Linux Academy

The Data Dossier

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What is Cloud Composer?

- Fully managed **Apache Airflow** implementation:
    - Infrastructure/OS handled for you

open source

What is Apache Airflow?

- Programatically create, schedule, and monitor data workflows

Why is this important?

- Automation and monitoring
- Big data pipelines are often a multi-step, complex process:
    - Create resources in multiple services
    - Process and move data from one service to another
    - Remove resources when they complete a task (e.g. Dataproc cluster)
- Collaborate workflow process with other team members

How Airflow/Composer helps

- Automates the above steps, including scheduling
- Built on open source, using Python as common language
- Easy to work with, and share workflow with others
- Works with non-GCP providers (on-premises, other clouds)

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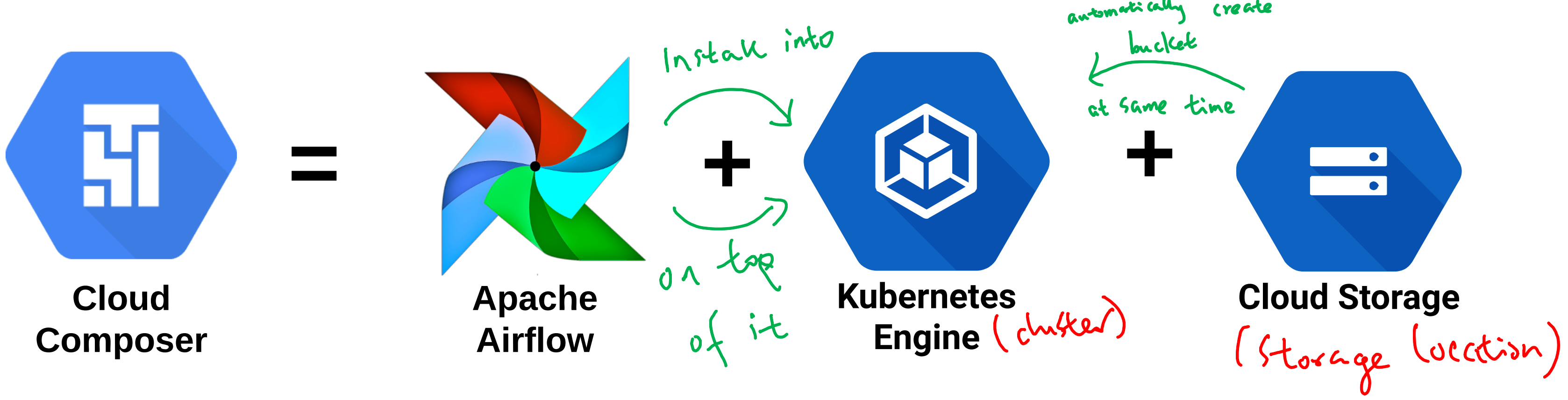
How It Works

Behind the scenes:

- GKE cluster with Airflow implemented
- Cloud Storage bucket for workflow files (and other application files)


Cloud Composer
=
Apache Airflow
Install into
+
on top of it
Kubernetes Engine (cluster)
automatically create bucket at same time
+
Cloud Storage (Storage location)

Workflows?

- Orchestrate data pipelines:
  - Like a walkthrough of tasks to run
- Format = Direct Acyclic Graph (DAG): ← important terminology
  - Written in Python
  - Collection of organized tasks that you want to schedule and run
- **Cloud Composer** creates **workflows** using **DAG** files

python application

Summary!

The Process

- Create Composer Environment (kubernete instance cluster)
- Set Composer variables (i.e. project ID, GCS bucket, region)
- Add Workflows (DAG files), which Composer will execute

different from Gcloud variables

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to cloud storage bucket
(to save cost)

Examples and Exam Perspective

- Create a Dataproc cluster, submit a job, and then delete the cluster.
- Execute a Cloud Dataflow pipeline from data in GCS, and write output to BigQuery.
- Ingest third party data into Cloud Dataflow, process, then upload to GCS.
- **Exam perspective:** Know what DAGs are, and why you'd want to use workflows.

Exam topics!!!

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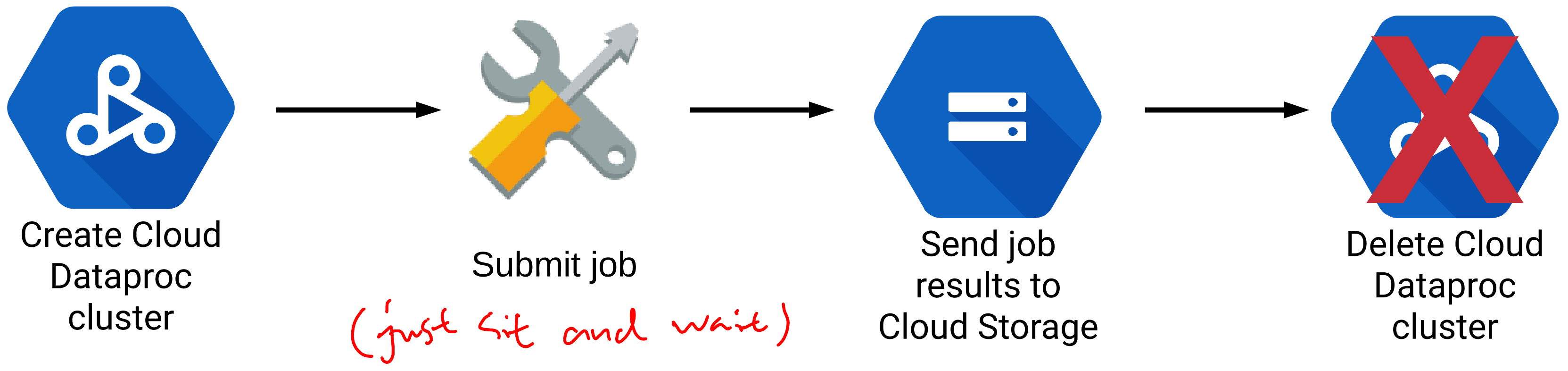
The Process:

- Create the Composer environment. cluster
- Then create the GCS bucket for Dataproc output.
- Assign Cloud Composer variables.
- Upload the workflow file to DAG folder.
- View the results.

Automatic processes -- Workflow


Create Cloud Dataproc cluster
Submit job
(just sit and wait)
Send job results to Cloud Storage
Delete Cloud Dataproc cluster

Create Composer Environment

- Enable Composer/Dataproc API
- Create environment in closest region:
  - What's happening?
  - Creating GKE cluster + GCS bucket

Create GCS bucket to output Dataproc results

- `gsutil mb -l us-central1 gs://output-$DEVSHELL_PROJECT_ID`

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Configure Cloud Composer Variables

- Format
    - **`gcloud composer environments run (ENVIRONMENT_NAME) --location (LOCATION) variables -- --set (KEY VALUE)`**

```
gcloud composer environments run my-environment --location us-central1 variables -- --set gcp_project (PROJECT-ID)
gcloud composer environments run my-environment --location us-central1 variables -- --set gcs_bucket gs://output-(PROJECT-ID)
gcloud composer environments run my-environment --location us-central1 variables -- --set gce_zone us-central1-c
```

Add workflow file (Python) to Composer DAG folder:

- github link

Next step? There is none! Cloud Composer will take it from here...