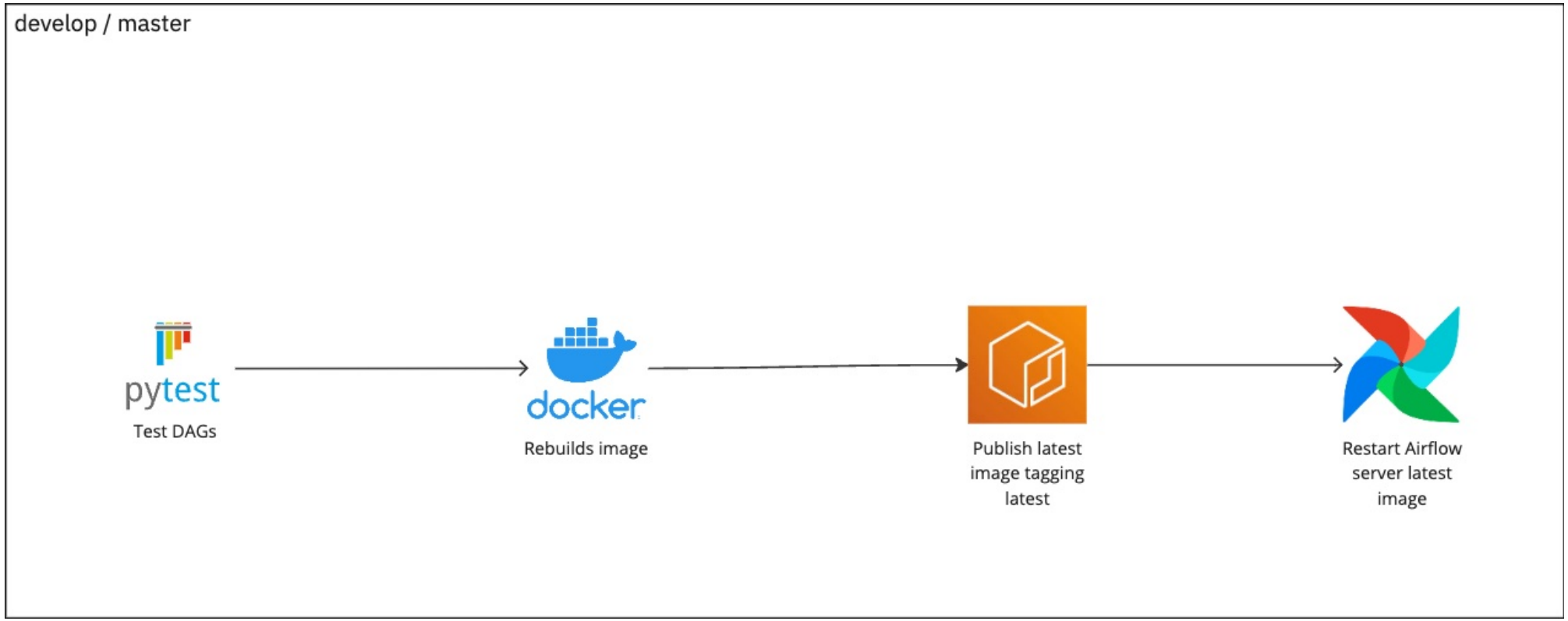

Enterprise Data Ops Airflow
Presented by Nam Tonthat
2023-06-21

📔 Agenda

- 🚀 CI/CD
  - Present
  - Planned
- 🌈 Future of Airflow
- ❓ Questions

Present CI/CD

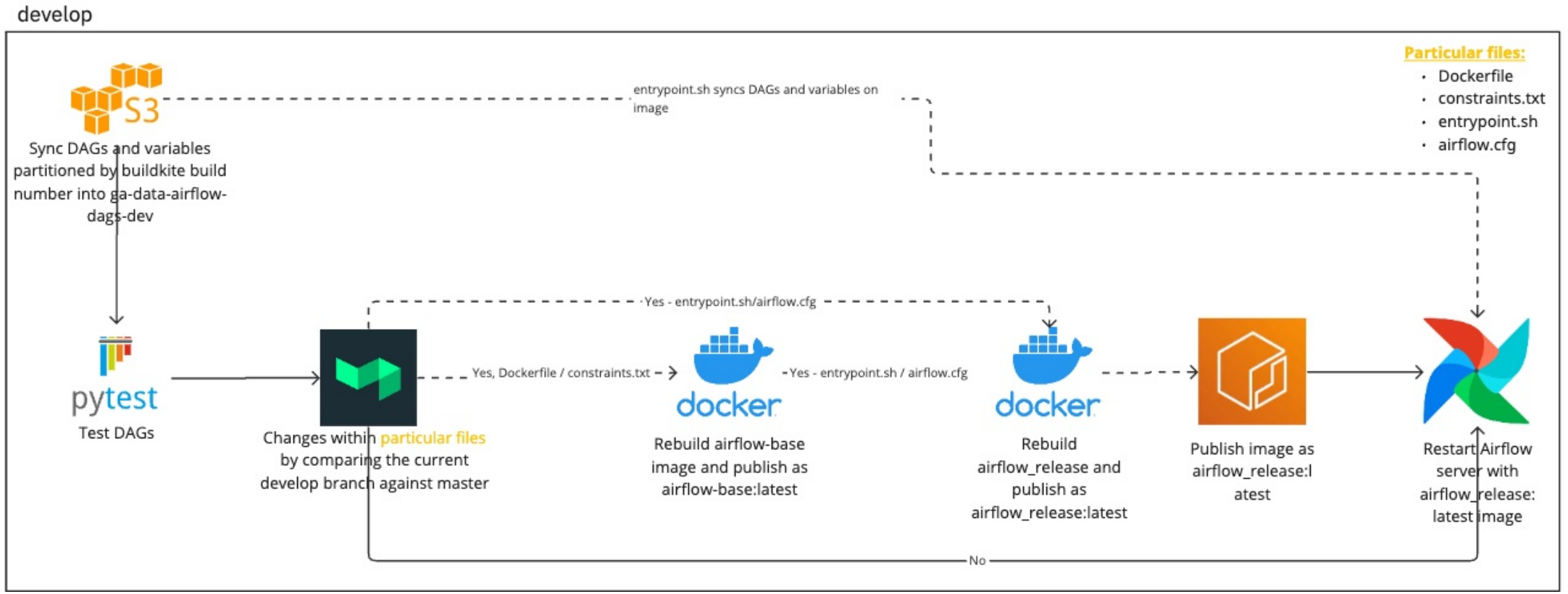
- Builds a new image for any changes
- Publishes this image `~500 MB` each time on updated changes
- Takes 10 minutes for each build



