Deploy To Cloud Run Using Cloud Build And Terraform

D

Dev Thakkar · Follow

3 min read · Dec 29, 2021

This article demonstrates use of Cloud Build and Terraform to deploy python backend service on Google Cloud Run.

Terraform is an "infrastructure as a code" tool that allows for reuse of similar and consistent set of instructions to provision Cloud services (Cloud Run, Compute etc) across projects.

As an example, we will deploy existing python application built in previous article.

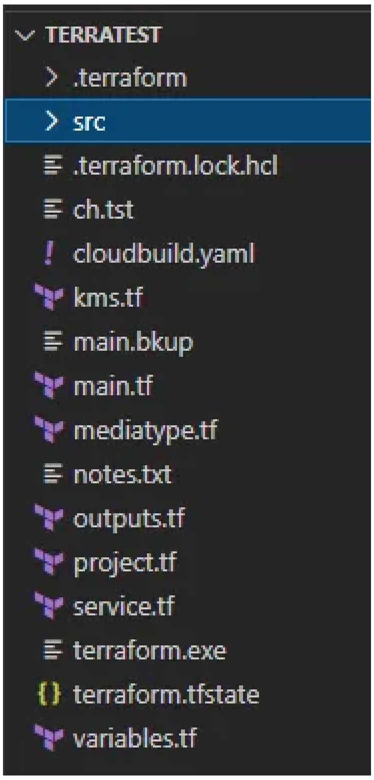
Step 1: Install tools

- Setup Google Cloud (GCP) account
- Download VS Code
- Download Terraform

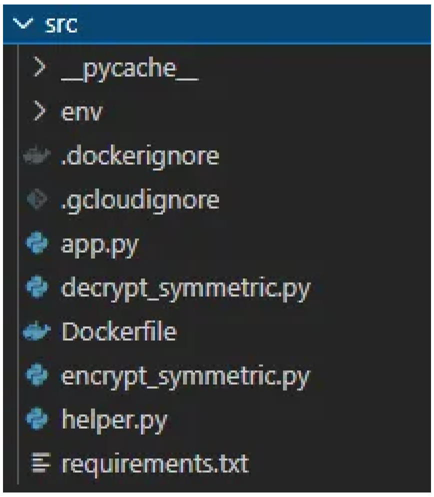
Step 2: Cloud Build application

- VS Code folder structure

Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF



```
TERRATEST
  > .terraform
  > src
    .terraform.lock.hcl
    ch.tst
    cloudbuild.yaml
    kms.tf
    main.bkup
    main.tf
    mediatype.tf
    notes.txt
    outputs.tf
    project.tf
    service.tf
    terraform.exe
    terraform.tfstate
    variables.tf
```

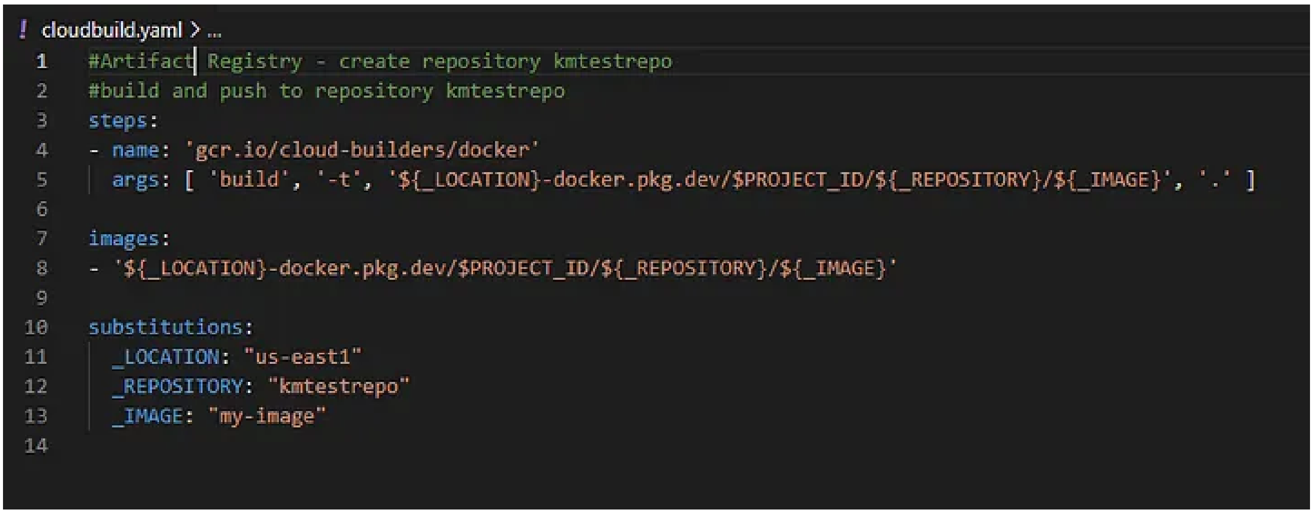


```
src
  > __pycache__
  > env
    .dockerignore
    .gcloudignore
    app.py
    decrypt_symmetric.py
    Dockerfile
    encrypt_symmetric.py
    helper.py
    requirements.txt
```

src folder contains python application from previous article

- Create **cloudbuild.yaml** as below

Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF

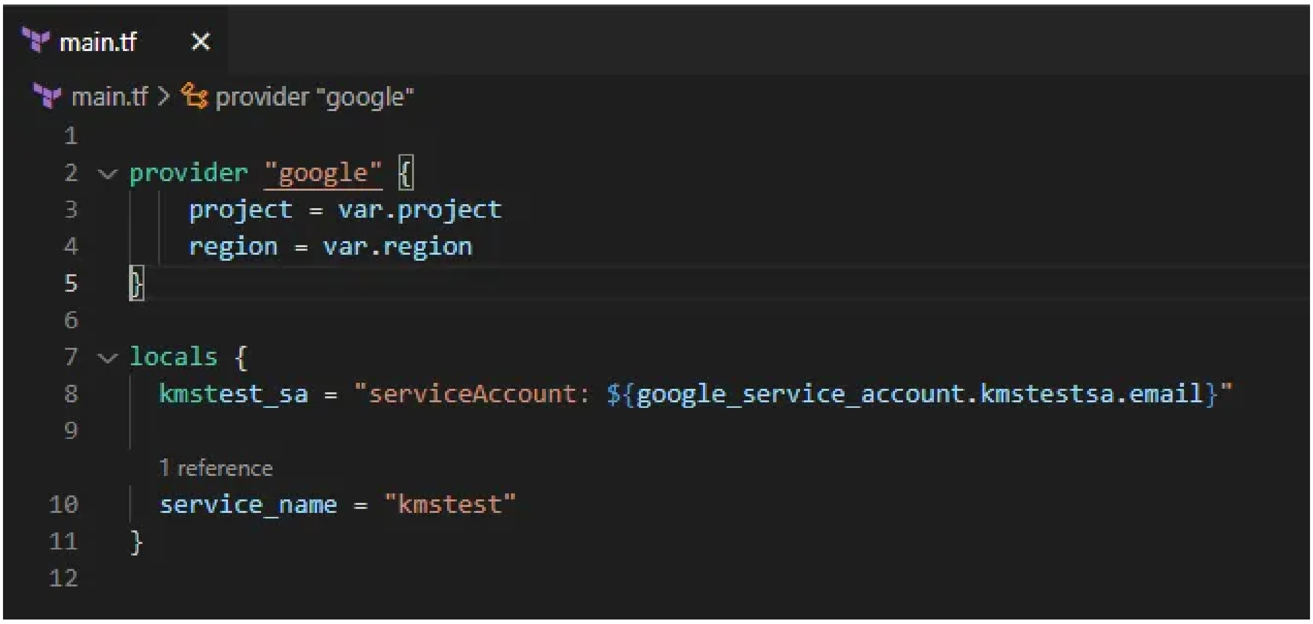


```yaml
#Artifact Registry - create repository kmtestrepo
#build and push to repository kmtestrepo
steps:
- name: 'gcr.io/cloud-builders/docker'
  args: [ 'build', '-t', '${_LOCATION}-docker.pkg.dev/$PROJECT_ID/${_REPOSITORY}/${_IMAGE}', '.' ]

images:
- '${_LOCATION}-docker.pkg.dev/$PROJECT_ID/${_REPOSITORY}/${_IMAGE}'

substitutions:
  _LOCATION: "us-east1"
  _REPOSITORY: "kmtestrepo"
  _IMAGE: "my-image"
```

```
# create empty repository kmtestrepo in Artifact Registry before
# running cloud build
#
# below command will create a docker image and push to artifact
# registry

> gcloud builds submit --config cloudbuild.yaml ./src
```

