Phase 9 - Testing and evaluation

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1 Project cost evaluation

To make this evaluation, the GCP Cost calculator was used.

1.1 Compute Engine

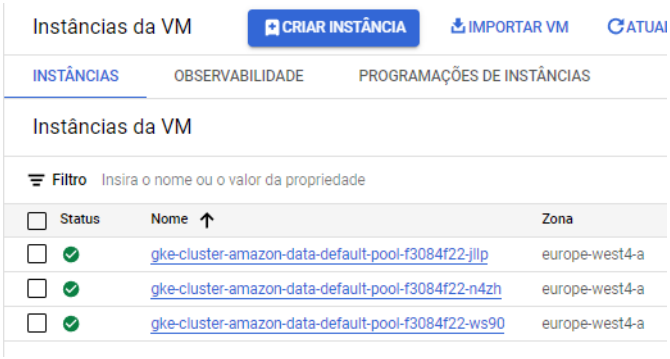

Figure 1: VM Instances

In this project 3 VM Instances were used and the machine type was the E2 series, specifically the e2-medium instance. This instance provides:

- Number of vCPUs: 1 vCPU

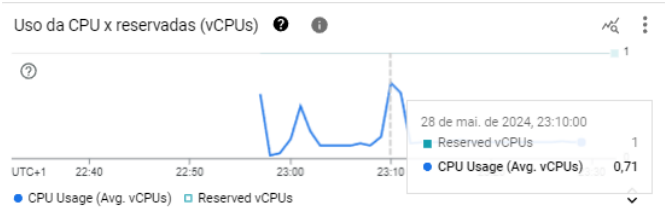

Figure 2: vCPUs usage for first cluster in figure 1

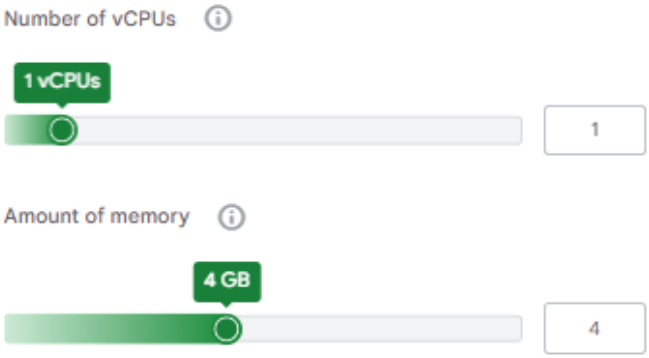

Figure 3: vcpu usage Graph for first cluster in figure 1

- Amount of memory: 4 GB
- Region: europe-west4

1.2 Kubernetes Engine

```
NAME: cluster-amazon-data
LOCATION: europe-west4-a
MASTER_VERSION: 1.29.4-gke.1043001
MASTER_IP: 35.204.187.51
MACHINE_TYPE: e2-medium
NODE_VERSION: 1.29.4-gke.1043001
NUM_NODES: 3
STATUS: RUNNING
```

Figure 4: GKE Cluster specifications obtained with cmd `gcloud container clusters list`

For the Kubernetes Engine (GKE), the configurations were obtained using the `gcloud container clusters list` command, which provided detailed specifications for the GKE clusters in use. These specifications were then input into the GCP Cost calculator to estimate the total cost of running the Kubernetes clusters.

- Number Of Nodes: 3
- Number Of Zonal Clusters : 1
- Machine Type: e2-medium
- Number of vCPUs: 1 vCPU
- Amount of memory: 4 GB
- Region: europe-west4

