I started the project with the management subnet, IAP, 3 SAs (owner, developer and gke-access) , custom role, Firewalls, VM, artifact registry and GKE

1. Github starting
2. creating separated modules
3. terraform constructure
    a. Add Credentials (key and gcloud auth)
        i. gcloud config set project PROJECT_ID
        ii. gcloud auth application-default login

    b. Adding new SA " sa-iti-tf-dev "
    gcloud iam service-accounts create sa-iti-tf-dev --description="Terraform Service account For Developers Final Project" --display-name="Terraform Service Account"

    c. Giving the SA role to Compute Instance Admin v1
        i. gcloud projects add-iam-policy-binding testingsevices \
        --member="serviceAccount:sa-iti-tf-dev@testingsevices.iam.gserviceaccount.com" \
        --role="roles/compute.instanceAdmin.v1"

    d. Impersonating this service account to make all our changes.
        i. gcloud iam service-accounts get-iam-policy sa-iti-tf-dev@testingsevices.iam.gserviceaccount.com --format=json > policy.json

        ii. Update the JSON file

policy.json > ...

```
{
"bindings": [
    {
        "members": [
            "user:alaa.seif.3112@gmail.com"
            ],
            "role" : "roles/iam.serviceAccountTokenCreator"
    }
],
"etag": "ACAB"
}
```

        iii. Update the policies with the policy.json file
        - gcloud iam service-accounts set-iam-policy sa-iti-tf-dev@testingsevices.gserviceaccount.com policy.json

    e. Create a bucket that will hold your Terraform Stat
        i. gsutil mb -l us-centeral-1 gs://iti-dev-tf-state
        ii. gsutil versioning set on gs://iti-dev-tf-state

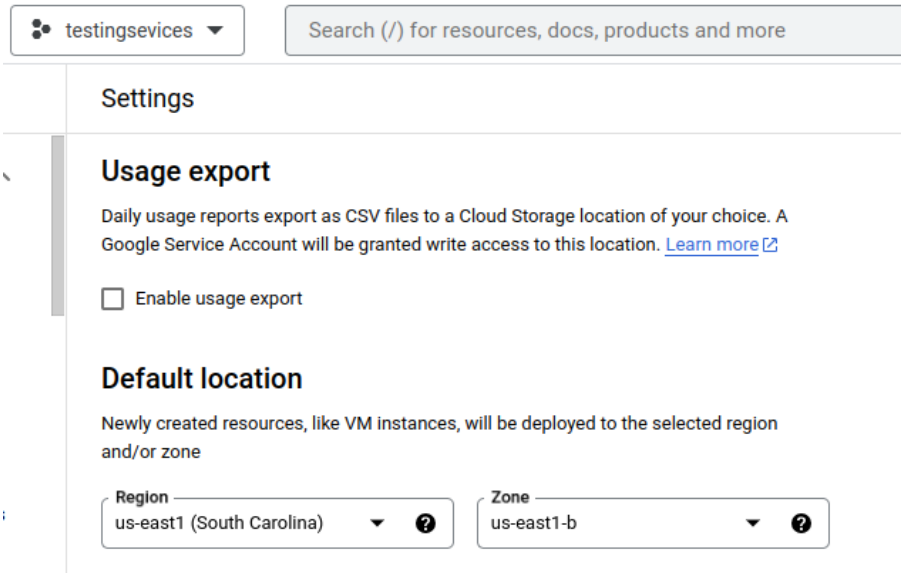
f. Create key to SA
    i. gcloud iam service-accounts keys create key.json --iam-account=sa-iti-tf-dev@testingsevices.iam.gserviceaccount.com

g. You will also need to enable some APIs in order to use terraform:

h. `gcloud services enable cloudresourcemanager.googleapis.com`
i. `gcloud services enable cloudbilling.googleapis.com`
j. `gcloud services enable iam.googleapis.com`
k. `gcloud services enable compute.googleapis.com`
l. Compute engine api

m. Creating VM (Following those links) ->
1- https://www.educative.io/answers/how-to-create-a-vmvirtual-machine-on-gcp-with-terraform
2-https://xebia.com/blog/how-to-login-to-private-instances-without-a-bastion-host-on-google-cloud-platform/
3-https://github.com/shamsway/gcp-terraform-examples/blob/main/gcve-bastion-iap/README.md

n. Enable Secret Manager API
o. To ssh >> `ssh <USERNAME>@localhost -p <LOCAL_PORT>`
p. Adding artifact registry to the vm
    i. Adding the terraform resource and run
    gcloud auth configure-docker us-centeral1-docker.pkg.dev
    To authenticate with Artifact Registry using the gcloud command
q. Setting project's default location



Workload Subnet

1- Enable the necessary APIs: Google Compute Engine, Kubernetes Engine, Google Container Registry.
2- Add SA with a custom role for accessing the GKE Cluster
3- Create a simple GKE Cluster with the subnet and nat.