DevOps Project BankApp Deployment using GitLab Google-Cloud-Platform (GCP) and AWS

By Ritesh Kumar Singh

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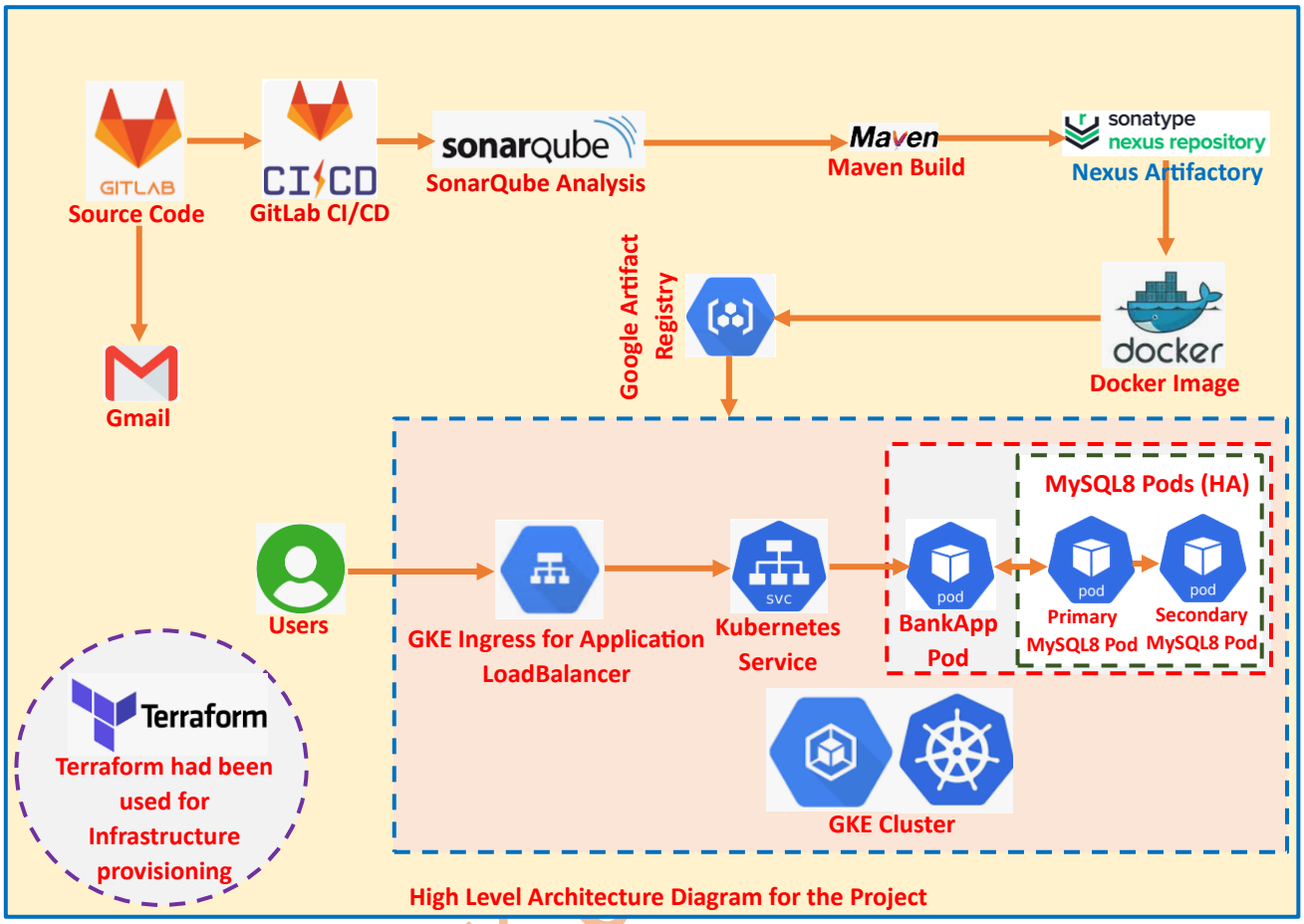
या कुन्देन्दुतुषारहारधवला या शुभ्रवस्त्रावृता
या वीणावरदण्डमण्डितकरा या श्वेतपद्मासना।
या ब्रह्माच्युत शंकरप्रभृतिभिर्देवैः सदा वन्दिता
सा मां पातु सरस्वती भगवती निःशेषजाड्यापहा ॥

