



Beyond the bundle

AIP-85+

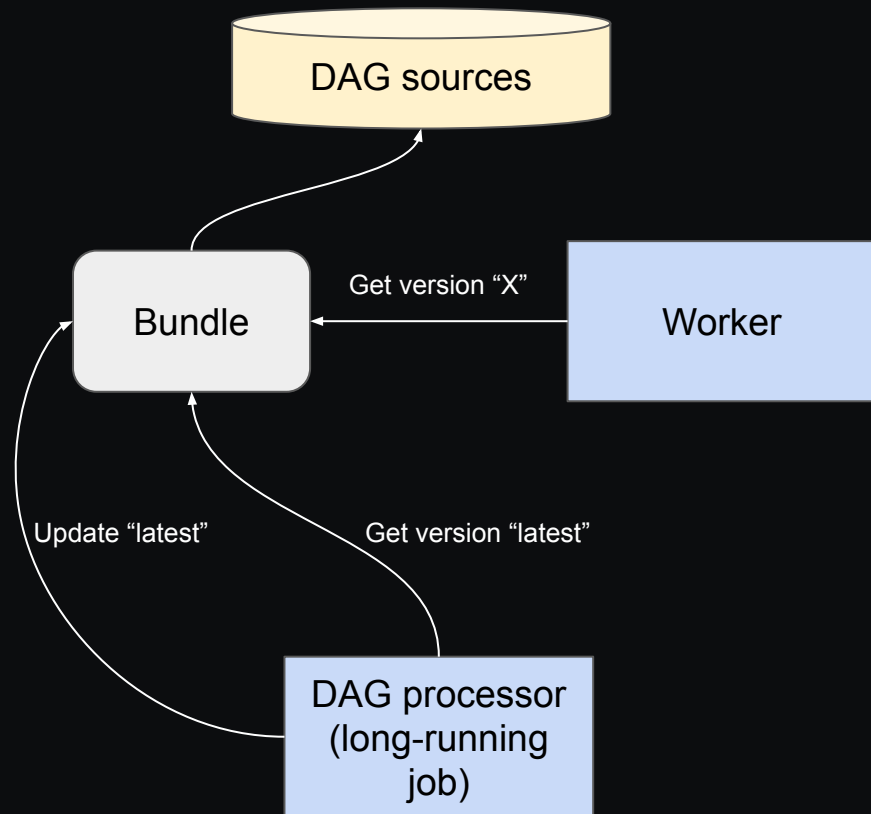
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Cloud Composer, Google

3.0

Bundles in Airflow 3

Bundles (introduced in AIP-66 by @jedcunningham):

- Consistency of version within a DAG run
- Customizable refresh of the latest version
- Many-to-one bundles to DAG processor support
- Operates within existing Airflow “eventual consistency” paradigm with source of truth being DAG sources storage (Git repo, FS, S3, etc.)

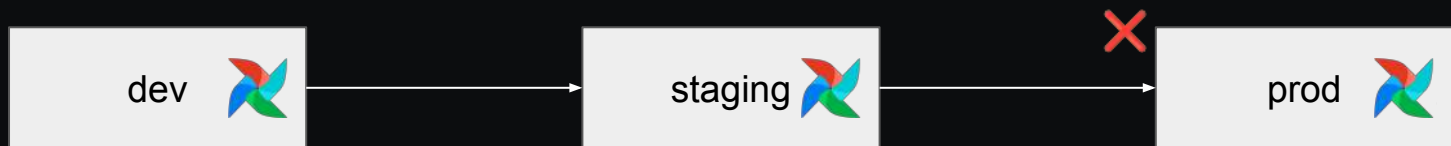


A case for “strong consistency” in DAG processing

- Feature of “continuous processing” can easily become a bug:
 - Transient DAG processing errors can affect effective DAG availability
 - AIP-92 introduces additional hops in DAG processing path => higher availability requirements for hops to maintain the same DAG availability

```
1. @dag(start_date=datetime.datetime(2021, 1, 1), schedule="@hourly")
2. def generate_dag():
3.     users_list = external_99_availability_service.fetch_users()
4.     for u in users_list:
5.         PythonOperator(task_id=f'per_user_task_{u}',
6.             python_callable=do_something_for(u))
```

