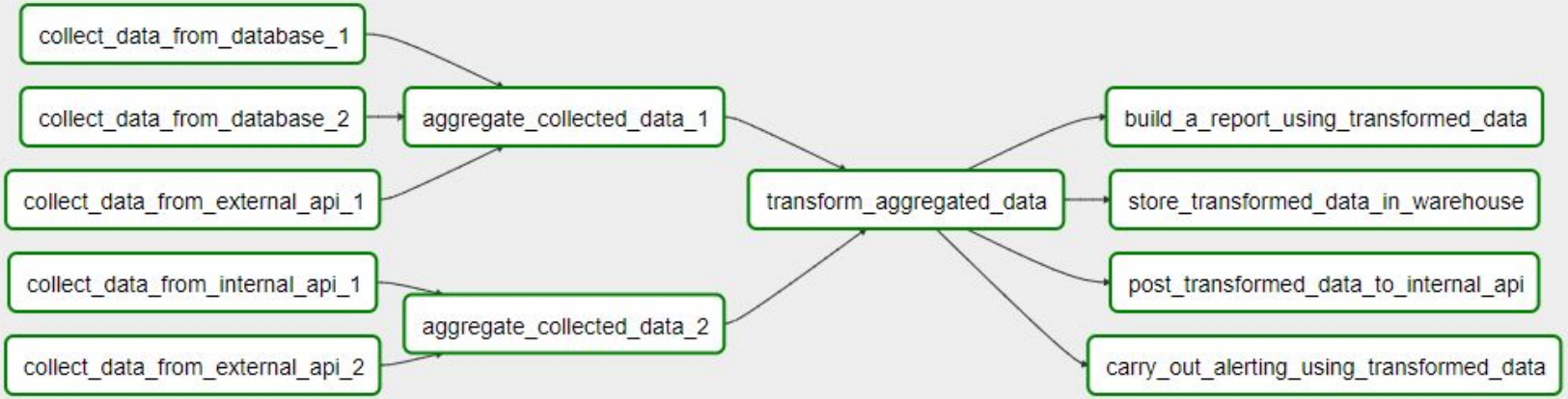

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```python
from airflow import DAG
from airflow.contrib.operators.bigquery_operator import BigQueryOperator

default_args = {
    "start_date": datetime(2020, 1, 1),
    "schedule_interval": "@daily",
}

with DAG(dag_id="user_data_users", default_args=default_dag_args) as dag:
    ...
    sql = """
      SELECT
        LOWER(email) AS email
      FROM `user_data.users`
    """