🎯 Planned CI/CD

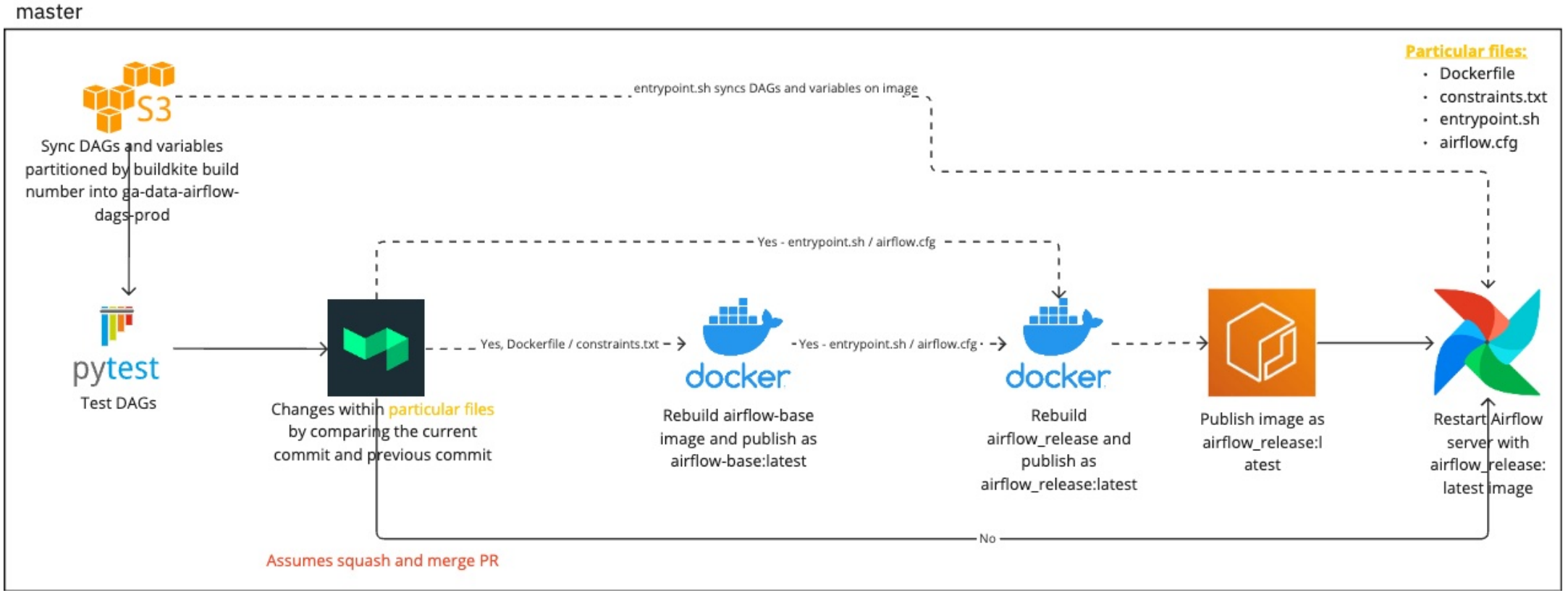
- Goals:
  - Reduce the time to build by 50%
- Achieved by:
  i. Sync `DAGs` / `variables` into `ga-data-airflow-dags-{env}` S3 bucket.
  ii. Splitting the Dockerfile into a multi stage build
    - `airflow_base` : for requirements
    - `airflow_release` : for `entrypoint.sh` / `airflow.cfg` changes
  iii. Update `entrypoint.sh` using `aws s3 sync` to sync DAGs back
- *Other changes*:
  - Using SEEK's open source software plugins (`seek-oss/docker-ecr-publish`)