DevOps Project BankApp Deployment using GitLab CI/CD GCP and AWS



High Level Architecture Diagram for the Project

High-level architecture diagram of the project is as shown in the screenshot attached above. The source code and helm charts for bankapp and bitnami mysql8 pods were present in the GitLab Private Repository. I had installed the GitLab on EC2 Instance using the Terraform script and for your reference it is available in the GitHub Repo https://github.com/singhritesh85/terraform-gitlab-server.git. As a part of disaster recovery, I had created the snapshots of EBS Volume attached to the GitLab Server using the Lifecycle Manager Policy and created the snapshots at 11:00 AM and 11:00 PM UTC (twice a day). The below steps and screenshot show how I had executed the terraform script.

The first resource which I created in this project was GCP Cloud DNS which I created using Terraform script present in the GitHub Repo https://github.com/singhritesh85/terraform-google-cloud-platform.git at the path **terraform-gcp-cloud-dns**. The state file for terraform I kept in the GCP bucket which automatically acquire state lock.

```
[root@terraform-server main]# gcloud --version
Google Cloud SDK 528.0.0
alpha 2025.06.20
beta 2025.06.20
bq 2.1.18
bundled-python3-unix 3.12.9
core 2025.06.20
gcloud-crc32c 1.0.0
gsutil 5.34
```

```
[root@terraform-server main]# gcloud auth login

You are running on a Google Compute Engine virtual machine.
It is recommended that you use service accounts for authentication.

You can run:

  $ gcloud config set account `ACCOUNT`

to switch accounts if necessary.

Your credentials may be visible to others with access to this
virtual machine. Are you sure you want to authenticate with
your personal account?

Do you want to continue (Y/n)?  Y

Go to the following link in your browser, and complete the sign-in prompts:

[redacted]

Once finished, enter the verification code provided in your browser: [redacted]

You are now logged in as [redacted].
Your current project is [redacted].  You can change this setting by running:
  $ gcloud config set project PROJECT_ID
```

terraform init -------> initializes a working directory containing configuration files and installs plugins for required providers.

