REDUCING THE LINES: A VISUAL DAG EDITOR

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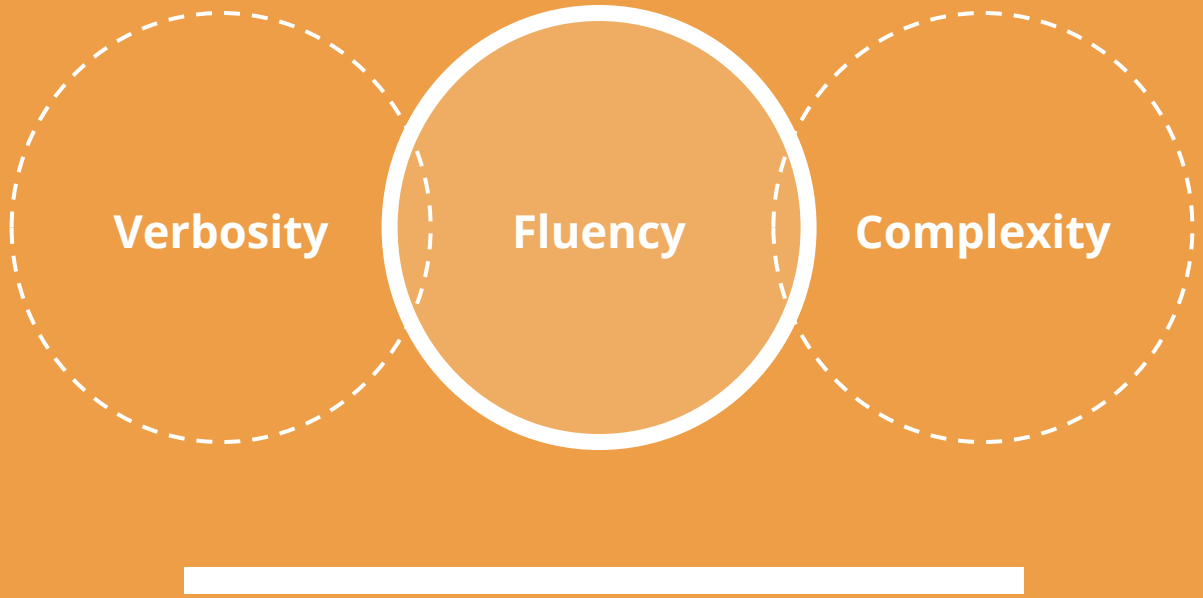
Why does this process take so long?

-- Every product owner, at every company

THE PROBLEM IS...

Writing DAGs can be a time consuming process. Checking all of the parameters for inclusion and accuracy, and creating task dependencies is time-consuming, and error prone.

THREE Impediments to writing DAGs quickly



1. VERBOSITY

Mountains of detail

DAG Metrics

DAG Length

Most DAGs were between 1000 and 2000 lines long, with many reaching up 4000 lines.

Task Relationships

Representing a many-to-one dependency ends up with many repetitions of very similar function calls.

```
task_1 >> task_4
task_2 >> task_4
task_3 >> task_4
```

More info on DAG parameters at:
https://airflow.apache.org/docs/stable/_api/airflow/models/dag/index.html

2.
COMPLEXITY

Where does that go?

Task Metrics

Number Task Parameters

Many task parameters are repeated and use standard or common parameters.

Providing clear values for default boolean parameters requires extra lines of code.

Confusing Order for Parameters

As DAGs are written by different developers and/or updated over time, parameter order can become confusing, or subject to personal preferences.

More info on operator parameters to use this template at:
https://airflow.apache.org/docs/stable/_api/airflow/operators/index.html

3.
FLUENCY

Not everyone speaks Python

Language Adoption

Python Developers

Approximately 8MM[†] developers worldwide use Python. Out of a total global workforce of 3 Billion[*]

0.002%

Business Power Users

Number of users familiar with a gui and browser.

1.5 Billion[‡]

Citations from:

[*]wikipedia(https://en.wikipedia.org/wiki/Global_workforce#:~:text=As%20of%202012%2C%20the%20global,workers%2C%20around%20200%20million%20unemployed.)

[†]zdnet(https://www.zdnet.com/article/programming-languages-python-developers-now-outnumber-java-one)

[‡]madeup stat to prove my point

A SOLUTION

In three parts

3 Questions: How can we enable?

Grouping

How can common tasks be grouped together?

Isolated Configuration

Can the creation of a DAG be driven dynamically?

Non-technical Authors

Can a someone without Python experience edit a DAG?

THREE Stages

~5,000

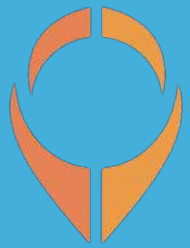
A complex DAG with 80 + tasks can weigh-in at near 5000 lines.

< 1,000

Adding SubDags for repetitive tasks can bring this down to less than 1000 lines.

< 500

Using Dynamic DAGs can help reduce this further.



CHARTIS

+

RABIX: VISUAL EDITOR

Airflow plugin to allow the use of Rabix: a visual editor using open standards for workflow definition.

cwl.py cwl2.py

```python
from airflow import DAG
from datetime import datetime, timedelta
from chartis.cwl import CWLDag

default_args = {
    "owner": "airflow",
    "depends_on_past": False,
    "start_date": datetime(2020, 2, 1, hour=2, minute=0),
    "email": ["airflow@example.com"],
    "email_on_failure": False,
    "email_on_retry": False,
    "retries": 1,
    "retry_delay": timedelta(minutes=5),
}

# Test Code
test_dag = CWLDag.from_yaml(
    "dags/yaml/basic_dag2.yaml", "test_cwl_dag2", start_date=default_a
)
```

A complete DAG

Huge reductions in length.

< 20

For all DAGs.

Where did the LINES go?

Code Modules.

SubDags help you to apply the DRY principle to your DAGs.

Duplicate lines are hidden behind abstractions.

Meta Data Files.

Configuration values are stored in metadata descriptions of your tasks and DAG.

A DEMO

THE TECHNICALS

Common Workflow Language

The Common Workflow Language (CWL) is an open standard for describing analysis workflows and tools...

https://github.com/common-workflow-language/common-workflow-language

Rabix

Rabix Composer: a powerful, open source, graphical editor allowing visual programming in CWL.

https://github.com/rabix/composer

https://rabix.io/

THANKS!

MY NAME IS TRAEY HATCH

I am here because I love Airflow.

You can find me at:

@trejas2

linkedin.com/in/trejas

github.com/trejas