🎯 Planned CI/CD - `develop`



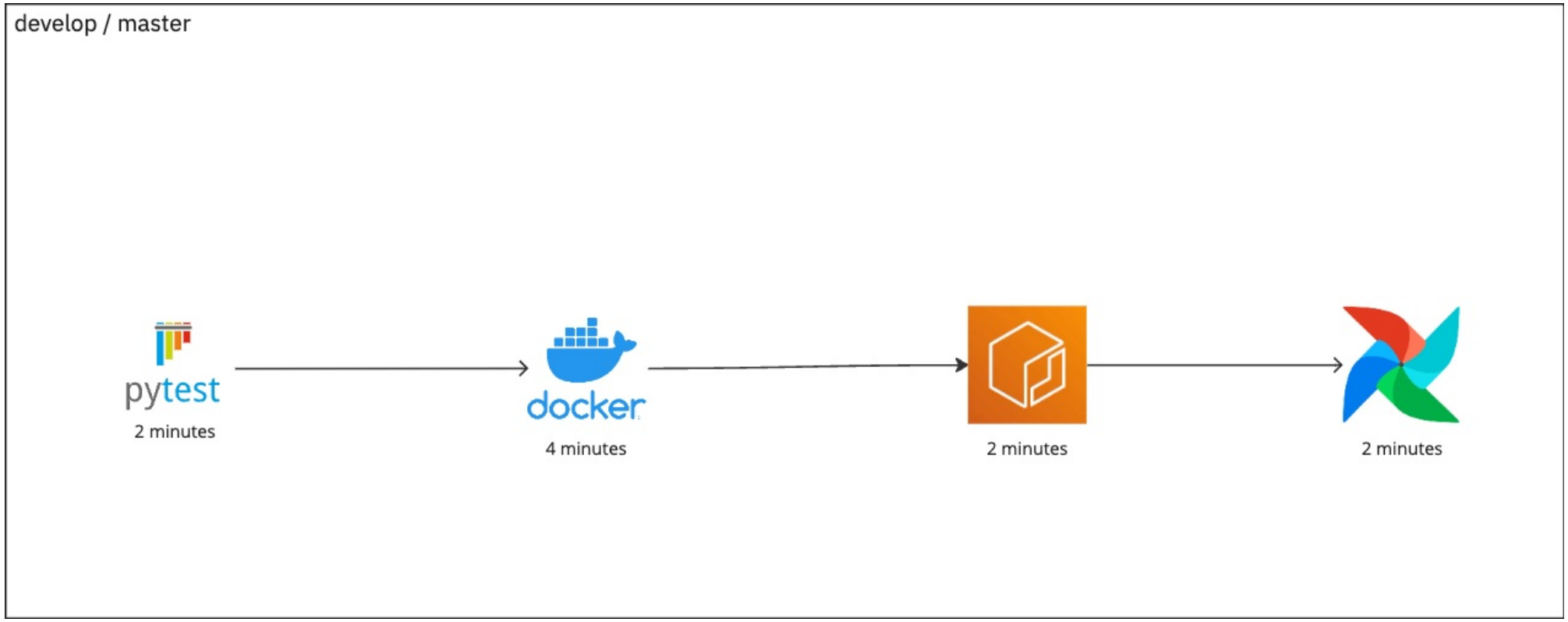
🎯 Planned CI/CD - `master`

Difference between `develop` and `master` is that each PR is a **squash and merge.**



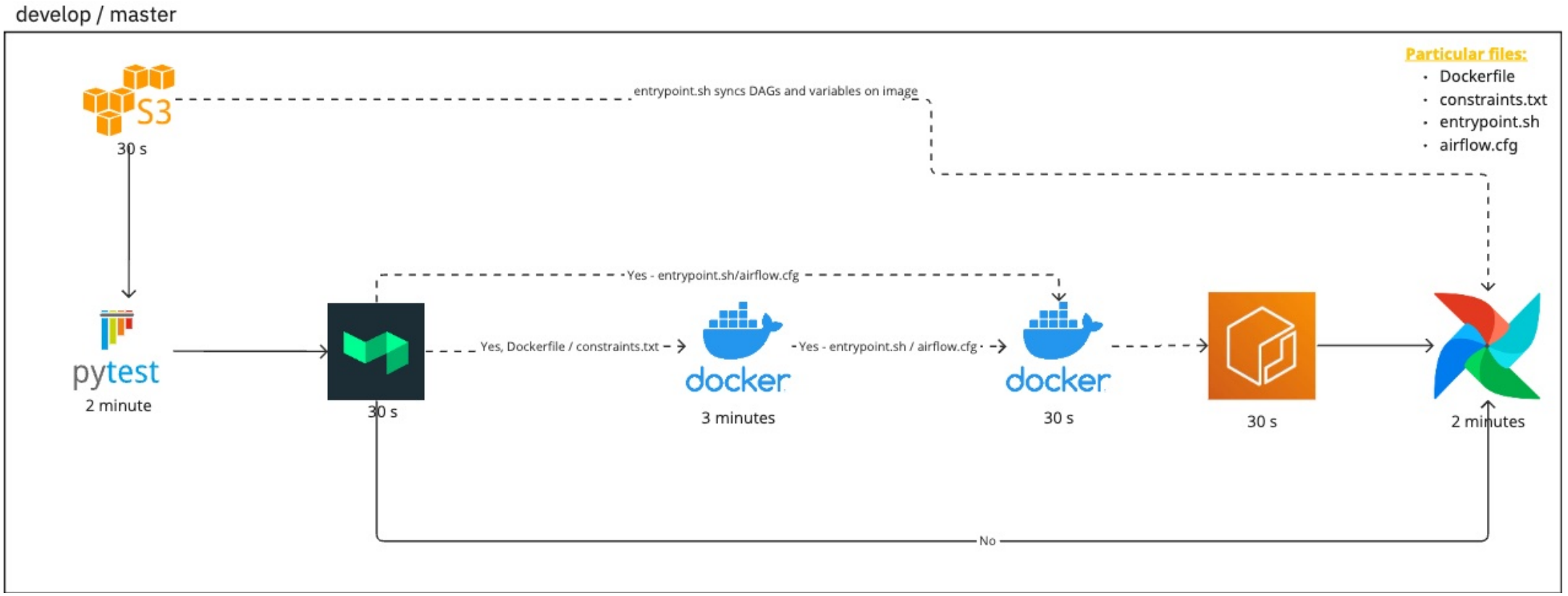
Timing differences - Present CI/CD

- Build time: 10 minutes



Timing differences - Planned CI/CD

- Build times:
  - 5 minutes for DAG / variable changes (most of the time ~95%)
  - 10 minutes for rebuilding image