1.3 Networks

1.3.1 Cloud Load balancing

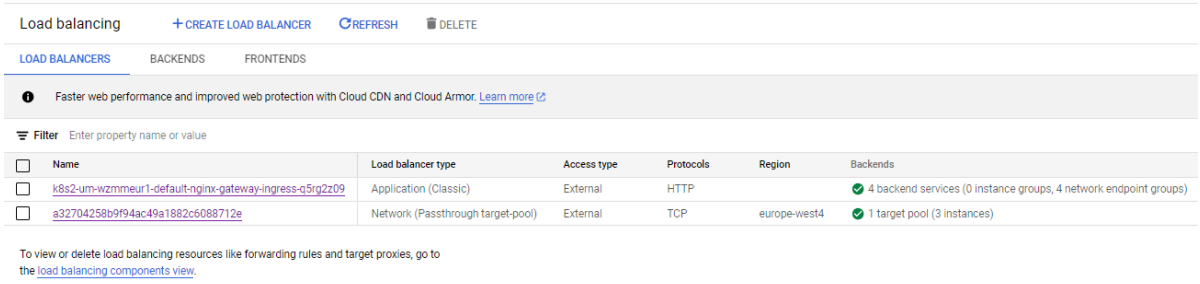

Figure 5: load balancers used in the app

In the Cost calculator about 2 different estimates were added (figure 5), one for the Network Cloud Balancer and the other for the Application Load balancer concerning the ingress, for this one in the estimate was also considered the use a Target Proxy that was also a specific configuration of this service. For both, these metrics were the same:

- Number of forwarding rules: 1
- Amount of inbound data: 100 GiB
- Amount of outbound data: 100 GiB

1.4 Artifact Registry

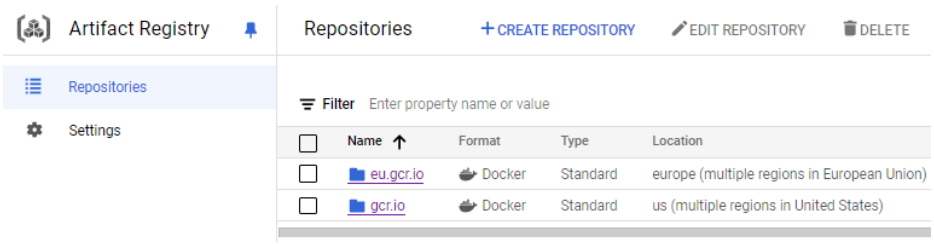

Figure 6: Repositories used in the project

As there was no Artifact Registry or Container Registry service available in the cost calculator, based on the current pricing established by GCP in this site [1], the estimate for this service is according to the rules:

- Storage Costs: $0.10 per GB per month for artifact storage.
- Network Egress Costs: Within the same region: Free.
- Cross-region egress: $0.12 per GB.
- Internet egress: Based on standard internet egress pricing (e.g., $0.12 per GB).

For example for our project a reasonable estimation would be :

- Storage Cost:
  - Storage Used: 100 GB
  - Cost: 100 GB * $0.10/GB = $10.00 per month
- Network Egress Cost:
  - Cross-region Egress:
  - Data Transferred: 20 GB
  - Cost: 20 GB * $0.12/GB = $2.40 per month
- Internet Egress:
  - Data Transferred: 10 GB
  - Cost: 10 GB * $0.12/GB = $1.20 per month
- Total Estimated Monthly Cost:
  - Storage Cost: $10.00
  - Cross-region Egress Cost: $2.40
  - Internet Egress Cost: $1.20
  - Total: $13.60 per month = 12.53 euros

1.5 Total

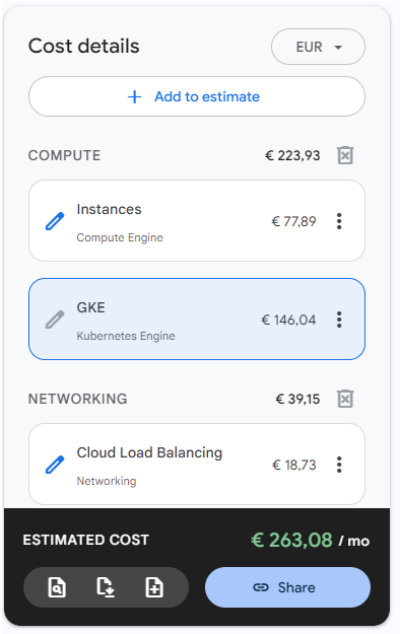

Figure 7: Cost Calculator Result

263,08 + 12,53 = 275,61 euros/month to run this application

References

[1] Google Cloud, "Artifact registry pricing," 2024, accessed: 2024-05-29. [Online]. Available: https://cloud.google.com/artifact-registry/pricing