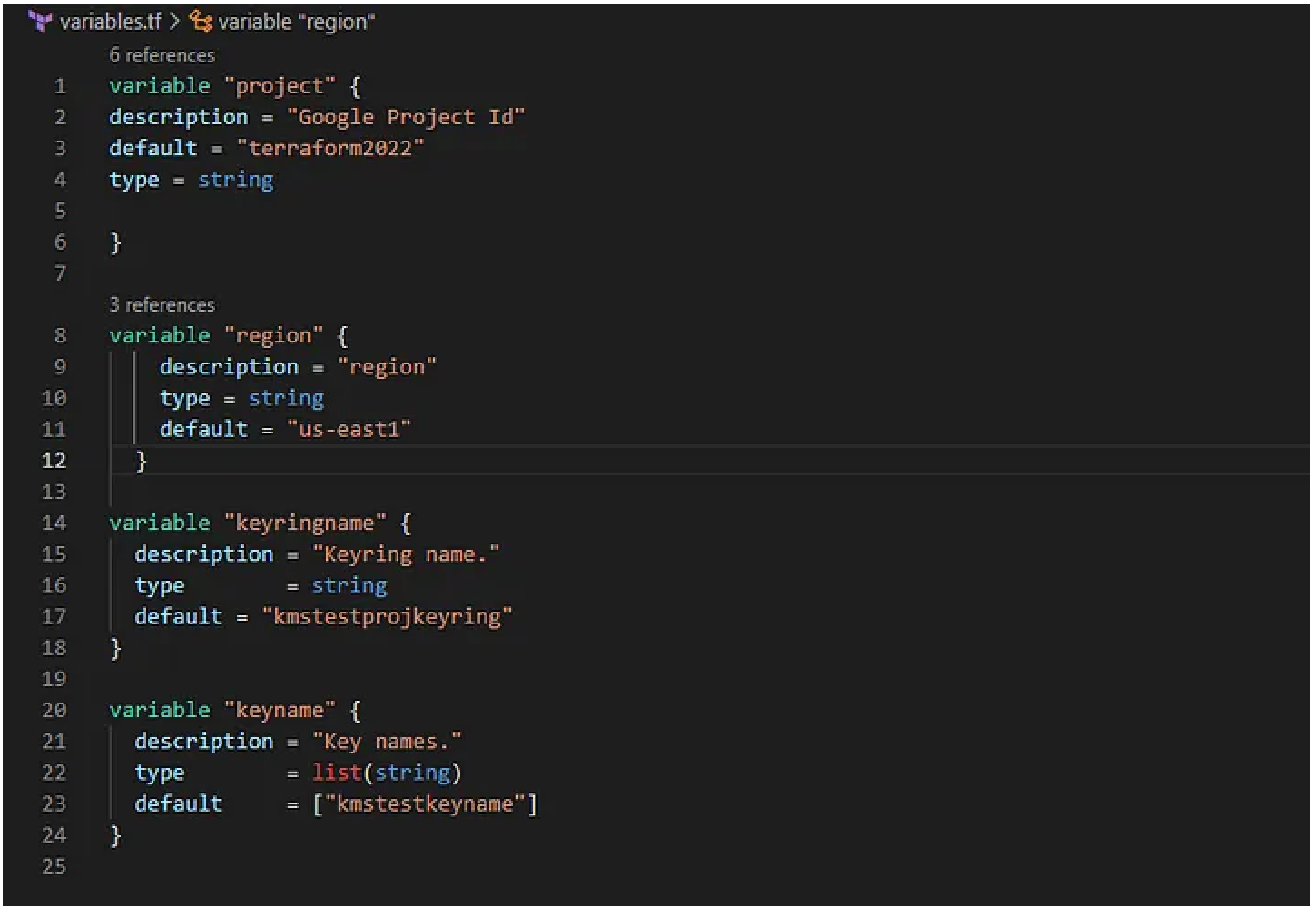
Step 3: Provision resources (terraform files to create)

- create **main.tf** as below



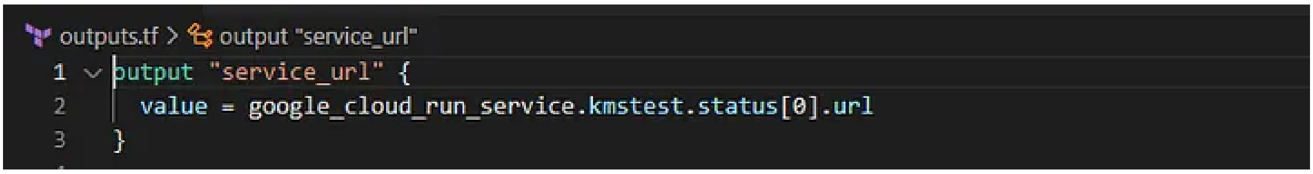
```hcl

provider "google" {
    project = var.project
    region = var.region
}

locals {
  kmstest_sa = "serviceAccount: ${google_service_account.kmstestsa.email}"

  service_name = "kmstest"
}