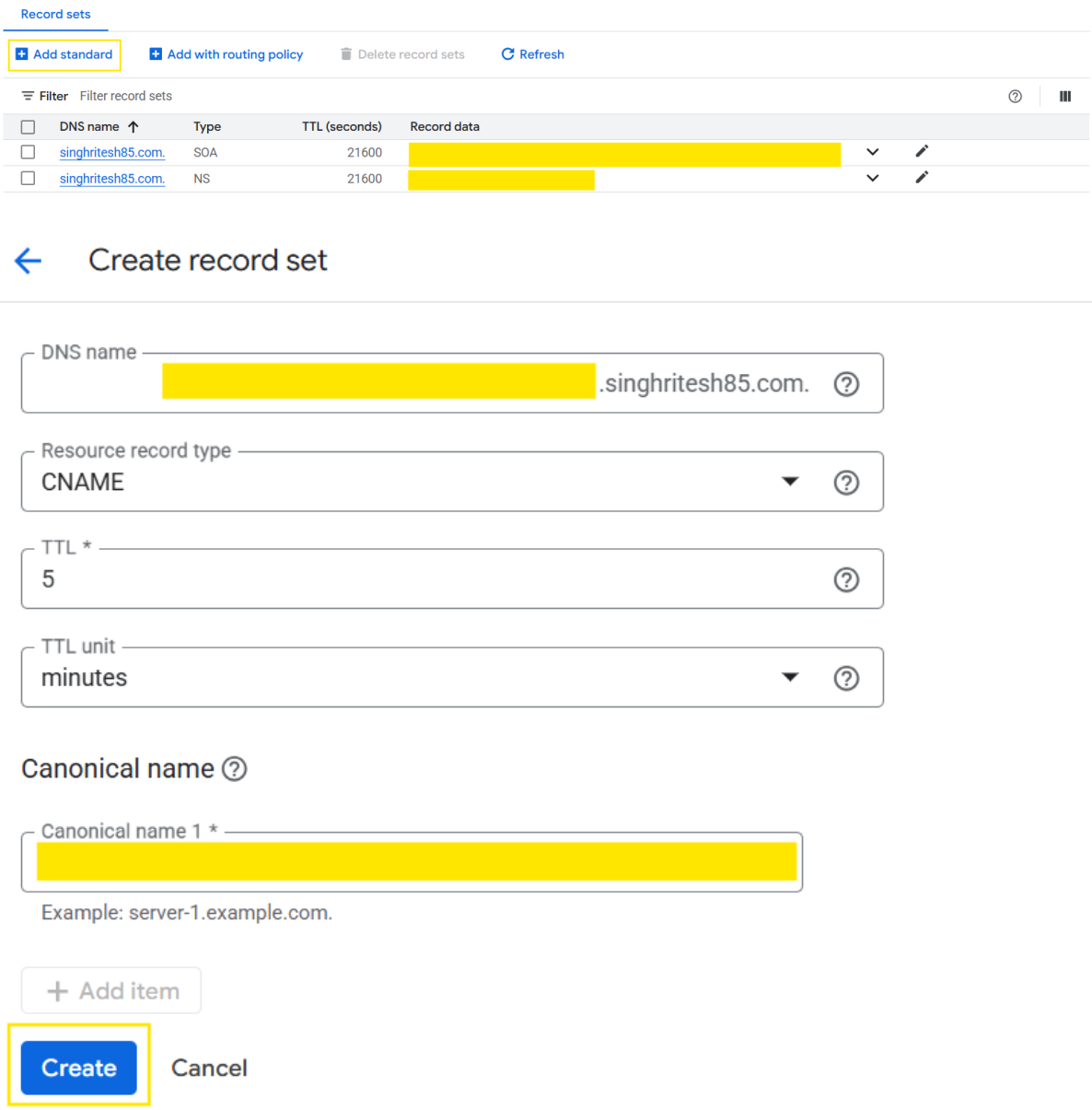
terraform validate --------> verify that terraform configuration file is correct or not

terraform plan ---------> Check which resources are going to be created.