🚀 Future Airflow

- The use of `variables`
- Dynamic DAGs
- Airflow upgrades

Use of `variables`

- Migration of all `variables` from `dev.yml` and `prod.yml`
- Use `common_airflow.read_airflow_env()` function to pull variables.

Dynamic DAGs

🎯 Motivation

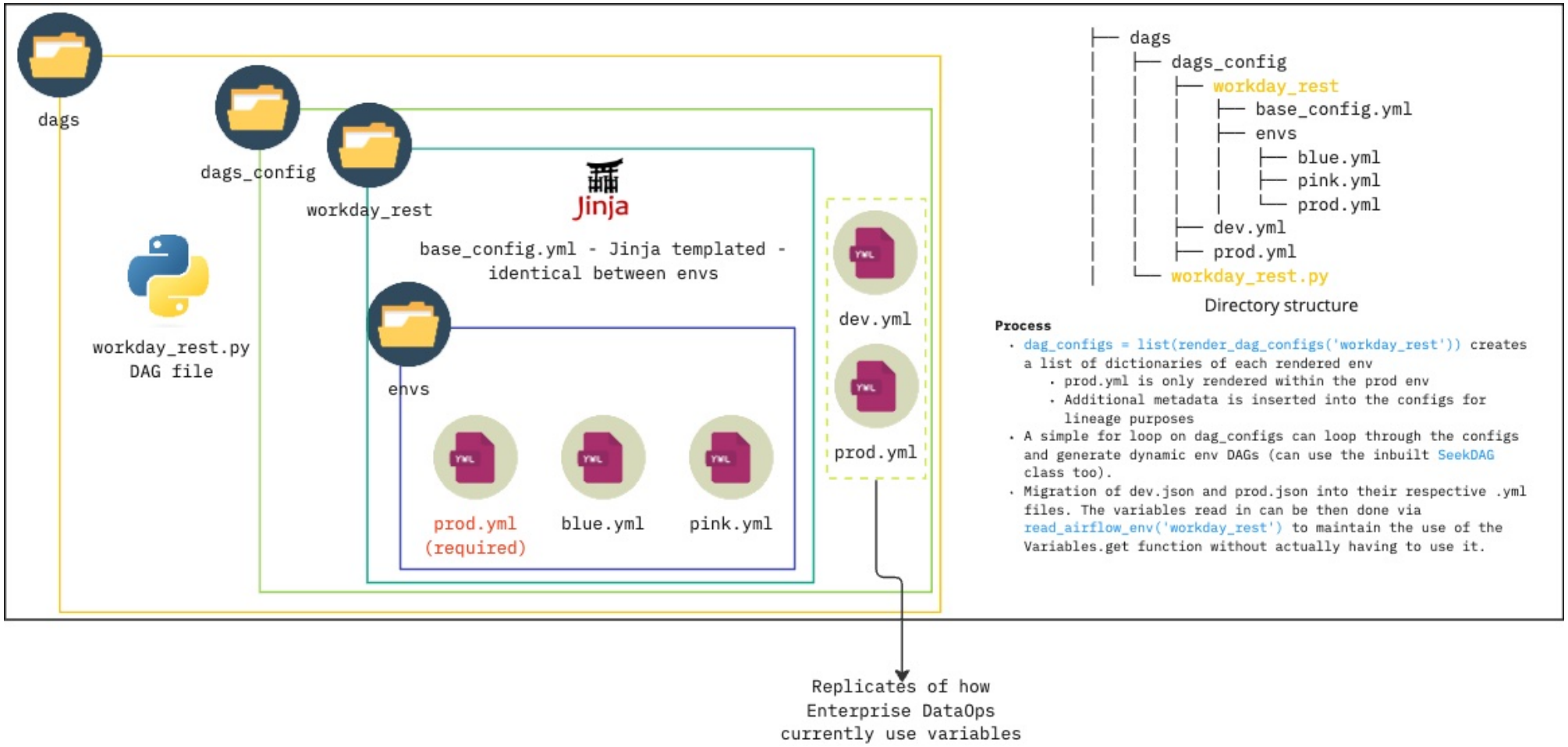
Reduce manual effort maintaing multiple DAGs for different envs