```

- create **variables.tf** as below



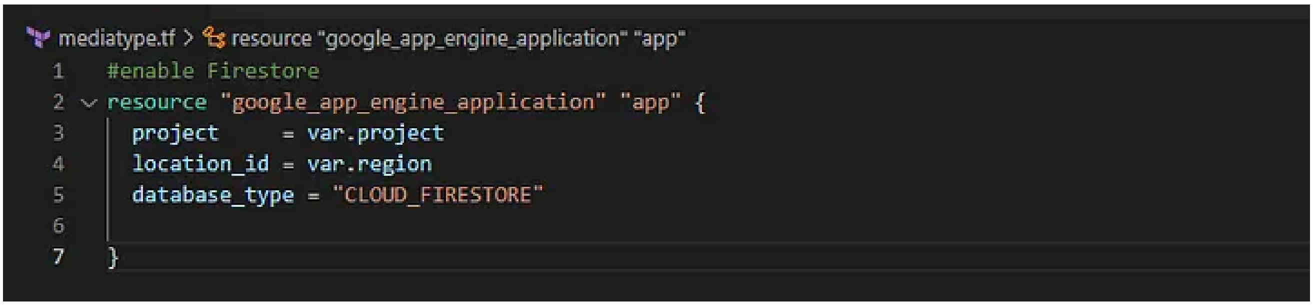
```
variable "project" {
description = "Google Project Id"
default = "terraform2022"
type = string

}

variable "region" {
    description = "region"
    type = string
    default = "us-east1"
  }

variable "keyringname" {
  description = "Keyring name."
  type        = string
  default = "kmstestprojkeyring"
}

variable "keyname" {
  description = "Key names."
  type        = list(string)
  default     = ["kmstestkeyname"]
}

```

- create **outputs.tf** as below



```
output "service_url" {
  value = google_cloud_run_service.kmstest.status[0].url
}
```

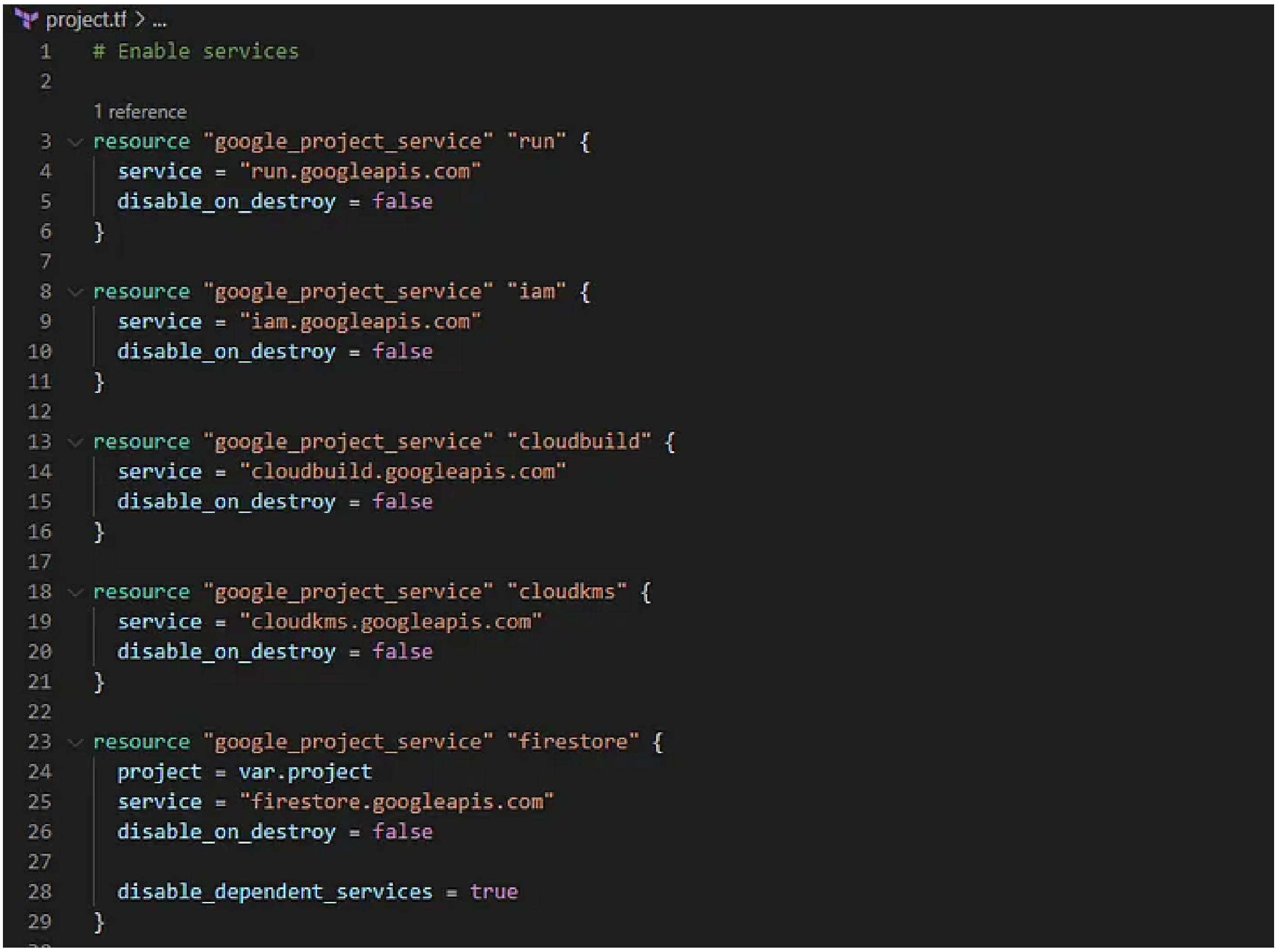
- create **mediatype.tf** as below


mediatype.tf > resource "google_app_engine_application" "app"

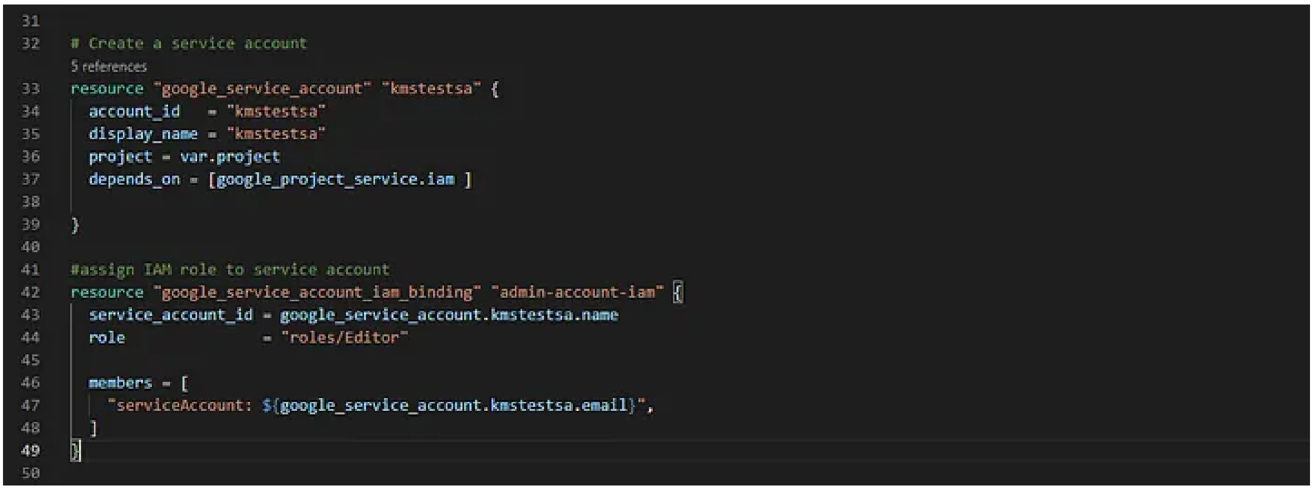
```
#enable Firestore
resource "google_app_engine_application" "app" {
  project     = var.project
  location_id = var.region
  database_type = "CLOUD_FIRESTORE"

}
```

