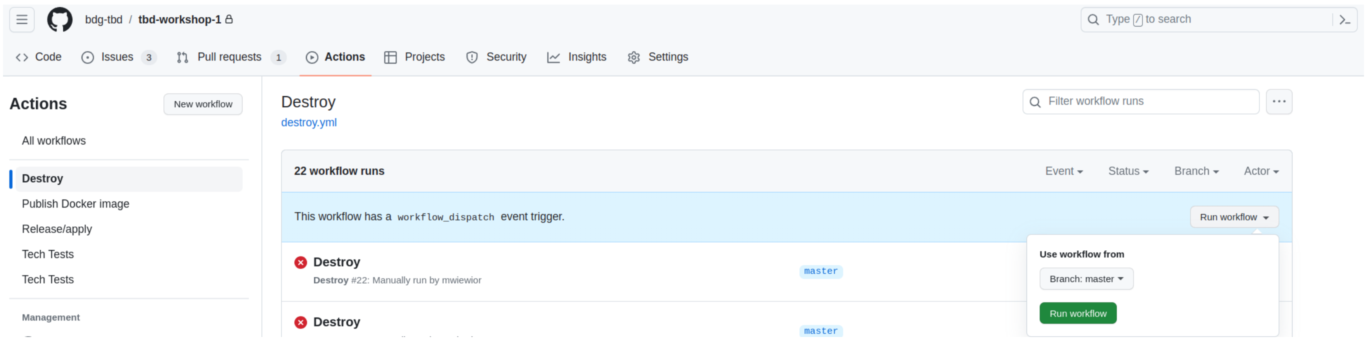
IMPORTANT □ □ □ Please remember to destroy all the resources after each work session. You can recreate infrastructure by creating new PR and merging it to master.


bdg-tbd / tbd-workshop-1

Code | Issues 3 | Pull requests 1 | Actions | Projects | Security | Insights | Settings

Actions — New workflow

All workflows
Destroy
Publish Docker image
Release/apply
Tech Tests
Tech Tests
Management

Destroy
destroy.yml

22 workflow runs — Event | Status | Branch | Actor

This workflow has a `workflow_dispatch` event trigger. — Run workflow

Destroy — Destroy #22: Manually run by mwiewior — master
Destroy — master

Use workflow from
Branch: master
Run workflow

1. Authors:

   14

   https://github.com/Tuvalu120/tbd-workshop-1

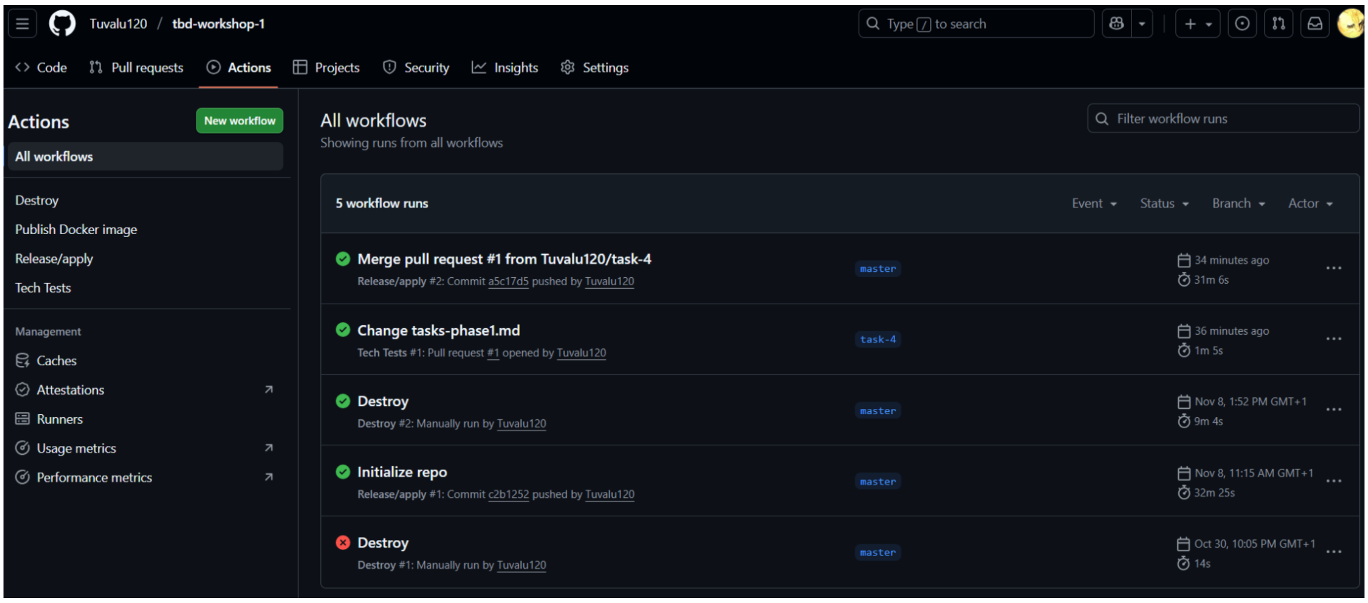
2. Follow all steps in README.md.