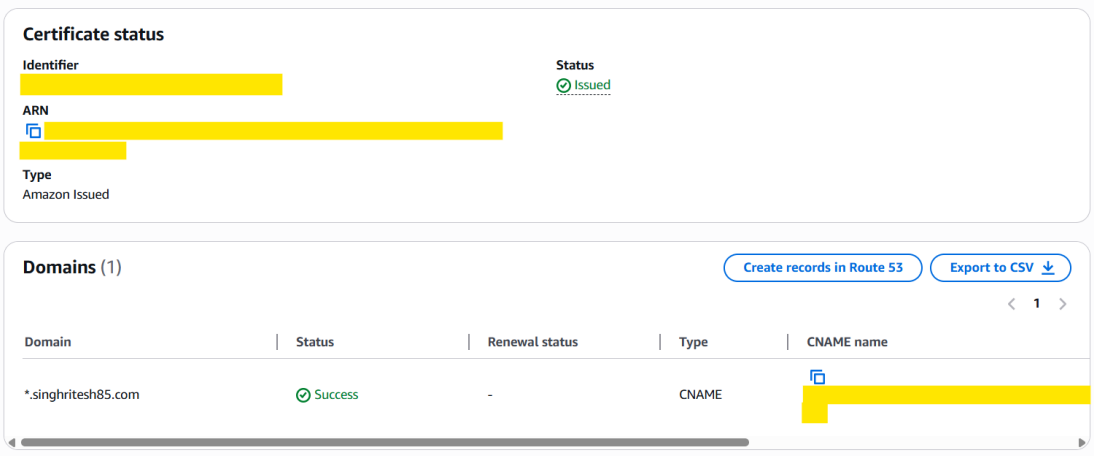
Then you can run the command **terraform apply -auto-approve** -----> Finally, Create the resources.

```
          + enable_logging = true
        }

      + dnssec_config {
          + kind          = "dns#managedZoneDnsSecConfig"
          + non_existence = (known after apply)
          + state         = "on"

          + default_key_specs (known after apply)
        }
    }

Plan: 1 to add, 0 to change, 0 to destroy.

Changes to Outputs:
  + gcp_cloud_dns_name_and_dns_name = {
      + dns_zone_nameservers = (known after apply)
      + zone_dns_name        = "singhritesh85.com."
      + zone_name            = "public-hosted-zone-logging-enabled"
    }
module.gcp_cloud_dns.google_dns_managed_zone.cloud_logging_enabled_zone: Creating...
module.gcp_cloud_dns.google_dns_managed_zone.cloud_logging_enabled_zone: Creation complete after 1s [id=projects/[redacted]/managedZones/public-hoste
d-zone-logging-enabled]

Apply complete! Resources: 1 added, 0 changed, 0 destroyed.

Outputs:

gcp_cloud_dns_name_and_dns_name = {
  "dns_zone_nameservers" = tolist([
    "[redacted]",
    "[redacted]",
    "[redacted]",
    "[redacted]",
  ])
  "zone_dns_name" = "singhritesh85.com."
  "zone_name" = "public-hosted-zone-logging-enabled"
}
```

Then I updated the Domain Name Provider's nameserver after that In AWS Account I requested a Public SSL Certificate and got it validated using the GCP Cloud DNS record set of Type CNAME as shown in the screenshot attached below.



Finally, the SSL Certificate in AWS Certificate Manager got issued as shown in the screenshot attached below.



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For this project to create the GitLab Server I installed Terraform on GCP VM Instance and used Amazon S3 Bucket to store the terraform state file and to achieve the state lock. Below Screenshot shows how I ran the terraform script and created the Resources in AWS Cloud. For Authentication and Authorization, I installed **aws cli** on GCP VM instance and created an IAM user in AWS account and used its access key and secret key as shown in the screenshot attached below (This terraform script for GitLab Server I made handy for you so that if you want you can directly run it in your AWS environment, that is the reason I am not storing the terraform state file in GCP bucket rather than I used AWS S3 Bucket).

```
[root@terraform-server ~]# cat /etc/os-release
NAME="Rocky Linux"
VERSION="8.10 (Green Obsidian)"
ID="rocky"
ID_LIKE="rhel centos fedora"
VERSION_ID="8.10"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Rocky Linux 8.10 (Green Obsidian)"
ANSI_COLOR="0;32"
LOGO="fedora-logo-icon"
CPE_NAME="cpe:/o:rocky:rocky:8:GA"
HOME_URL="https://rockylinux.org/"
BUG_REPORT_URL="https://bugs.rockylinux.org/"
SUPPORT_END="2029-05-31"
ROCKY_SUPPORT_PRODUCT="Rocky-Linux-8"
ROCKY_SUPPORT_PRODUCT_VERSION="8.10"
REDHAT_SUPPORT_PRODUCT="Rocky Linux"
REDHAT_SUPPORT_PRODUCT_VERSION="8.10"
```

To install aws cli I installed first python3.9 as shown in the screenshot attached below.

```
[root@terraform-server ~]# yum install -y python3.9

[root@terraform-server ~]# ln -s /usr/bin/python3.9 /usr/bin/python

[root@terraform-server ~]# python --version
Python 3.9.20
```

Then installed aws-cli using the commands as shown below.