- create **project.tf** as below

Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF



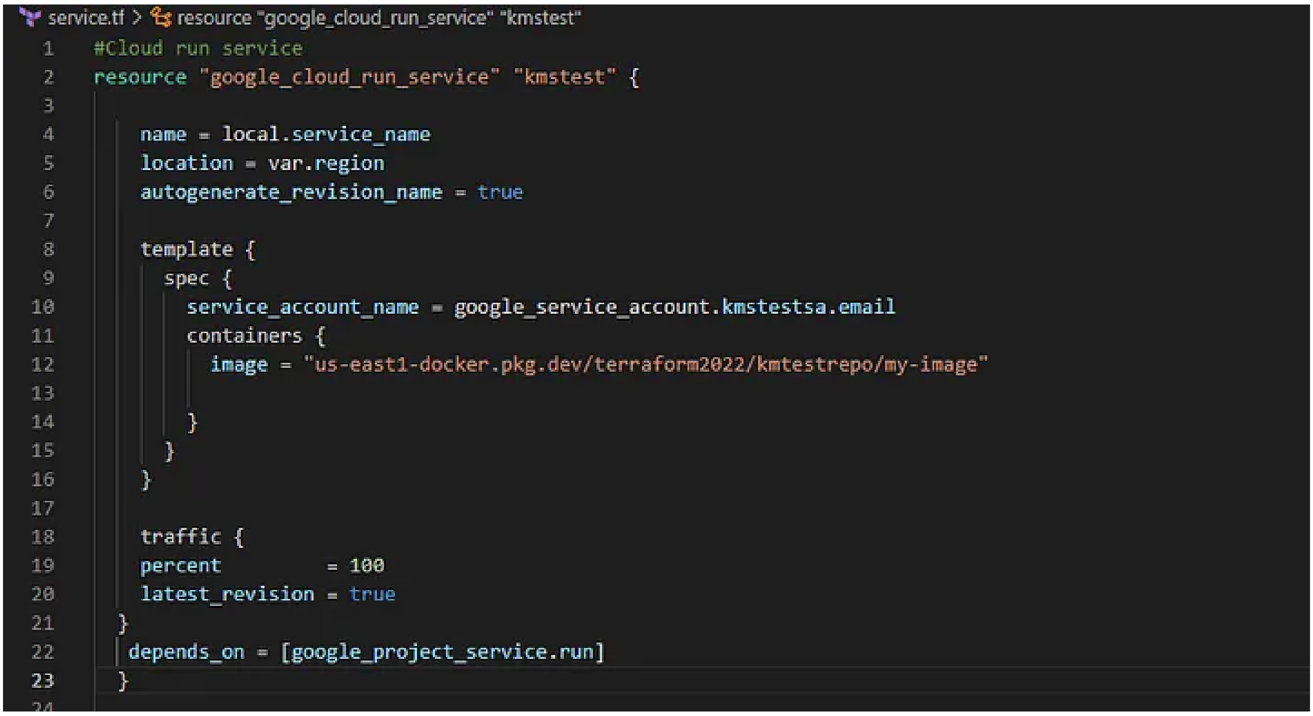
```
# Enable services

resource "google_project_service" "run" {
  service = "run.googleapis.com"
  disable_on_destroy = false
}

resource "google_project_service" "iam" {
  service = "iam.googleapis.com"
  disable_on_destroy = false
}

resource "google_project_service" "cloudbuild" {
  service = "cloudbuild.googleapis.com"
  disable_on_destroy = false
}

resource "google_project_service" "cloudkms" {
  service = "cloudkms.googleapis.com"
  disable_on_destroy = false
}

resource "google_project_service" "firestore" {
  project = var.project
  service = "firestore.googleapis.com"
  disable_on_destroy = false

  disable_dependent_services = true
}
```



```

# Create a service account
resource "google_service_account" "kmstestsa" {
  account_id   = "kmstestsa"
  display_name = "kmstestsa"
  project = var.project
  depends_on = [google_project_service.iam ]

}

#assign IAM role to service account
resource "google_service_account_iam_binding" "admin-account-iam" {
  service_account_id = google_service_account.kmstestsa.name
  role               = "roles/Editor"

  members = [
    "serviceAccount: ${google_service_account.kmstestsa.email}",
  ]
}