3. From avaialble Github Actions select and run destroy on main branch.

4. Create new git branch and:

   1. Modify tasks-phase1.md file.

   2. Create PR from this branch to **YOUR** master and merge it to make new release.


Tuvalu120 / tbd-workshop-1

Code | Pull requests | Actions | Projects | Security | Insights | Settings

Actions — New workflow

All workflows
Destroy
Publish Docker image
Release/apply
Tech Tests

Management
Caches
Attestations
Runners
Usage metrics
Performance metrics

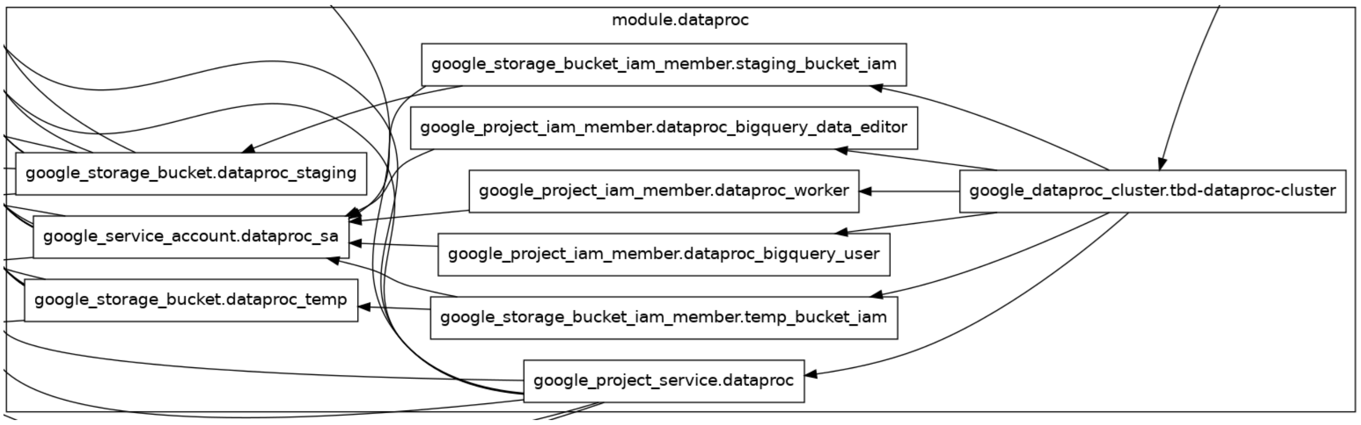
All workflows
Showing runs from all workflows

5 workflow runs — Event | Status | Branch | Actor

Merge pull request #1 from Tuvalu120/task-4 Release/apply #2: Commit a5c17d5 pushed by Tuvalu120	master	34 minutes ago	31m 6s
Change tasks-phase1.md Tech Tests #1: Pull request #1 opened by Tuvalu120	task-4	36 minutes ago	1m 5s
Destroy Destroy #2: Manually run by Tuvalu120	master	Nov 8, 1:52 PM GMT+1	9m 4s
Initialize repo Release/apply #1: Commit c2b1252 pushed by Tuvalu120	master	Nov 8, 11:15 AM GMT+1	32m 25s
Destroy Destroy #1: Manually run by Tuvalu120	master	Oct 30, 10:05 PM GMT+1	14s

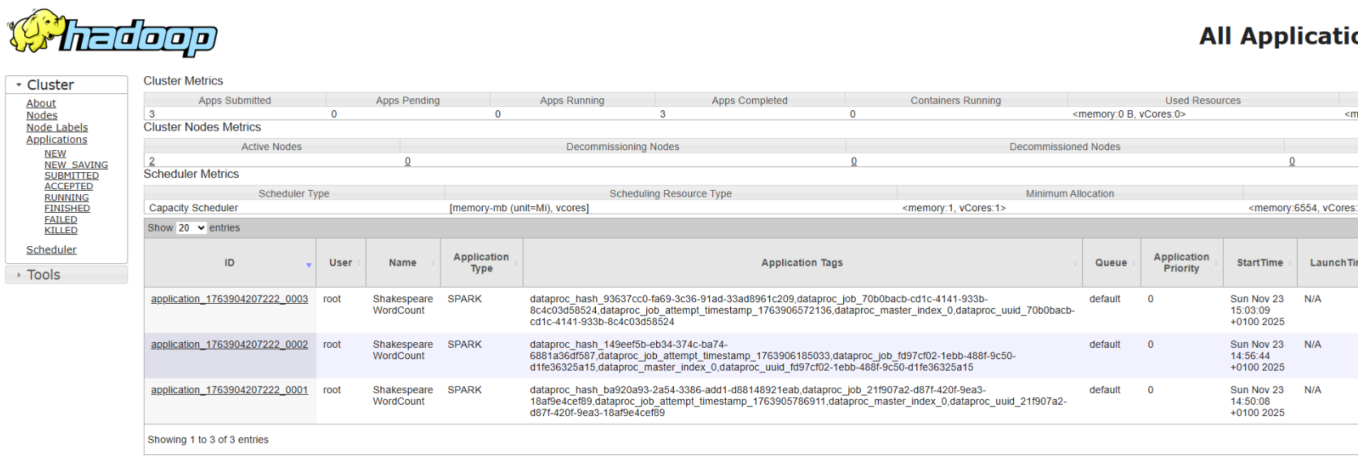
5. Analyze terraform code. Play with terraform plan, terraform graph to investigate different modules.