🏗️ Planned Implementation

- A `base_config.yml` in `Jinja2` template to have a consistently render each DAG
- Different `dags_config/<dag_name>/envs` files
- Use `common_airflow.render_dag_configs` function; adds additional metadata on rendering.

Dynamic DAGs

🎁 Putting it all together




```
├── dags
│   ├── dags_config
│   │   ├── workday_rest
│   │   │   ├── base_config.yml
│   │   │   ├── envs
│   │   │   │   ├── blue.yml
│   │   │   │   ├── pink.yml
│   │   │   │   └── prod.yml
│   │   │   ├── dev.yml
│   │   │   ├── prod.yml
│   │   └── workday_rest.py
```

Directory structure

Process

- `dag_configs = list(render_dag_configs('workday_rest'))` creates a list of dictionaries of each rendered env
  - prod.yml is only rendered within the prod env
  - Additional metadata is inserted into the configs for lineage purposes
- A simple for loop on dag_configs can loop through the configs and generate dynamic env DAGs (can use the inbuilt SeekDAG class too).
- Migration of dev.json and prod.json into their respective .yml files. The variables read in can be then done via `read_airflow_env('workday_rest')` to maintain the use of the Variables.get function without actually having to use it.

Dynamic DAGs

`base_config.yml`

```
pipeline_suffix: "{{ pipeline_suffix }}"
concurrency: {{ concurrency }}
default_args:
  retries: 1
  retry_delay: {{ default_args.retry_delay }}
list_schedule_interval: {{ list_schedule_interval }}
optimise_schedule_interval: {{ optimise_schedule_interval }}
optimise_glue_databases: {{ optimise_glue_databases }}
optimise_instance_upsize_objects:
  - raw/ecc/gl_items/gl_line_items/
  - raw/ecc/copa_items/copa_items/
  - transformed/semantic.fact_talent_search_activity.delta/
```

Dynamic DAGs

`prod.yml`

```
pipeline_suffix: ""
concurrency: 40
default_args:
  retry_delay: 300
list_schedule_interval: 30 21 * * SAT
optimise_schedule_interval: 0 22 * * SAT
optimise_glue_databases:
  - spectrum_general
  - spectrum_base
  - spectrum_raw
  - spectrum_salesforce
```

Dynamic DAGs

Sample Code

```
dags_configs = list(render_dag_configs())

for dag_config in dags_configs:
    # additional metadata `render_dag_configs()`
    dag_config_file_name = dag_config.get("file_name")
    base_dag_name = dag_config.get("base_dag_name")
    seek_env = dag_config.get("seek_env")
    config_absolute_path = dag_config.get('config_absolute_path')
    dag_id = dag_config.get('dag_id')


    with SeekDAG(
        dag_id=dag_config.get("dag_id"),
        catchup=False,
        default_args=default_args,
        concurrency=dag_config.get("concurrency"),
        doc_md=airflow_md_env,
        max_active_runs=1,
        schedule_interval=dag_config.get("optimise_schedule_interval"),
        start_date=datetime(2023, 2, 10, tzinfo=local_tz),
        seek_env_config=dag_config,
        tags=tags,
    ) as dag:
        logging.info("Rendering DAG %s", dag.dag_id)
        globals()[dag.dag_id] = dag
```

Airflow upgrades

- Planned to complete by end of July 2023
- Migration from 1.10.15 to 2.6.2 (with support for Python 3.11)
- Planned changes
  - Backup Postgres database
  - Update all operators
  - Run `upgrade_check` CLI tool
- Post upgrade change - migrate all `JSON` variables into `YML` files

? Questions

References

- Migration to Airflow 2