```

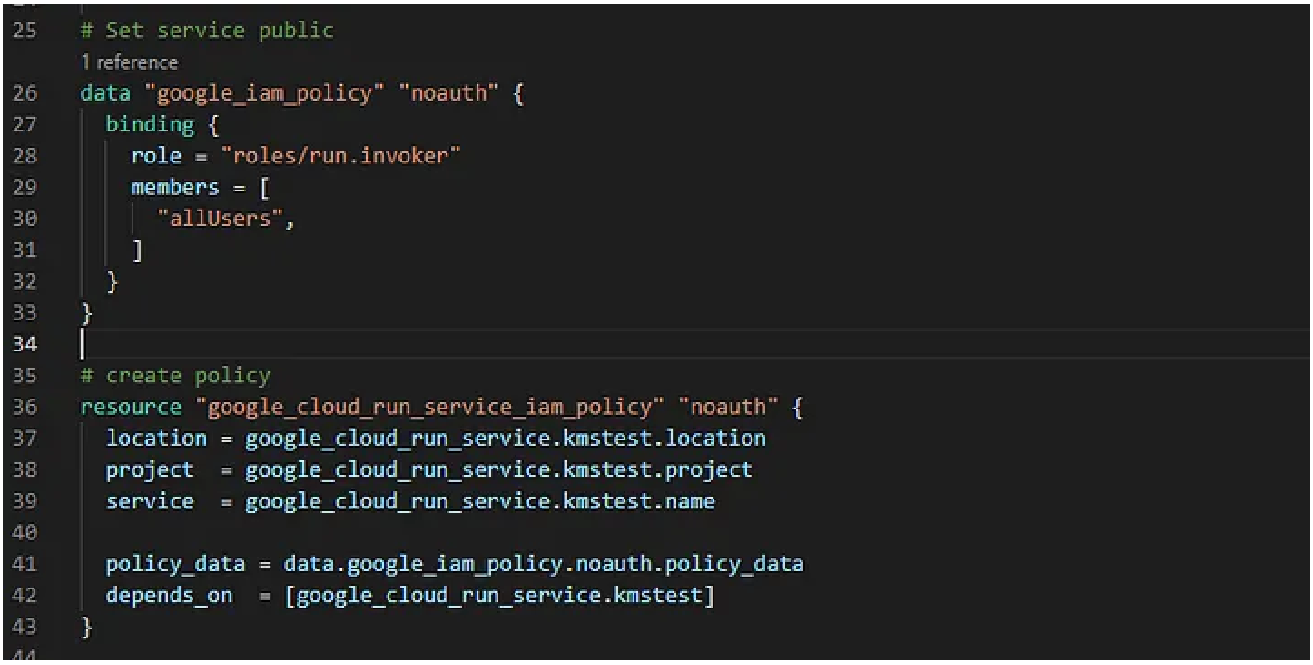
- create **service.tf** as below

Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF



```
#Cloud run service
resource "google_cloud_run_service" "kmstest" {

    name = local.service_name
    location = var.region
    autogenerate_revision_name = true

    template {
      spec {
        service_account_name = google_service_account.kmstestsa.email
        containers {
          image = "us-east1-docker.pkg.dev/terraform2022/kmtestrepo/my-image"

        }
      }
    }

    traffic {
    percent         = 100
    latest_revision = true
  }
   depends_on = [google_project_service.run]
  }
```

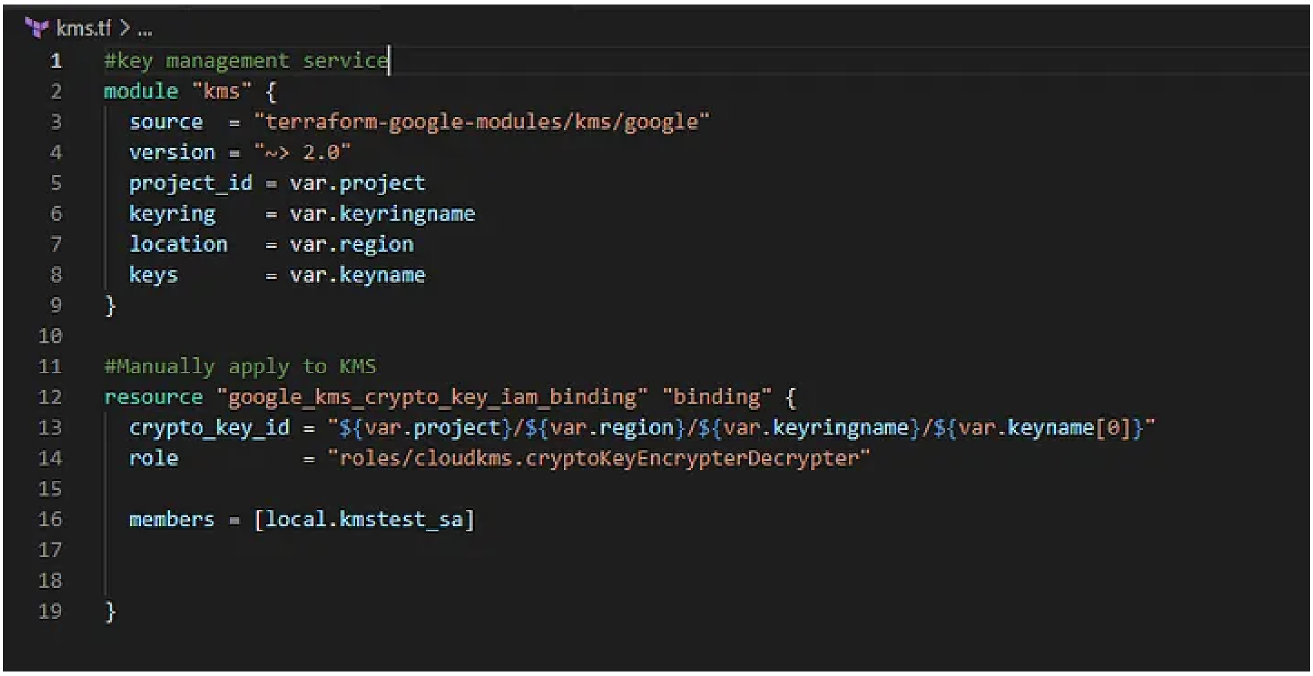
image value is from artifact registry after running cloud build



```
# Set service public
data "google_iam_policy" "noauth" {
  binding {
    role = "roles/run.invoker"
    members = [
      "allUsers",
    ]
  }
}

# create policy
resource "google_cloud_run_service_iam_policy" "noauth" {
  location = google_cloud_run_service.kmstest.location
  project  = google_cloud_run_service.kmstest.project
  service  = google_cloud_run_service.kmstest.name

  policy_data = data.google_iam_policy.noauth.policy_data
  depends_on  = [google_cloud_run_service.kmstest]
}
```

- create **kms.tf** as below (note: Once created this key will not be removed by *terraform destroy* command)

Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF



```
#key management service
module "kms" {
  source  = "terraform-google-modules/kms/google"
  version = "~> 2.0"
  project_id = var.project
  keyring    = var.keyringname
  location   = var.region
  keys       = var.keyname
}

#Manually apply to KMS
resource "google_kms_crypto_key_iam_binding" "binding" {
  crypto_key_id = "${var.project}/${var.region}/${var.keyringname}/${var.keyname[0]}"
  role          = "roles/cloudkms.cryptoKeyEncrypterDecrypter"

  members = [local.kmstest_sa]


}
```

Step 4: Apply terraform and test application

```
#run terraform init

> terraform init

# run terraform plan and confirm changes to outputs

> terraform plan

# run terraform apply

> terraform apply
```

Notes: If below error received for IAM role then perform a manual update to project

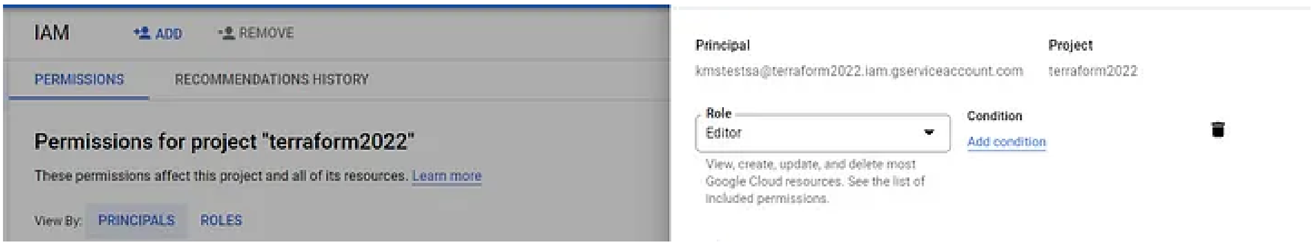
```
Error: Error applying IAM policy for service account 'projects/terraform2022/serviceAccounts/kmstestsa@terraform2022.iam.gserviceaccount.com': Error setting IAM policy for service account 'projects/terraform2022/serviceAccounts/kmstestsa@terraform2022.iam.gserviceaccount.com': googleapi: Error 400: Service account kmstestsa@terraform2022.iam.gserviceaccount.com does not exist., badRequest
```