   Moduł dataproc służy do stworzenia i konfiguracji klastera Apache Spark w wykorzystywanej w tym ćwiczeniu usłudze Google Cloud Dataproc. W architekturze naszego projektu pełni rolę środowiska obliczeniowego dla zadań przetwarzania danych oraz środowiska interaktywnego. Moduł ten jest ściśle powiązany z modułem sieciowym vpc (depends_on = [module.vpc]), czyli wymaga on uprzednio utworzonej sieci vpc. Zadaniami modułu jest zapewnienie, że sieć vpc jest gotowa, stworzenie klastra w określonym projekcie (project_name = var.project_name) i regionie (var.region), umieszczenie węzłów klastra w odpowiedniej podsieci vpc (subnet = module.vpc.subnets[local.notebook_subnet_id].id). Dodatkowo instaluje on oprogramowanie oparte na obrazie Dataproc w wersji 2.2 z Ubuntu 22 (image_version = "2.2.69-ubuntu22") i używa maszyn wirtualnych typu e2-standard-2 (machine_type = "e2-standard-2").


module.dataproc
google_storage_bucket_iam_member.staging_bucket_iam
google_project_iam_member.dataproc_bigquery_data_editor
google_storage_bucket.dataproc_staging
google_project_iam_member.dataproc_worker
google_dataproc_cluster.tbd-dataproc-cluster
google_service_account.dataproc_sa
google_project_iam_member.dataproc_bigquery_user
google_storage_bucket.dataproc_temp
google_storage_bucket_iam_member.temp_bucket_iam
google_project_service.dataproc

6. Reach YARN UI

```
gcloud compute ssh --zone "europe-west1-b" "tbd-cluster-m" --tunnel-through-iap --project "tbd-2025z-14" -- -L 8088:localhost:8088
```



Cluster Metrics

Apps Submitted	Apps Pending	Apps Running	Apps Completed	Containers Running	Used Resources	
3	0	0	3	0	<memory:0 B, vCores:0>	<m

Cluster Nodes Metrics

Active Nodes	Decommissioning Nodes	Decommissioned Nodes	
2	0	0	0

Scheduler Metrics

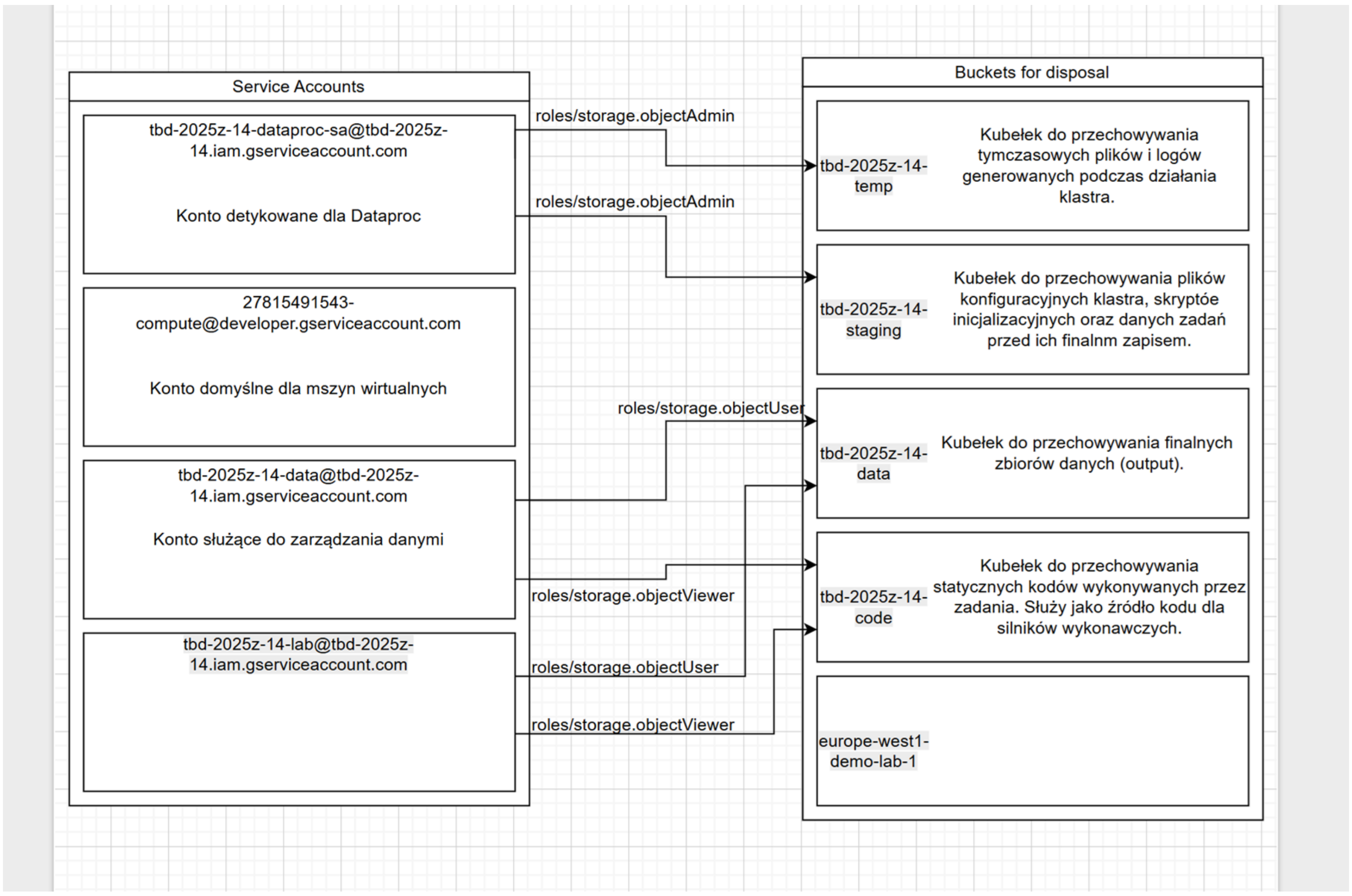
Scheduler Type	Scheduling Resource Type	Minimum Allocation	
Capacity Scheduler	[memory-mb (unit=Mi), vcores]	<memory:1, vCores:1>	<memory:6554, vCores:

Show 20 entries

ID	User	Name	Application Type	Application Tags	Queue	Application Priority	StartTime	LaunchTi
application_1763904207222_0003	root	Shakespeare WordCount	SPARK	dataproc_hash_93637cc0-fa69-3c36-91ad-33ad8961c209,dataproc_job_70b0bacb-cd1c-4141-933b-8c4c03d58524,dataproc_job_attempt_timestamp_1763906572136,dataproc_master_index_0,dataproc_uuid_70b0bacb-cd1c-4141-933b-8c4c03d58524	default	0	Sun Nov 23 15:03:09 +0100 2025	N/A
application_1763904207222_0002	root	Shakespeare WordCount	SPARK	dataproc_hash_149eef5b-eb34-374c-ba74-6881a36df587,dataproc_job_attempt_timestamp_1763906185033,dataproc_job_fd97cf02-1ebb-488f-9c50-d1fe36325a15,dataproc_master_index_0,dataproc_uuid_fd97cf02-1ebb-488f-9c50-d1fe36325a15	default	0	Sun Nov 23 14:56:44 +0100 2025	N/A
application_1763904207222_0001	root	Shakespeare WordCount	SPARK	dataproc_hash_ba920a93-2a54-3386-add1-d88148921eab,dataproc_job_21f907a2-d87f-420f-9ea3-18af9e4cef89,dataproc_job_attempt_timestamp_1763905786911,dataproc_master_index_0,dataproc_uuid_21f907a2-d87f-420f-9ea3-18af9e4cef89	default	0	Sun Nov 23 14:50:08 +0100 2025	N/A

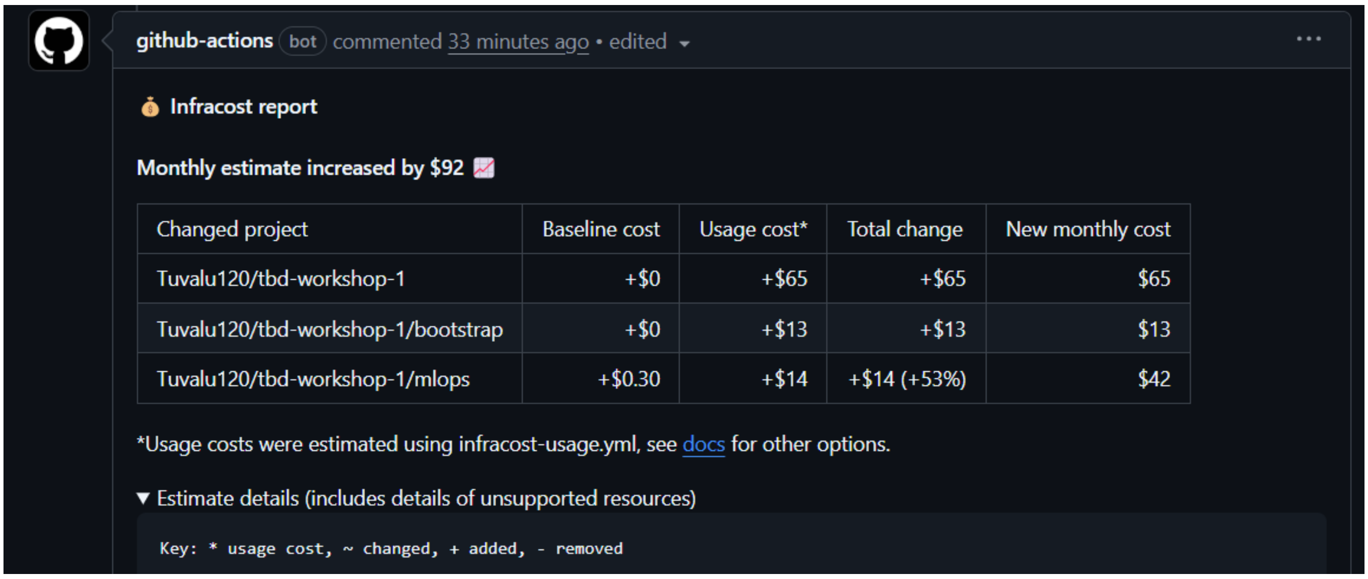
Showing 1 to 3 of 3 entries

7. Draw an architecture diagram (e.g. in draw.io) that includes:
    1. Description of the components of service accounts
    2. List of buckets for disposal