    transform_data = BigQueryOperator(
        task_id="transform_data",
        sql=sql,
        destination_dataset_table="cleansed_data.users",
        ...
        dag=dag,
    )
    ...
    extract_data >> transform_data >> another_transform_data
```

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5. **Catalog/Dictionary**: clearly described table along with column descriptions
6. **Cost efficiency**: eliminates the need to process in each of the team

Google Cloud Platform | My Project | Search products and

Data Catalog | Search | CREATE

covid | SEARCH

Sort by: Relevance | Systems | Data types | Include public datasets

Name	Description	Type	System	Project	Last modified
summary Dataset: covid19_jhu_csse	Summary COVID-19 cases, aggregated by country/region and province/state. See the original source files here: ...	Table	BigQuery	bigquery-public-data	Jul 22, 2020
mobility_report Dataset: covid19_google_mobility	This dataset is intended to help remediate the impact of COVID-19. It shouldn't be used for medical diagnostic, prognostic, or treatment purposes. It also isn't ...	Table	BigQuery	bigquery-public-data	Jul 22, 2020
covid19_open_data Dataset: covid19_open_data	This dataset contains country-level datasets of daily time-series data related to COVID-19 globally. You can	Table	BigQuery	bigquery-public-data	Jul 22, 2020

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But sometimes it does not solve the problems...

- **Yet another copy of data**, but old data still being used
- Not being used because **hard to understand**
- Not being used because **not trusted** (different number)
- **Failing often**, not reliable, not timely
- **Takes long time to implement**, users end up creating their own data pipeline

Hard to use. Not reliable. Hard to maintain.
Not so enjoyable...

Principles of Enjoyable Data Pipeline

Enjoyable Data Pipeline

1. **Ease of Use** - Gampang dipakai data analysts / data scientists
2. **Trustworthy** - Data yang disajikan berkualitas, bisa dipercaya
3. **Maintainable** - Kode mudah dibaca, mudah diubah, dan didebug

Ease of Use

Ease of Use

- **Close collaboration** with user: Does this make sense to you?
- Tables are **intuitive**. Easy to query: Try to create one dashboard and feel it
- Nice **design trade off** between ease of query and modeling best practice
- Clarity of **definition**
- **Searchable**
- **Verbose** name: descriptive, clear timezone

Trustworthy

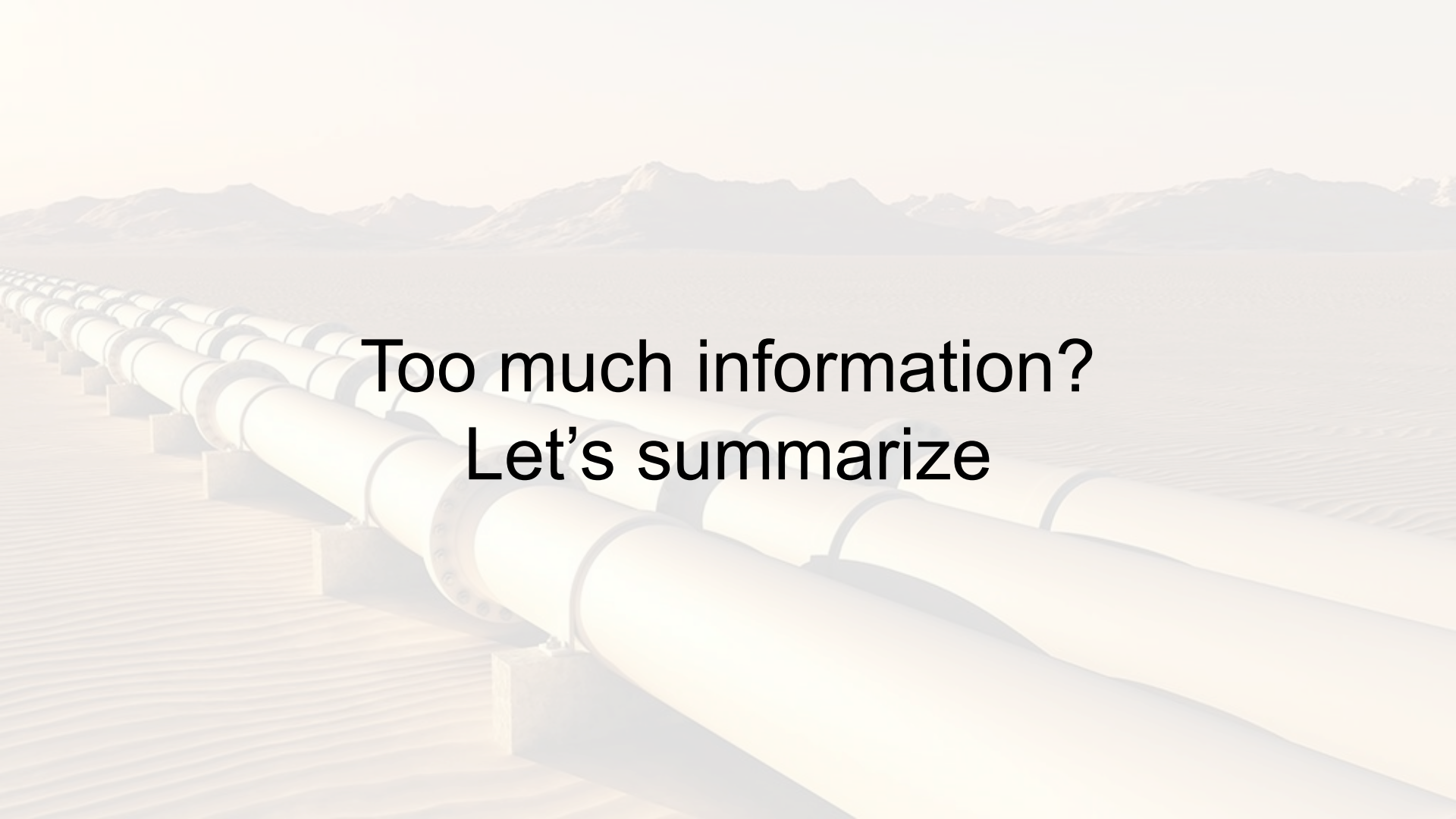
Trustworthy

- Again, **close collaboration** with users: testings, sharing numbers
- **Human-centric** Operations: Over-communicate, active update when issue happens, manage expectation
- Fulfill **Quality**: Timeliness, completeness, uniqueness, consistency
- **Code** Review, Testing
- **SLA**, Alerting, On-Call

Maintainable

Maintainable

- Good **Data Layers** Design: staging → … → warehouse
- **Readable** codes / SQL: alias & CTE naming, indentation, capital
- Clear data **modeling convention**: fact, dim
- **Divide** and Conquer: avoid >300 lines of SQLs
- **Automated Testing**: uniqueness, compleness, validation
- **Idempotent** Processing: deterministic when we rerun



Too much information?
Let’s summarize

Recap

Principles of Enjoyable Data Pipeline

1. **Ease of Use**
2. **Trustworthy**
3. **Maintainable**

Most important things to remember:

1. **Collaborate** closely with user
2. **Human-centric** operations
3. **Craftmanship** on building data pipeline

That’s all folks.

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