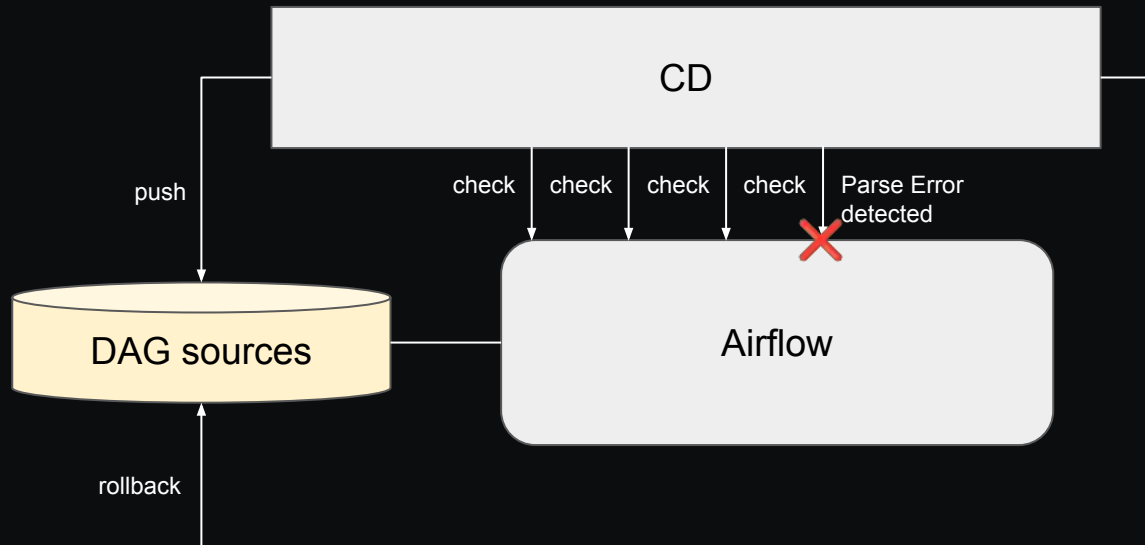
A case for “strong consistency” in DAG processing



- A classic deployment between different “environments” works well up to a certain DAG codebase size
- A more reliable approach is introduction of canarying

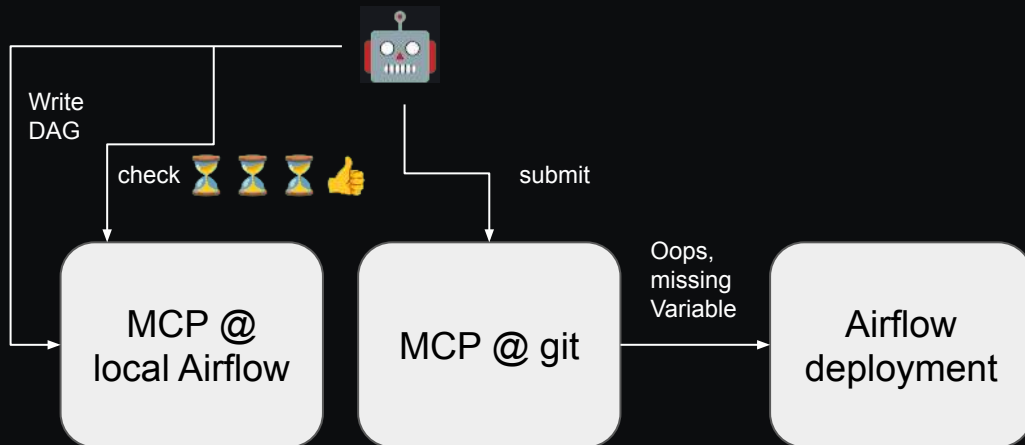
A case for “strong consistency” in DAG processing

- Safe continuous delivery in Airflow requires offloading a lot of complexity to CI/CD implementation
- Multiple asynchronous checks for all DAGs to be re-parsed



A case for “strong consistency” in DAG processing

- AI agents need a reliable and a fast way to evaluate authored DAGs
- Preferably in the environment with the final target context