Step 5:

Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF

Manual update of “google_service_account_iam_binding” and “google_kms_crypto_key_iam_binding” for newly created service account “kmstestsa@terraform2022.iam.gserviceaccount.com”

- In **IAM** Add Principal “kmstestsa@terraform2022.iam.gserviceaccount.com”
- Role: Editor



IAM — ADD — REMOVE

PERMISSIONS — RECOMMENDATIONS HISTORY

Permissions for project "terraform2022"

These permissions affect this project and all of its resources. Learn more

View By: PRINCIPALS ROLES

Principal: kmstestsa@terraform2022.iam.gserviceaccount.com

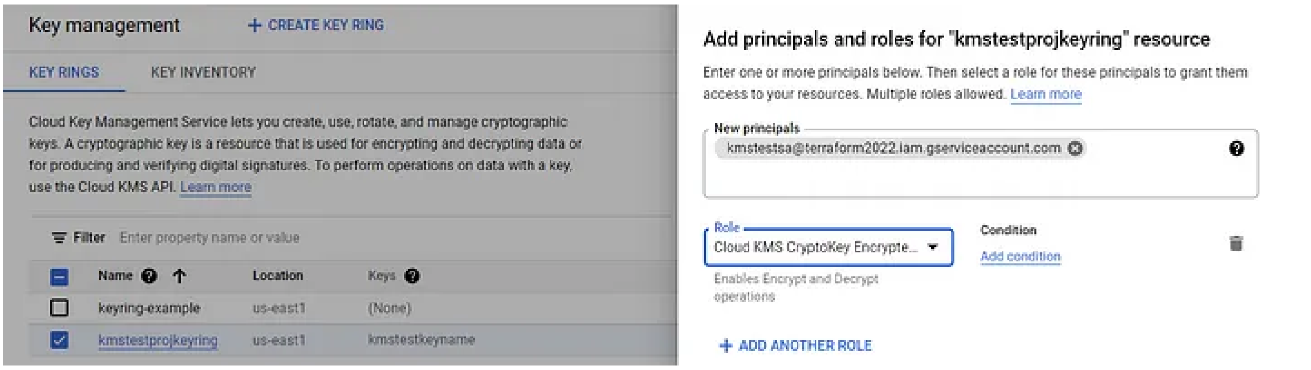
Project: terraform2022

Role: Editor

View, create, update, and delete most Google Cloud resources. See the list of included permissions.

Condition: Add condition

- In Security => **Key Management** for “kmstestprojkeyring” Add Principal “kmstestsa@terraform2022.iam.gserviceaccount.com”
- Role: Cloud KMS Cryptokey Encrypter/Decrypter



Key management — CREATE KEY RING

KEY RINGS — KEY INVENTORY

Cloud Key Management Service lets you create, use, rotate, and manage cryptographic keys. A cryptographic key is a resource that is used for encrypting and decrypting data or for producing and verifying digital signatures. To perform operations on data with a key, use the Cloud KMS API. Learn more

Filter: Enter property name or value

	Name	Location	Keys
□	keyring-example	us-east1	(None)
☑	kmstestprojkeyring	us-east1	kmstestkeyname

Add principals and roles for "kmstestprojkeyring" resource

Enter one or more principals below. Then select a role for these principals to grant them access to your resources. Multiple roles allowed. Learn more

New principals: kmstestsa@terraform2022.iam.gserviceaccount.com

Role: Cloud KMS CryptoKey Encrypte...

Enables Encrypt and Decrypt operations

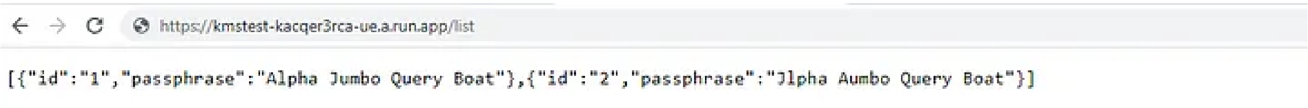
Condition: Add condition

ADD ANOTHER ROLE

Step 6: Test

Terraform apply will output service_url = “https://kmstest-kacqer3rca-ue.a.run.app"

In browser view list



https://kmstest-kacqer3rca-ue.a.run.app/list

```
[{"id":"1","passphrase":"Alpha Jumbo Query Boat"},{"id":"2","passphrase":"Jlpha Aumbo Query Boat"}]
```

Step 7: remove resources

Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF

```
#Terraform commands

#remove all resources
> terraform destroy

# Note: Certain services such as KMS or
# AppEngine Firestore will still remain

#Review what is in Terraform state
> Terraform state list

# To remove item from state (in case of mismatch with Cloud
service)
> Terraform state rm <listitem>

# To refresh
> Terraform refresh
```

Step 8: Delete the project along with all resources (optional)

```
gcloud projects delete terraform2022
```

Terraform · Google Cloud · Google Cloud Run

Written by Dev Thakkar

3 Followers · 3 Following

Responses (1)

What are your thoughts?

Respond

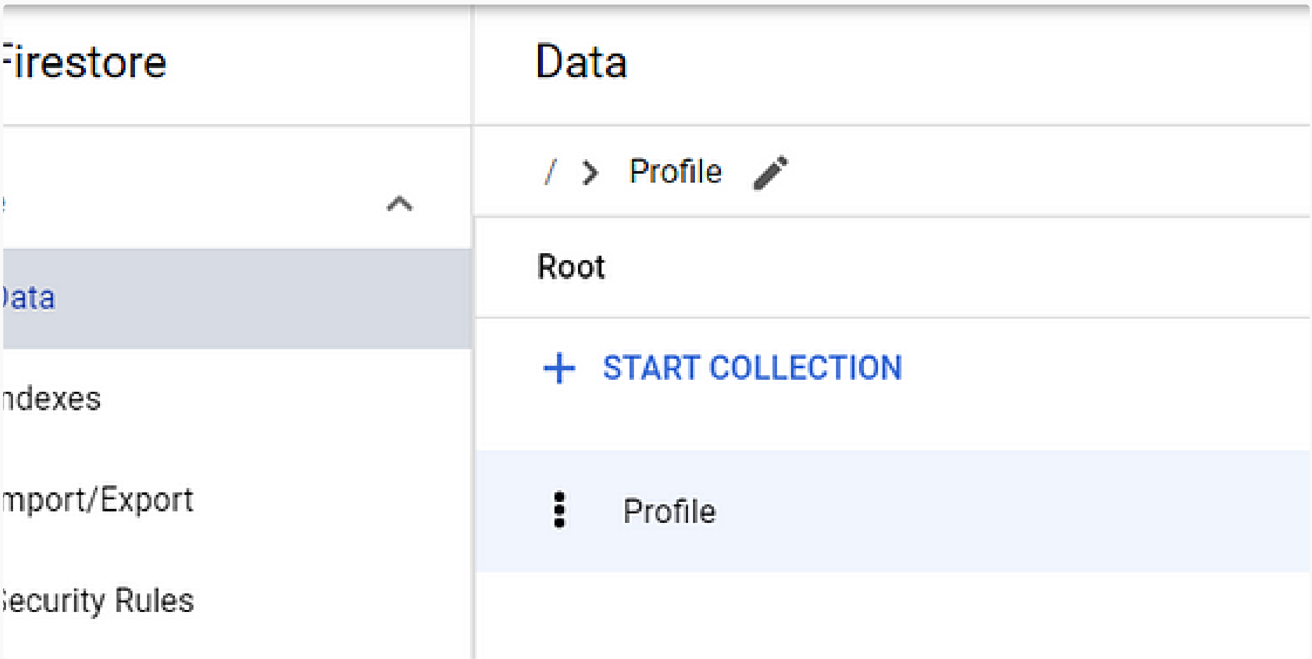
Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF

John E. Heyer
almost 2 years ago

There's some good terraform code here. But it would be a lot easier to consume if posted in text format rather than screenshots.