Service Accounts
tbd-2025z-14-dataproc-sa@tbd-2025z-14.iam.gserviceaccount.com
Konto detykowane dla Dataproc
27815491543-compute@developer.gserviceaccount.com
Konto domyślne dla mszyn wirtualnych
tbd-2025z-14-data@tbd-2025z-14.iam.gserviceaccount.com
Konto służące do zarządzania danymi
tbd-2025z-14-lab@tbd-2025z-14.iam.gserviceaccount.com
roles/storage.objectAdmin
roles/storage.objectAdmin
roles/storage.objectUser
roles/storage.objectViewer
roles/storage.objectUser
roles/storage.objectViewer
Buckets for disposal
tbd-2025z-14-temp
Kubełek do przechowywania tymczasowych plików i logów generowanych podczas działania klastra.
tbd-2025z-14-staging
Kubełek do przechowywania plików konfiguracyjnych klastra, skryptóe inicjalizacyjnych oraz danych zadań przed ich finalnm zapisem.
tbd-2025z-14-data
Kubełek do przechowywania finalnych zbiorów danych (output).
tbd-2025z-14-code
Kubełek do przechowywania statycznych kodów wykonywanych przez zadania. Służy jako źródło kodu dla silników wykonawczych.
europe-west1-demo-lab-1

8. Create a new PR and add costs by entering the expected consumption into Infracost For all the resources of type: `google_artifact_registry`, `google_storage_bucket`, `google_service_networking_connection` create a sample usage profiles and add it to the Infracost task in CI/CD pipeline. Usage file example

```
google_artifact_registry_repository:
  storage_gb: 150
  monthly_egress_data_transfer_gb:
    europe_west1: 50

google_storage_bucket:
  storage_gb: 192
  monthly_class_a_operations: 100000
  monthly_class_b_operations: 500000
  monthly_data_retrieval_gb: 250
  monthly_egress_data_transfer_gb:
    same_continent: 100
    worldwide: 50

google_service_networking_connection:
  monthly_egress_data_transfer_gb:
    same_region: 10
    europe: 5
```



github-actions bot commented 33 minutes ago • edited

💰 Infracost report

Monthly estimate increased by $92 📈

Changed project	Baseline cost	Usage cost*	Total change	New monthly cost
Tuvalu120/tbd-workshop-1	+$0	+$65	+$65	$65
Tuvalu120/tbd-workshop-1/bootstrap	+$0	+$13	+$13	$13
Tuvalu120/tbd-workshop-1/mlops	+$0.30	+$14	+$14 (+53%)	$42

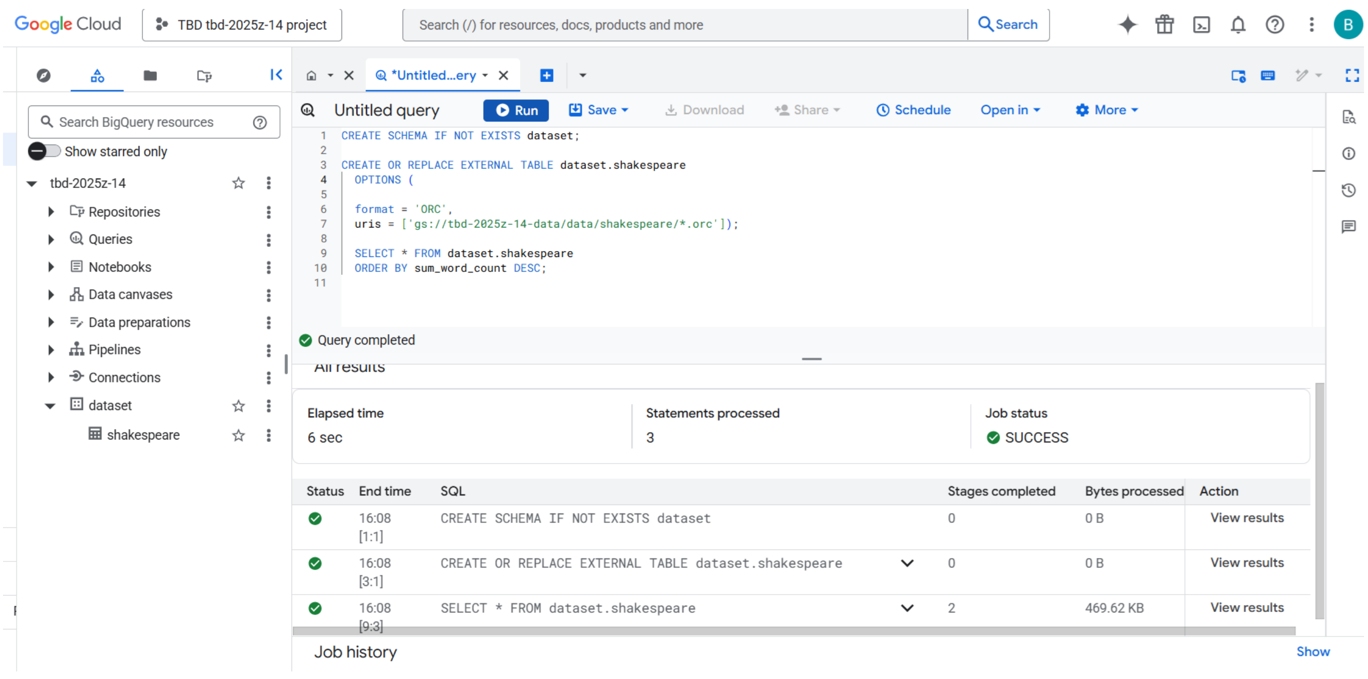
*Usage costs were estimated using infracost-usage.yml, see docs for other options.