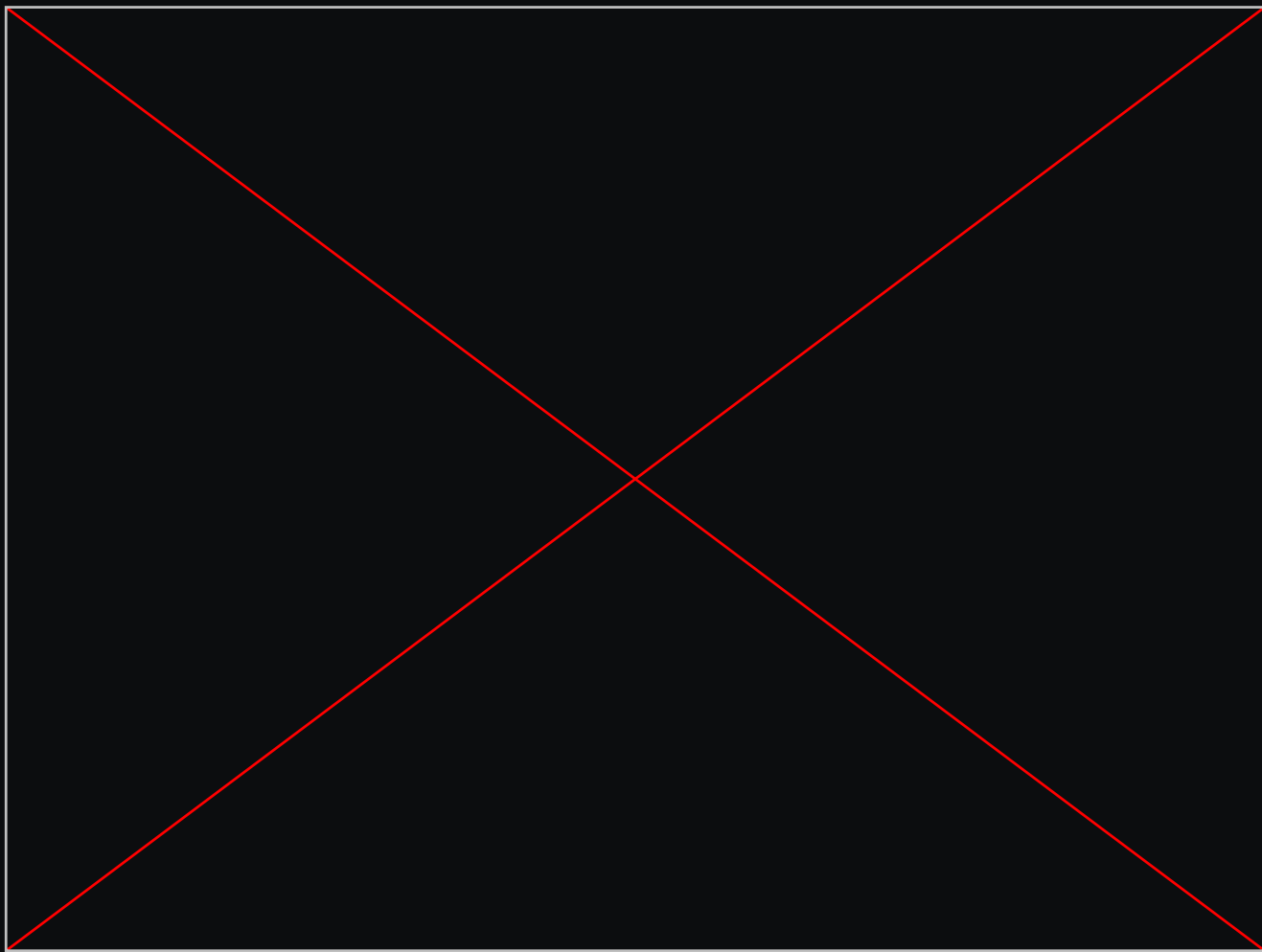
A case for “strong consistency” in DAG processing