Reply

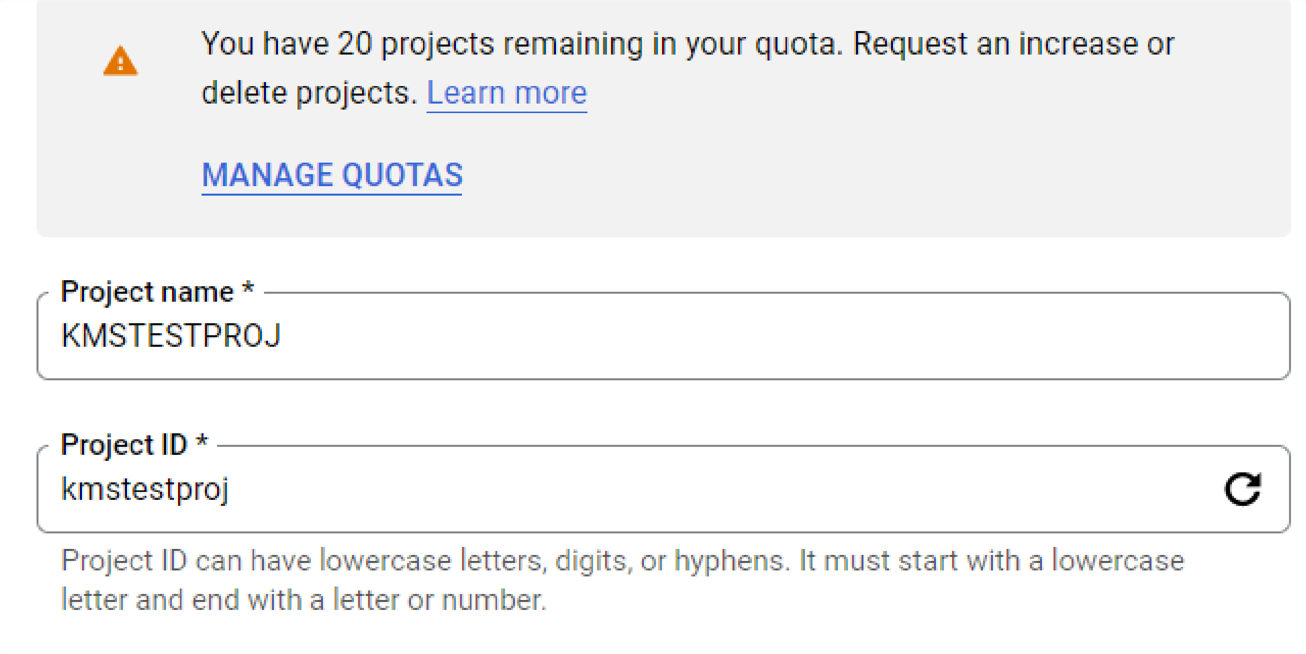
More from Dev Thakkar



Dev Thakkar

Nov 19, 2021

Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF



⚠ You have 20 projects remaining in your quota. Request an increase or delete projects. Learn more

MANAGE QUOTAS

Project name *
KMSTESTPROJ

Project ID *
kmstestproj

Project ID can have lowercase letters, digits, or hyphens. It must start with a lowercase letter and end with a letter or number.

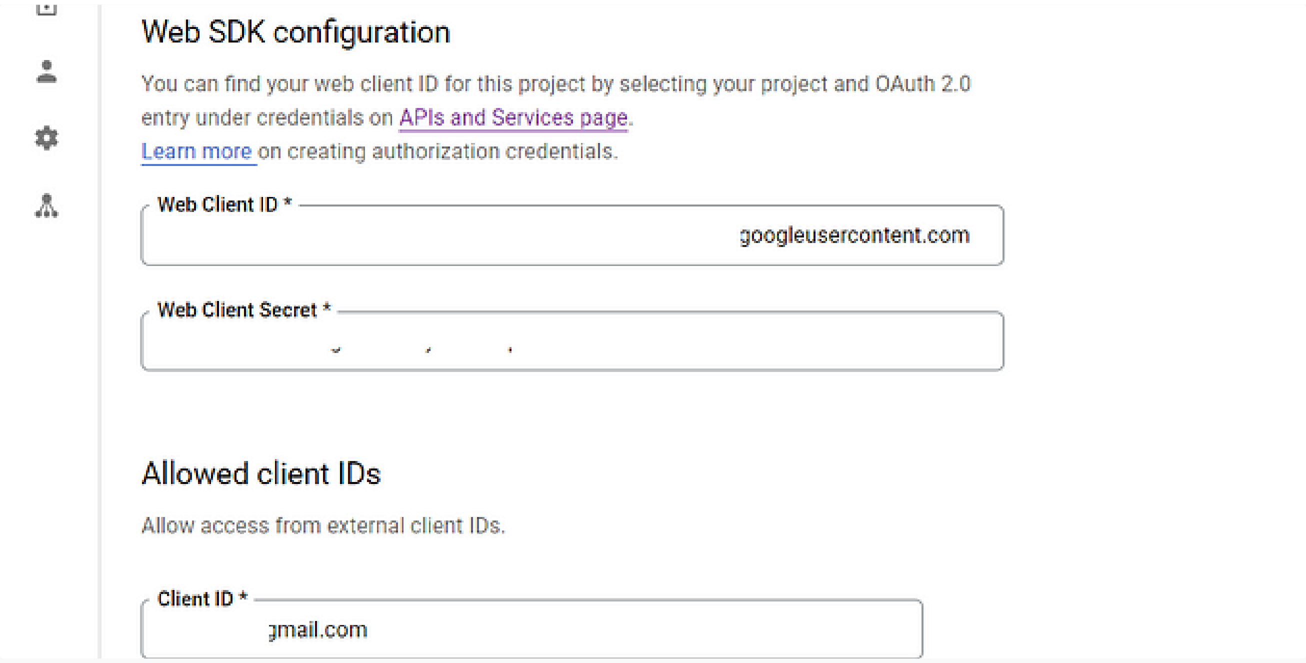
Dev Thakkar

Nov 19, 2021

Dev Thakkar

Mar 15

Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF



Web SDK configuration

You can find your web client ID for this project by selecting your project and OAuth 2.0 entry under credentials on APIs and Services page.
Learn more on creating authorization credentials.