▼ Estimate details (includes details of unsupported resources)

```
Key: * usage cost, ~ changed, + added, - removed
```

9. Create a BigQuery dataset and an external table using SQL

```
CREATE SCHEMA IF NOT EXISTS dataset;

CREATE OR REPLACE EXTERNAL TABLE dataset.shakespeare
OPTIONS (

format = 'ORC',
uris = ['gs://tbd-2025z-14-data/data/shakespeare/.orc']);

SELECT FROM dataset.shakespeare
ORDER BY sum_word_count;
```



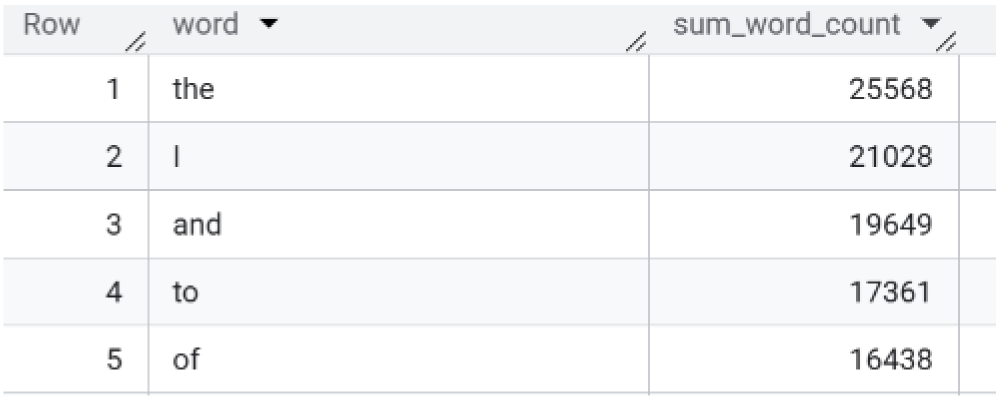
```
CREATE SCHEMA IF NOT EXISTS dataset;

CREATE OR REPLACE EXTERNAL TABLE dataset.shakespeare
  OPTIONS (

  format = 'ORC',
  uris = ['gs://tbd-2025z-14-data/data/shakespeare/*.orc']);

  SELECT * FROM dataset.shakespeare
  ORDER BY sum_word_count DESC;
```

Query completed

All results

Elapsed time	Statements processed	Job status
6 sec	3	SUCCESS

Status	End time	SQL	Stages completed	Bytes processed	Action
✓	16:08 [1:1]	CREATE SCHEMA IF NOT EXISTS dataset	0	0 B	View results
✓	16:08 [3:1]	CREATE OR REPLACE EXTERNAL TABLE dataset.shakespeare	0	0 B	View results
✓	16:08 [9:3]	SELECT * FROM dataset.shakespeare	2	469.62 KB	View results