! DAG Import Errors (1)

```
Broken DAG: [/home/airflow/gcs/dags/genealogy.py]
Traceback (most recent call last):
  File "<frozen importlib._bootstrap>", line 241, in _call_with_frames_removed
  File "/home/airflow/gcs/dags/genealogy.py", line 22, in <module>
    from git_operators import GitCloneOperator
ModuleNotFoundError: No module named 'git_operators'
```

Phase 1
Demo

3.0

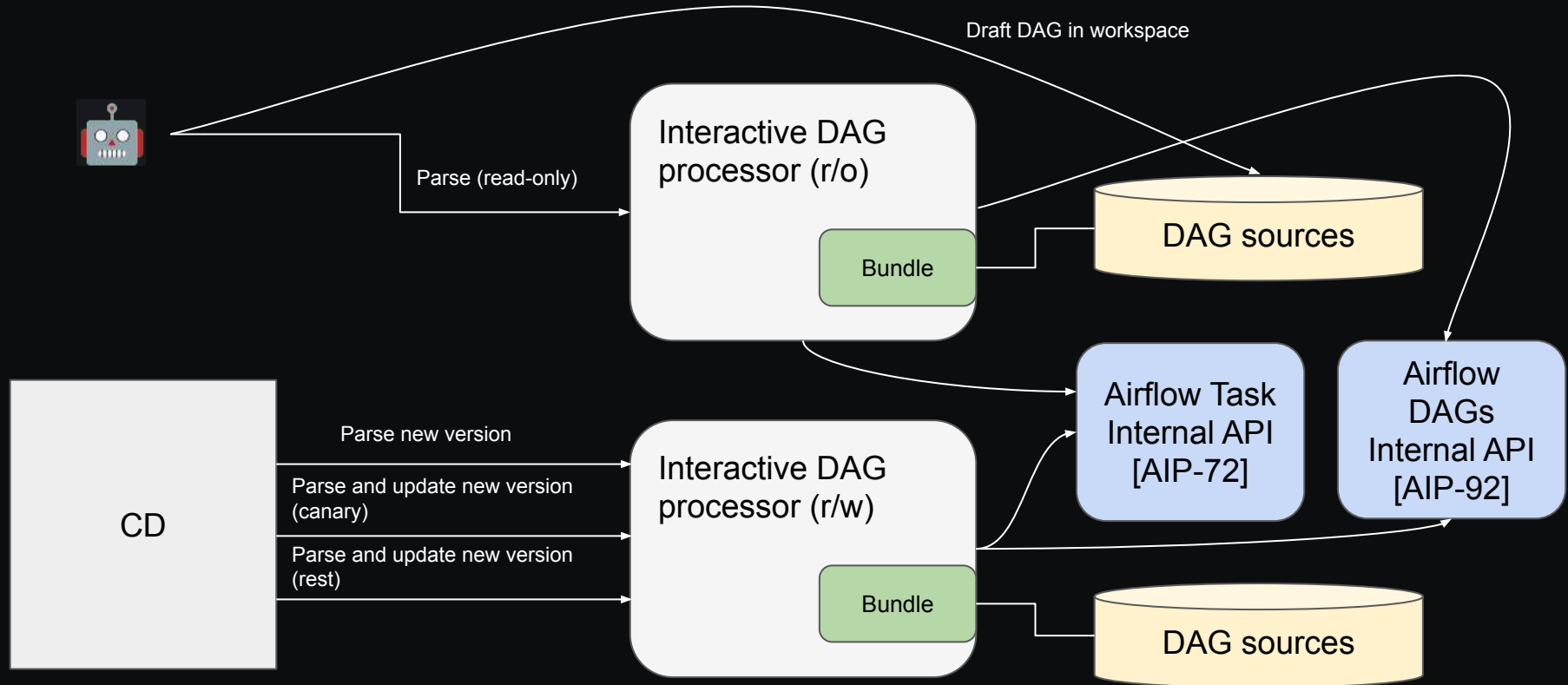


The screenshot displays the Apache Airflow web interface. The main area shows a DAG named 'check_weather_in_warsaw' with three tasks: 'download_data_task' (PythonOperator), 'upload_data_task' (LocalFileSystemToGCSOperator), and 'cleanup_data_task' (PythonOperator). The interface includes a sidebar with navigation options (Home, Dags, Assets, Browse, Admin) and a right-hand panel showing DAG details like Schedule, Latest Run, Next Run, and a list of recent runs.

