

# Create Dynamic DAGs with Apache Airflow



**Matt Stenzel**

Cloud Solution Architect

[LinkedIn: stenzelmatt](#) | [www.clouditected.com](http://www.clouditected.com)



# Overview



**Follow a data engineer named Arvind**

**Define dynamic DAGs**

**Understand the differences between static and dynamic DAGs**

**Build a dynamic DAG with variables**

**Build a dynamic DAG with macros**



# Scenario Overview



Arvind is a new data engineer at Wired Brain Coffee Company

New to Apache Airflow

Asked to create some new DAGs

DAGs need to be flexible and reusable

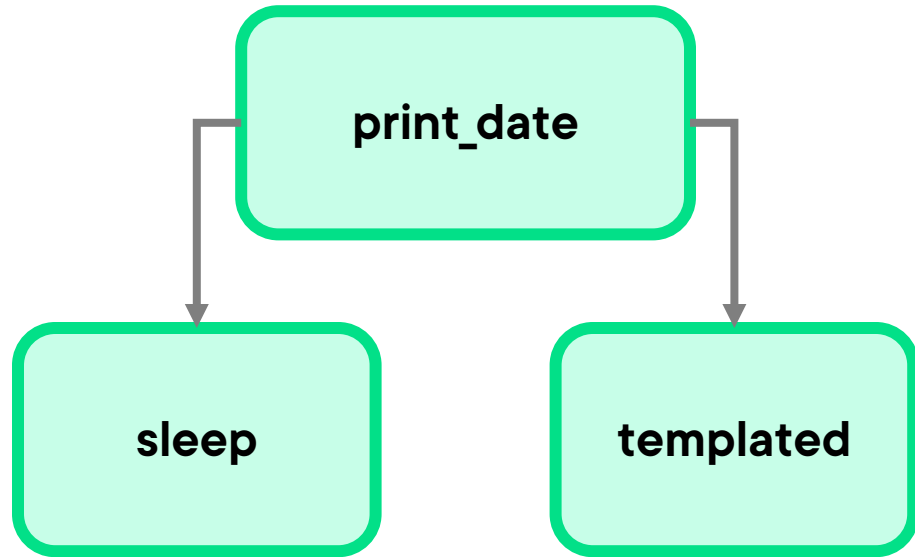




# Define Dynamic DAG



# What Is a Dynamic DAG?



## DAG = Directed Acyclic Graph

- Graph – Groups of nodes and edges
- Directed – Program flow goes one way
- Acyclic – There are no closed loops

Made up of tasks, relationships, and dependencies

Orchestrates the execution of tasks in a workflow

Dynamic DAG is a DAG that can change depending on a variable





# **Understand the Differences between Static and Dynamic DAGs**



# Static vs. Dynamic DAGs

## Static DAG

**Fixed structure where task dependencies are determined before runtime**

**Relatively easy to implement and maintain**

**Relatively easier to optimize**

**More efficient resource allocation**

## Dynamic DAG

**Adapt structure based on runtime conditions**

**Flexible, but more complex to implement and maintain**

**Relatively harder to optimize**

**Resource allocation is dynamic due to changing dependencies**



# When to Use Static vs. Dynamic DAGs

## Static DAG

### Consistent or stable workflow

- Data from the same source transformed the same way every time

### Batch processes that do the same tasks on each run

- Classic ETL pipeline

## Dynamic DAG

### Process data based on date ranges or other user preference

- Extract/transform data based on date or domain

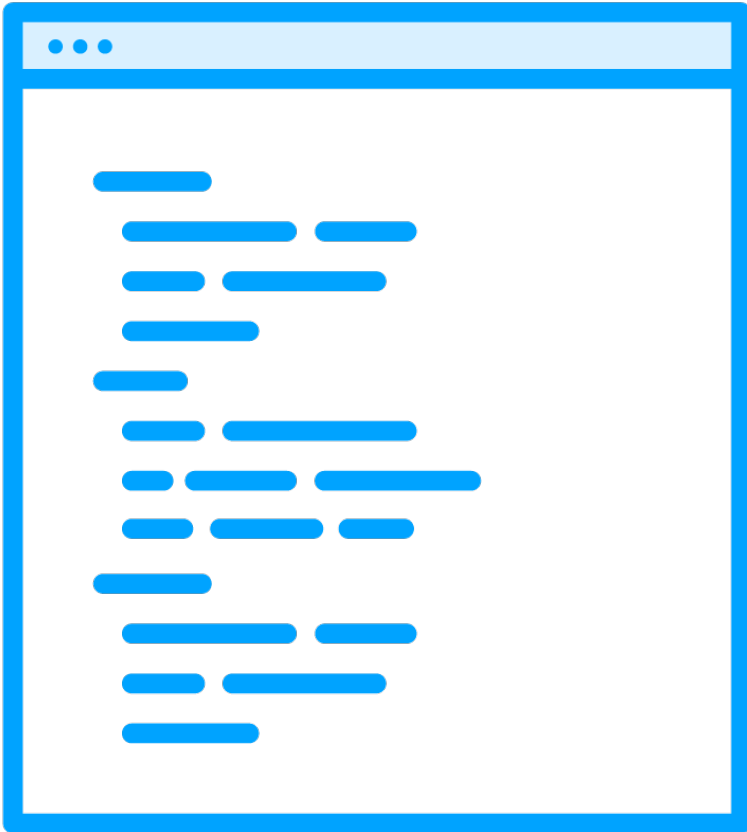
### Modify a task(s) based on runtime condition

- Change workflow logic depending on development environment





# What Is a Macro?



Inject code, variables, and parameters into tasks at runtime

Airflow has built-in and custom macros

Built-in macros focus on DAG execution metadata and configuration settings

Accessed through templates

Example: `{{ ds }}`



## Summary



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