curl "https://awscli.amazonaws.com/awscli-exe-linux-x86_64.zip" -o "awscliv2.zip"

unzip awscliv2.zip

sudo ./aws/install

```
[root@terraform-server ~]# vim ~/.bashrc
[root@terraform-server ~]# logout
[ritesh@terraform-server ~]$ sudo -i
[root@terraform-server ~]# cat ~/.bashrc
# .bashrc

# User specific aliases and functions

alias rm='rm -i'
alias cp='cp -i'
alias mv='mv -i'

# Source global definitions
if [ -f /etc/bashrc ]; then
        . /etc/bashrc
fi

PATH="$PATH:/usr/local/bin"
[root@terraform-server ~]# echo $PATH
/usr/local/sbin:/sbin:/bin:/usr/sbin:/usr/bin:/usr/local/bin:/root/bin
[root@terraform-server ~]# aws --version
aws-cli/2.27.50 Python/3.13.4 Linux/4.18.0-553.58.1.el8_10.x86_64 exe/x86_64.rocky.8
```

terraform init -------> initializes a working directory containing configuration files and installs plugins for required providers.

terraform validate --------> verify that terraform configuration file is correct or not

terraform plan ---------> Check which resources are going to be created.

Then you can run the command **terraform apply -auto-approve** -----> Finally, Create the resources.

```
[root@terraform-server main]# aws configure
AWS Access Key ID [None]:
AWS Secret Access Key [None]:
Default region name [None]: us-east-2
Default output format [None]: text
```