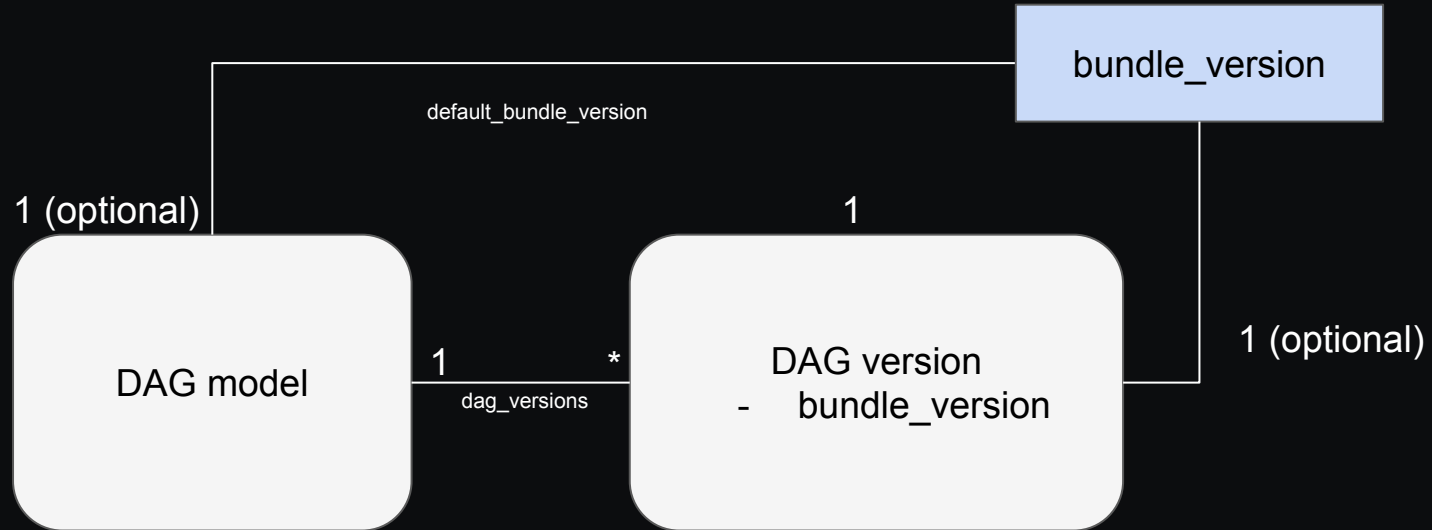
Phase 1: Interactive DAG processor

- `POST /bundle/parse { "bundle", "path", "version" } -> { "import_errors", "dags" }`
- `POST /bundle/parse_update { "bundle", "path", "version" } -> { "import_errors", "dags", "version" }`
- `DELETE /bundle { "bundle", "path", "dag_ids" }`
- `GET /bundle -> { "bundle", "version" }`
- `POST /bundle/set_version { "bundle", "dag_ids", "version" }`