Row	word	sum_word_count
1	the	25568
2	I	21028
3	and	19649
4	to	17361
5	of	16438

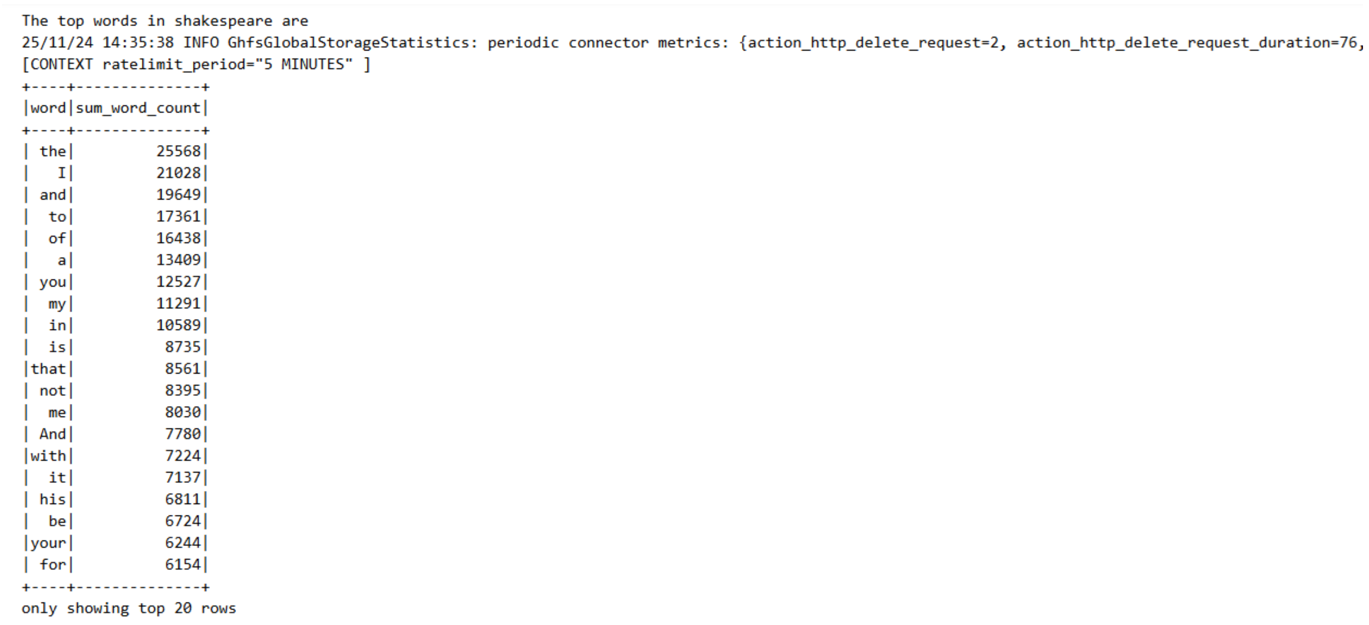
ORC to format plików używany do przechowywania danych w systemach Big Data. Jedną z jego głównych zalet jest to, iż pliki ORC przechowują informacje o swoim schemacie (nazwy kolumn i typy danych) wewnątrz struktury. Dzięki temu systemy takie jak BigQuery mogą odczytać plik i automatycznie odtworzyć strukturę danych, bez konieczności ręcznego definiowania schematu podczas tworzenia tabeli zewnętrznej.

10. Find and correct the error in spark-job.py

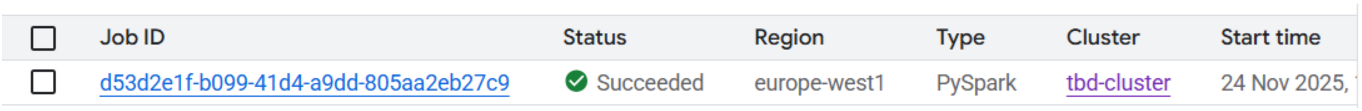
Problem był spowodowany tym, iż w pliku spark-job.py zawarty byłniewłaściwy Bucket. Informacje o złym Buckecie można było odczytać z logów nieudanego joba w konsoli Goggle Cloud i dataproc. Po zamianie nazwy Bucketa na:

```
DATA_BUCKET = "gs://tbd-2025z-14-data/data/shakespeare/"
```

job został wykonany pomyślnie.



```
The top words in shakespeare are
25/11/24 14:35:38 INFO GhfsGlobalStorageStatistics: periodic connector metrics: {action_http_delete_request=2, action_http_delete_request_duration=76,
[CONTEXT ratelimit_period="5 MINUTES" ]
+----+--------------+
|word|sum_word_count|
+----+--------------+
| the|         25568|
|   I|         21028|
| and|         19649|
|  to|         17361|
|  of|         16438|
|   a|         13409|
| you|         12527|
|  my|         11291|
|  in|         10589|
|  is|          8735|
|that|          8561|
| not|          8395|
|  me|          8030|
| And|          7780|
|with|          7224|
|  it|          7137|
| his|          6811|
|  be|          6724|
|your|          6244|
| for|          6154|
+----+--------------+
only showing top 20 rows
```



☐	Job ID	Status	Region	Type	Cluster	Start time
☐	d53d2e1f-b099-41d4-a9dd-805aa2eb27c9	✓ Succeeded	europe-west1	PySpark	tbd-cluster	24 Nov 2025,

11. Add support for preemptible/spot instances in a Dataproc cluster

```
[modules/dataproc/main.tf](modules/dataproc/main.tf)

~~~
preemptible_worker_config {
  num_instances = 2
  preemptibility = "SPOT"

  disk_config {
    boot_disk_type    = "pd-standard"
    boot_disk_size_gb = 100
  }
}
~~~
```

12. Triggered Terraform Destroy on Schedule or After PR Merge. Goal: make sure we never forget to clean up resources and burn money.