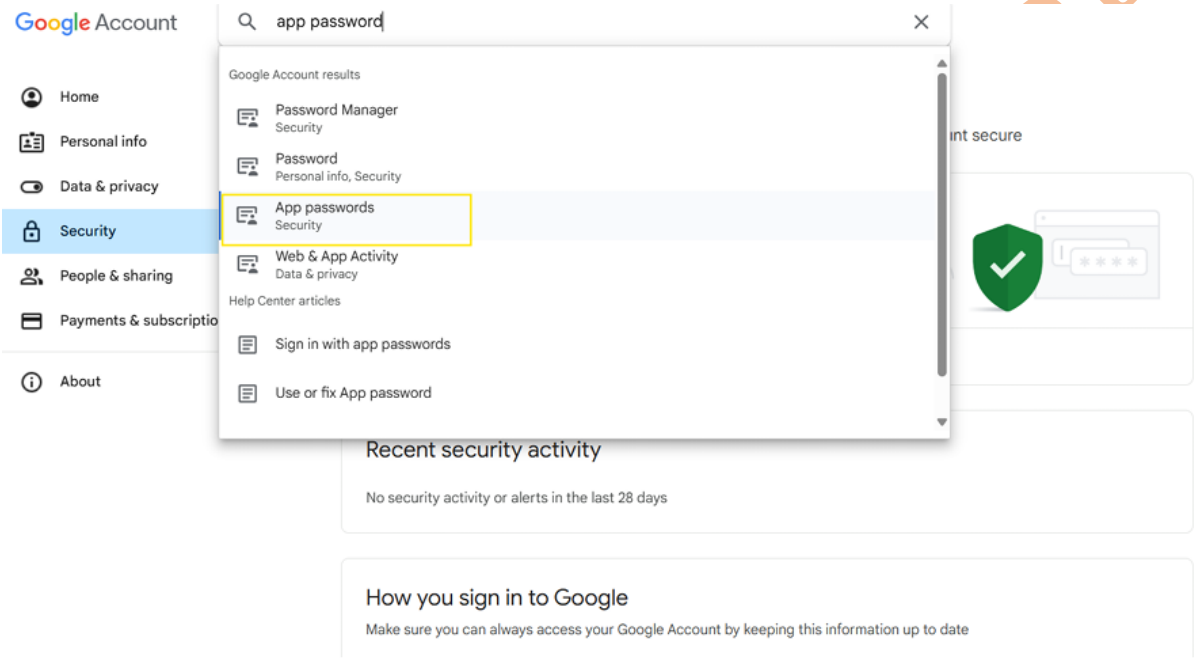
```
module.gitlab.null_resource.gitlab_server (remote-exec): ok: run: gitlab-exporter: (pid 31149) 18s
module.gitlab.null_resource.gitlab_server (remote-exec): ok: run: gitlab-kas: (pid 30462) 237s
module.gitlab.null_resource.gitlab_server (remote-exec): ok: run: gitlab-workhorse: (pid 31124) 19s
module.gitlab.null_resource.gitlab_server (remote-exec): ok: run: logrotate: (pid 30089) 266s
module.gitlab.null_resource.gitlab_server (remote-exec): ok: run: nginx: (pid 31132) 19s
module.gitlab.null_resource.gitlab_server (remote-exec): ok: run: node-exporter: (pid 31143) 18s
module.gitlab.null_resource.gitlab_server (remote-exec): ok: run: postgres-exporter: (pid 31191) 14s
module.gitlab.null_resource.gitlab_server (remote-exec): ok: run: postgresql: (pid 30271) 243s
module.gitlab.null_resource.gitlab_server (remote-exec): ok: run: prometheus: (pid 31167) 17s
module.gitlab.null_resource.gitlab_server (remote-exec): ok: run: puma: (pid 30594) 141s
module.gitlab.null_resource.gitlab_server (remote-exec): ok: run: redis: (pid 30136) 260s
module.gitlab.null_resource.gitlab_server (remote-exec): ok: run: redis-exporter: (pid 31151) 17s
module.gitlab.null_resource.gitlab_server (remote-exec): ok: run: sidekiq: (pid 30622) 135s
module.gitlab.null_resource.gitlab_server (remote-exec): run: alertmanager: (pid 31183) 16s; run: log: (pid 30927) 88s
module.gitlab.null_resource.gitlab_server (remote-exec): run: gitaly: (pid 31158) 19s; run: log: (pid 30205) 255s
module.gitlab.null_resource.gitlab_server (remote-exec): run: gitlab-exporter: (pid 31149) 20s; run: log: (pid 30823) 106s
module.gitlab.null_resource.gitlab_server (remote-exec): run: gitlab-kas: (pid 30462) 239s; run: log: (pid 30472) 238s
module.gitlab.null_resource.gitlab_server (remote-exec): run: gitlab-workhorse: (pid 31124) 21s; run: log: (pid 30697) 128s
module.gitlab.null_resource.gitlab_server (remote-exec): run: logrotate: (pid 30089) 268s; run: log: (pid 30101) 266s
module.gitlab.null_resource.gitlab_server (remote-exec): run: nginx: (pid 31132) 21s; run: log: (pid 30727) 121s
module.gitlab.null_resource.gitlab_server (remote-exec): run: node-exporter: (pid 31143) 20s; run: log: (pid 30789) 112s
module.gitlab.null_resource.gitlab_server (remote-exec): run: postgres-exporter: (pid 31191) 16s; run: log: (pid 30966) 82s
module.gitlab.null_resource.gitlab_server (remote-exec): run: postgresql: (pid 30271) 245s; run: log: (pid 30295) 243s
module.gitlab.null_resource.gitlab_server (remote-exec): run: prometheus: (pid 31167) 19s; run: log: (pid 30893) 94s
module.gitlab.null_resource.gitlab_server (remote-exec): run: puma: (pid 30594) 143s; run: log: (pid 30605) 140s
module.gitlab.null_resource.gitlab_server (remote-exec): run: redis: (pid 30136) 262s; run: log: (pid 30145) 261s
module.gitlab.null_resource.gitlab_server (remote-exec): run: redis-exporter: (pid 31151) 19s; run: log: (pid 30858) 100s
module.gitlab.null_resource.gitlab_server (remote-exec): run: sidekiq: (pid 30622) 137s; run: log: (pid 30630) 135s
module.gitlab.null_resource.gitlab_server: Creation complete after 11m33s [

Apply complete! Resources: 39 added, 0 changed, 0 destroyed.

Outputs:

ec2_private_ip_alb_dns = {
  "EC2_Instance_GitLab_Server_Private_IP_Address" = "10.
  "GitLab_ALB_DNS_Name" = "gitlab-.us-east-2.elb.amazonaws.com"
}
```