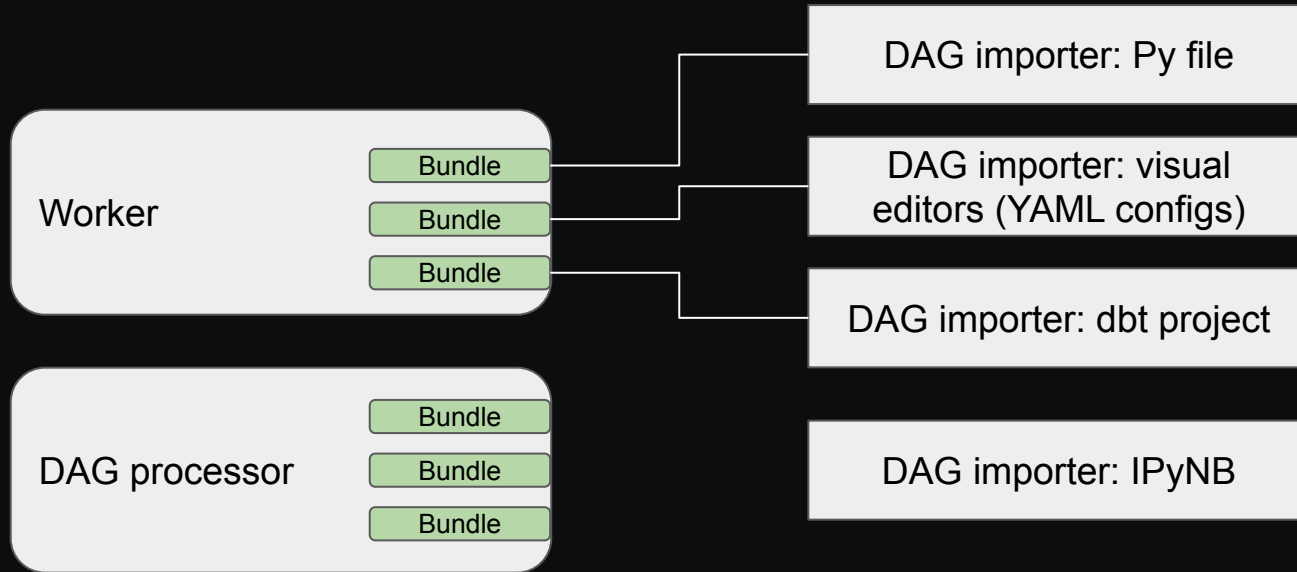
Phase 1: Interactive DAG processor



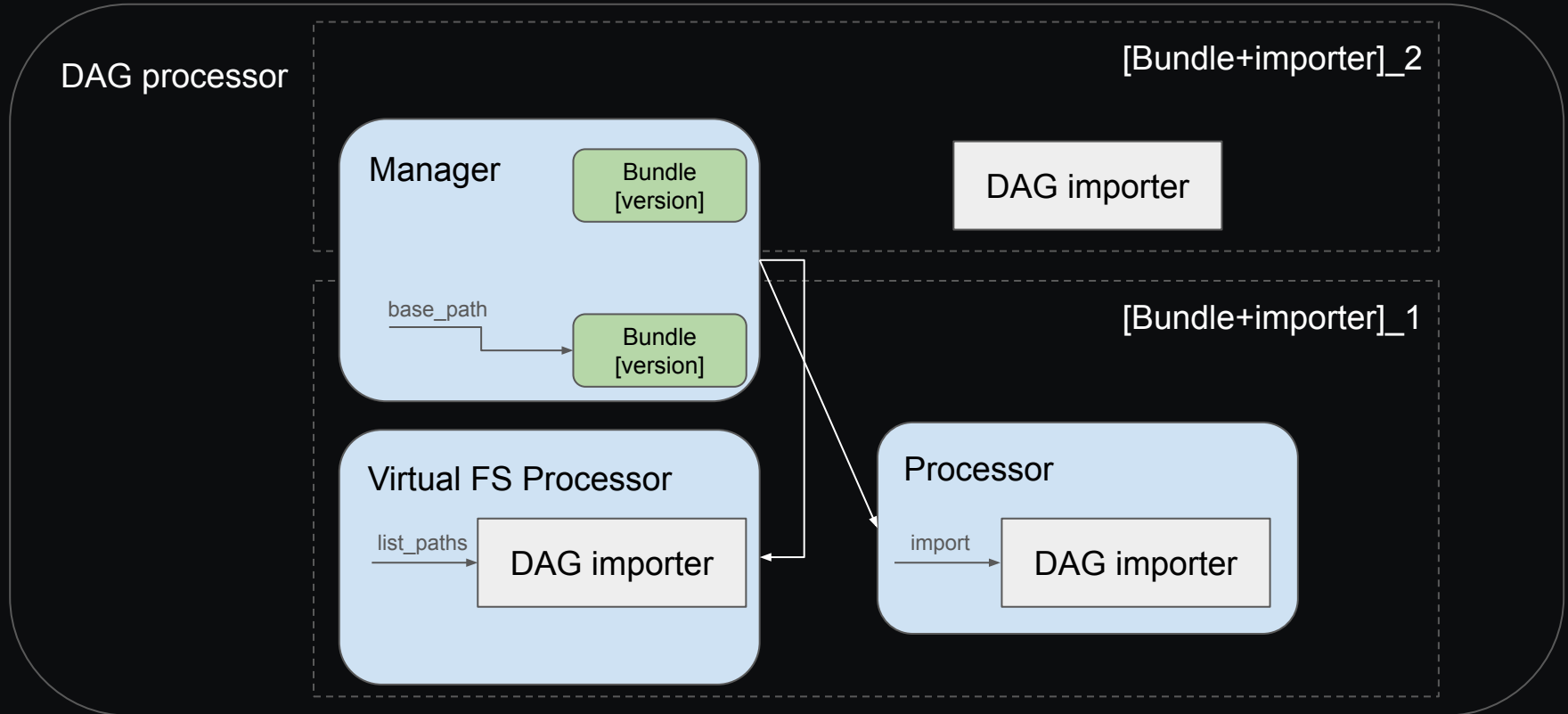
Model extension



Phase 2: Abstract DAG importer



DAG importer - bundle interaction



DAG importer interface

- `import_path(path, options)` -> `Iterable[DagsImportResult]`
- `list_paths(subpath)` -> `Iterable[Path]`
- `dag_path_exists(dagpath)` -> `bool`
- `modified_time(dagpath)` -> `timestamp`

Split of responsibility

DAG processor	DAG bundle	DAG importer
<ul style="list-style-type: none">- What DAGs are ingested- When DAGs are ingested- Airflow metadata updates (through API after AIP-92)	<ul style="list-style-type: none">- DAG sources storage management (as a “bundle” unit)- DAG sources version control (as a “bundle” unit)	<ul style="list-style-type: none">- How the DAG is constructed from sources- What DAG paths exist in the sources within a bundle

Phase 2
Demo

3.0



Google Cloud

ikholopov-dag-api-plg

Search (/) for resources, docs, products, and more

Search



Explorer

+ Add data



Search for resources

Home

Starred

Job history

ikholopov-dag-api-plg

Datasets

External connections

Queries

(Classic) Queries

Notebooks

Data canvases

Data preparations

Pipelines

Repositories

bigquery-public-data

concord-prod



demo-pipeline1

Run

Schedule

Share

Ask Agent

Compiled