Web Client ID * googleusercontent.com

Web Client Secret *

Allowed client IDs

Allow access from external client IDs.

Client ID * gmail.com

D Dev Thakkar

Dec 12, 2021

See all from Dev Thakkar

Recommended from Medium

Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF

Supriti

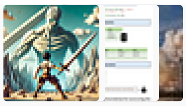
✦ Nov 1 80

Wael Rahhal, Ph.D.

✦ Nov 1 411 2

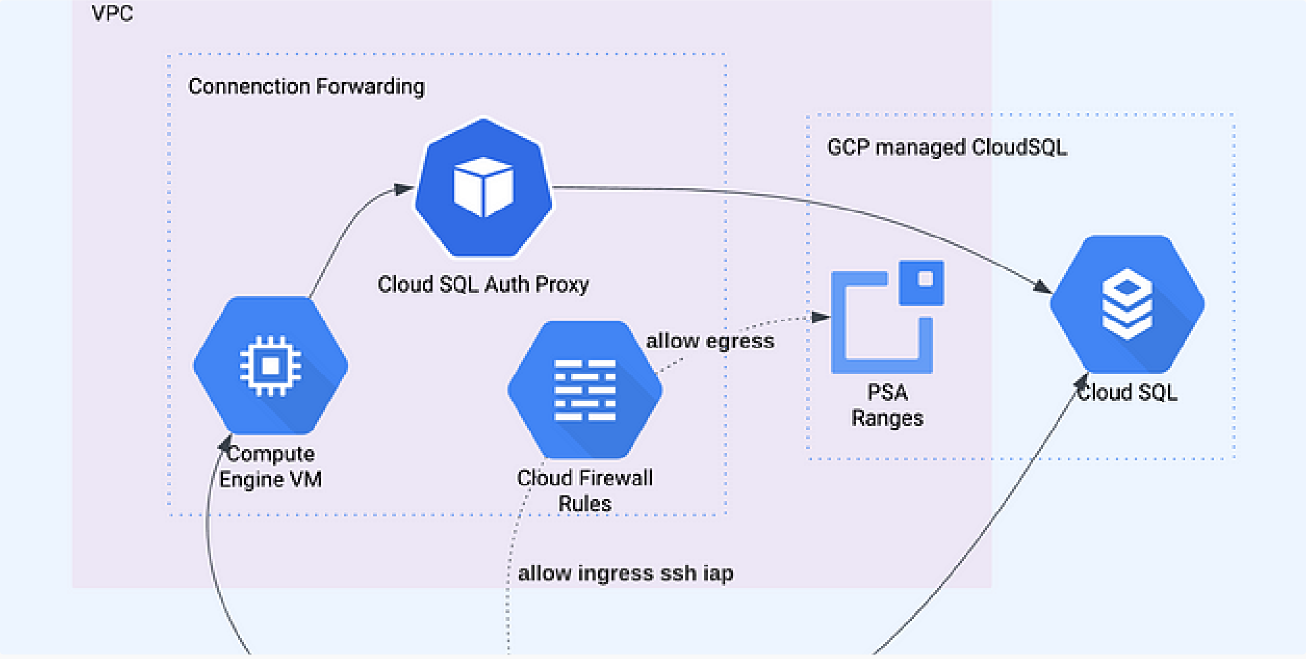
Lists

Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF



Natural Language Processing

1881 stories · 1506 saves



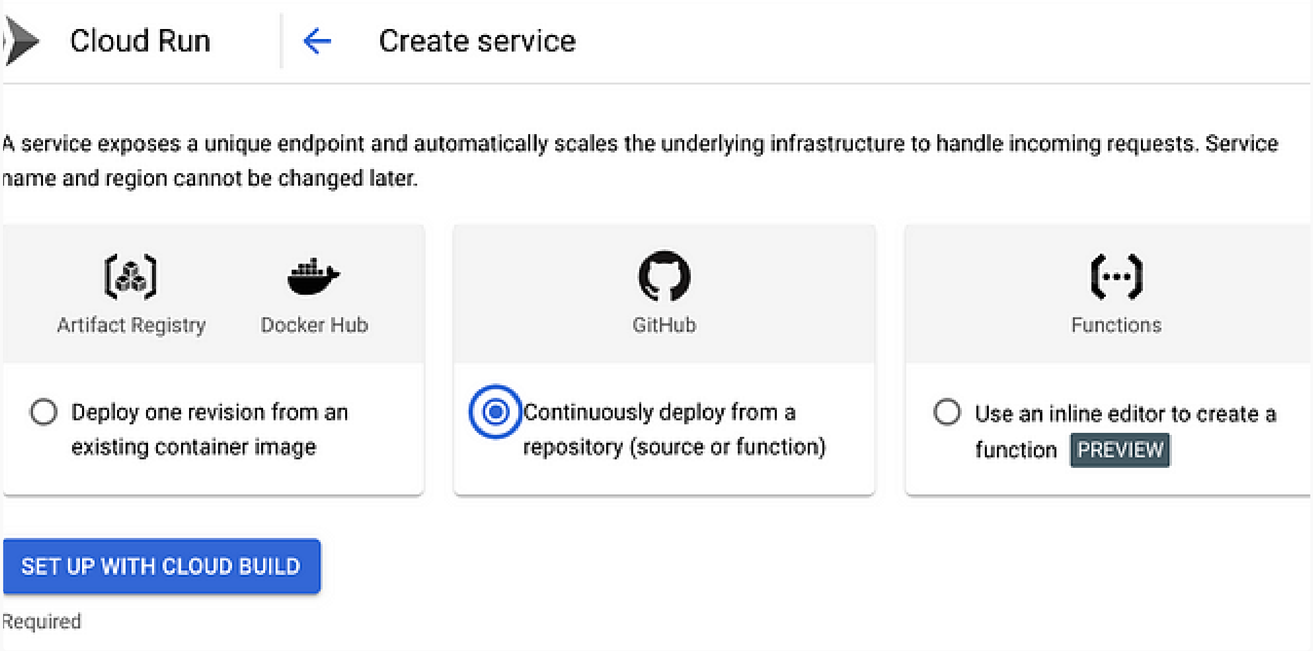
Peng Cao

Sep 23 50

Harendra

Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF

Oct 26 8.3K 132



Cloud Run ← Create service

A service exposes a unique endpoint and automatically scales the underlying infrastructure to handle incoming requests. Service name and region cannot be changed later.

○ Deploy one revision from an existing container image

● Continuously deploy from a repository (source or function)

○ Use an inline editor to create a function PREVIEW

SET UP WITH CLOUD BUILD

Required

Judy Dev

Oct 17 5

In Terraform & Beyond by Shlpa S Behani

Sep 28 4

Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF

See more recommendations

Explore our developer-friendly HTML to PDF API Printed using PDFCrowd HTML to PDF