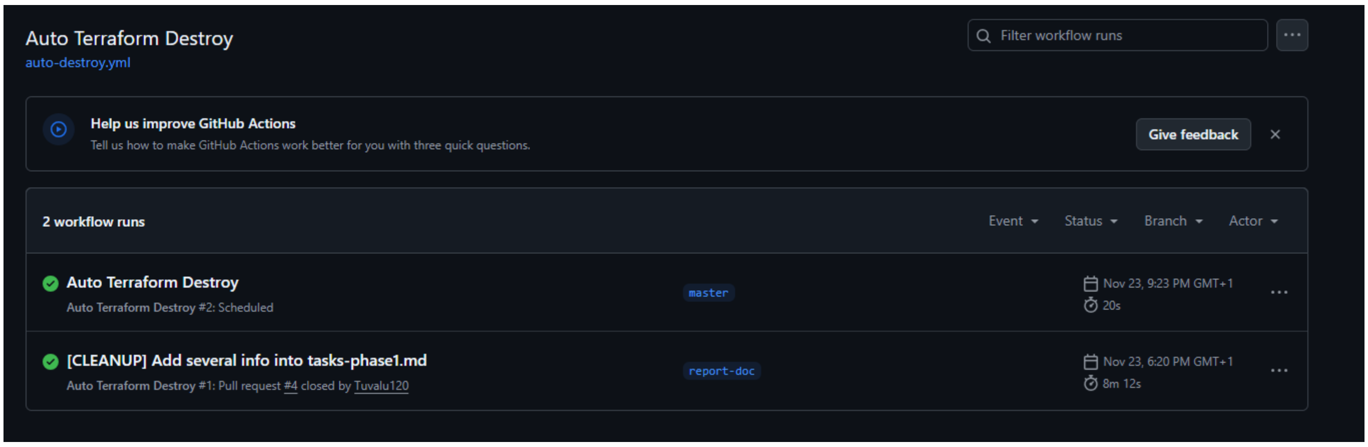
Add a new GitHub Actions workflow that:

1. runs terraform destroy -auto-approve
2. triggers automatically: a) on a fixed schedule (e.g. every day at 20:00 UTC) b) when a PR is merged to main containing [CLEANUP] tag in title

Steps:

1. Create file .github/workflows/auto-destroy.yml
2. Configure it to authenticate and destroy Terraform resources
3. Test the trigger (schedule or cleanup-tagged PR)

.github/workflows/auto-destroy.yml



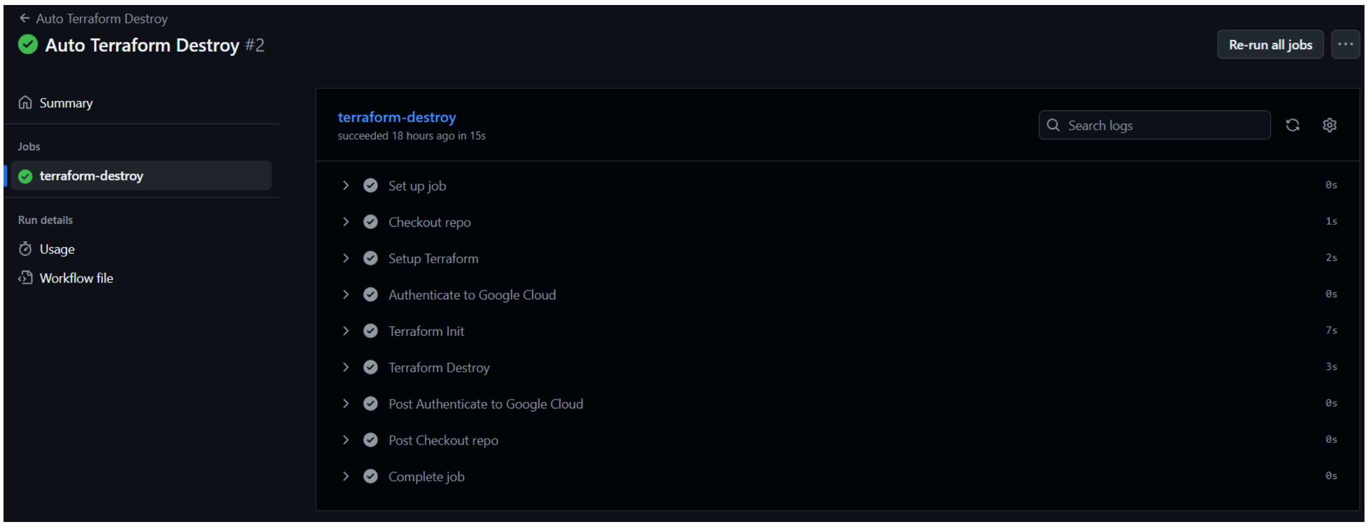
Auto Terraform Destroy
auto-destroy.yml

Help us improve GitHub Actions
Tell us how to make GitHub Actions work better for you with three quick questions.

2 workflow runs

Auto Terraform Destroy
Auto Terraform Destroy #2: Scheduled — master — Nov 23, 9:23 PM GMT+1 — 20s

[CLEANUP] Add several info into tasks-phase1.md
Auto Terraform Destroy #1: Pull request #4 closed by Tuvalu120 — report-doc — Nov 23, 6:20 PM GMT+1 — 8m 12s



Auto Terraform Destroy #2

terraform-destroy
succeeded 18 hours ago in 15s

```
Set up job                          0s
Checkout repo                       1s
Setup Terraform                     2s
Authenticate to Google Cloud        0s
Terraform Init                      7s
Terraform Destroy                   3s
Post Authenticate to Google Cloud   0s
Post Checkout repo                  0s
Complete job                        0s
```

Automatycznie czyszczenie środowiska o zadanej godzinie pomaga zminimalizować zużycie zasobów, kiedy nie są one używane (np. kiedy ktoś zapomniał o jego czyszczeniu po skończonej pracy), a czyszczenie środowiska z uzyciem taga [CLEANUP] znacząco ułatwia osobom zajmującym się projektem uporządkowanie zasobów po skończonej pracy nad projektem.