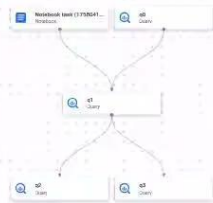
Pipeline

Executions

Settings

Add task

35%



Query updated



Show debug panel

DAG bundle x DAG importer compatibility

<p>FS bundles</p> <ul style="list-style-type: none">- git- LocalFS- S3	<p>File importers</p> <ul style="list-style-type: none">- Local FS Python- Local FS Notebook- BQ pipeline YAML-format
<p>Synthetic bundles (virtual path, pass version to importer)</p>	<p>External importers (no files to import, produce “paths” and DAGs directly)</p> <ul style="list-style-type: none">- BQ Pipelines importer

Example: BQ pipeline (unversioned-online)

Synthetic FS Bundle

```
path = /fixed/mnt-point  
dag_importer=BQPipelinesImporter
```

BQ Pipelines Importer

- list_paths ->
 - /fixed/mnt-point/pipeline_a
 - /fixed/mnt-point/pipeline_b
- import_path ->
 - rpc://Dataform.CreateCompilationResult
 - rpc://Dataform.QueryCompilationResultAction
 - Translate BQ Action -> Airflow task

Example: BQ pipeline (versioned-local)

git Bundle

```
path = /checkedout/version  
dag_importer=YAMLPipelinesImporter
```

Local BQ Pipelines Importer

- list_paths -> os.listdir()
- import_path ->
 - Run local compilation of YAML
 - Translate BQ Action -> Airflow task

Questions?

Email: ikholopov@google.com

Airflow Slack: Igor Kholopov

AIP-85: [wiki](#)

Dev list thread:
tinyurl.com/aip-85-dev-thread