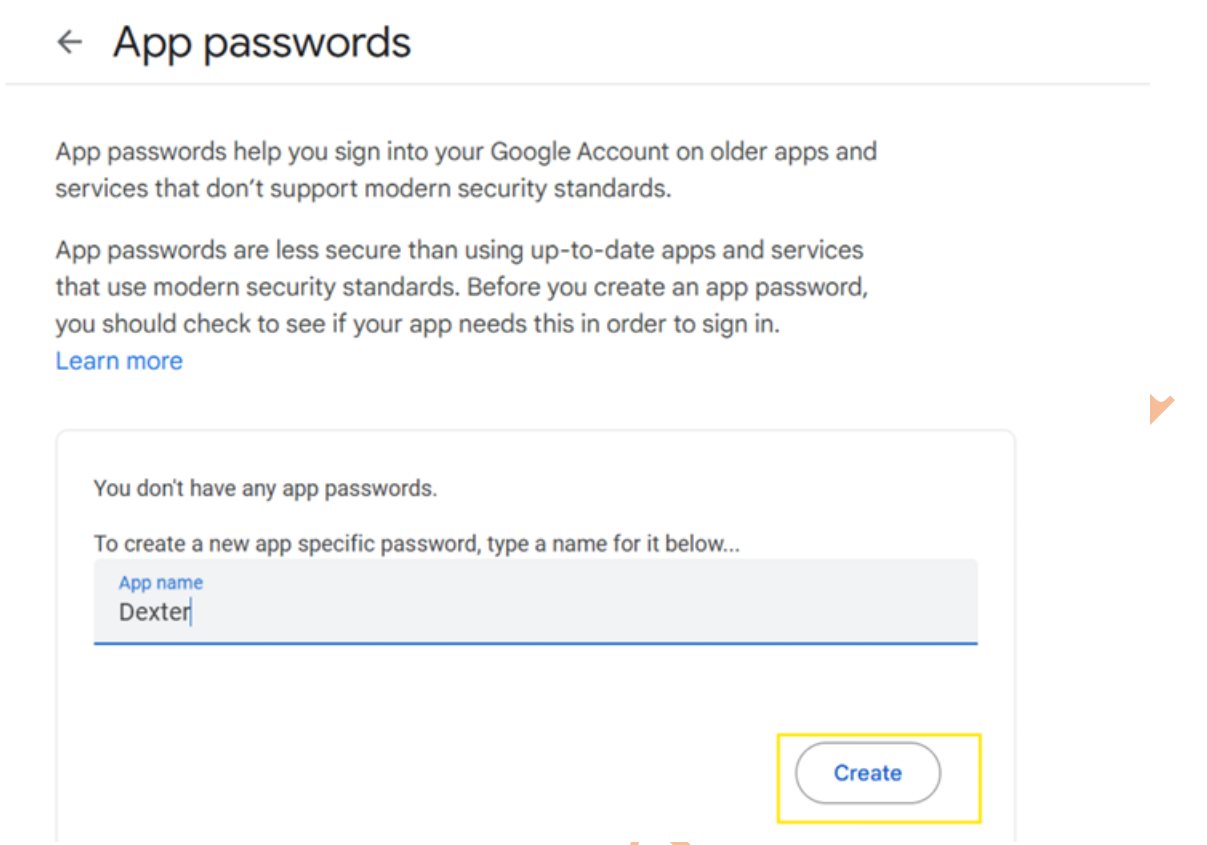
In the GitLab server the Nginx was by default installed which you can check using the command as written below.

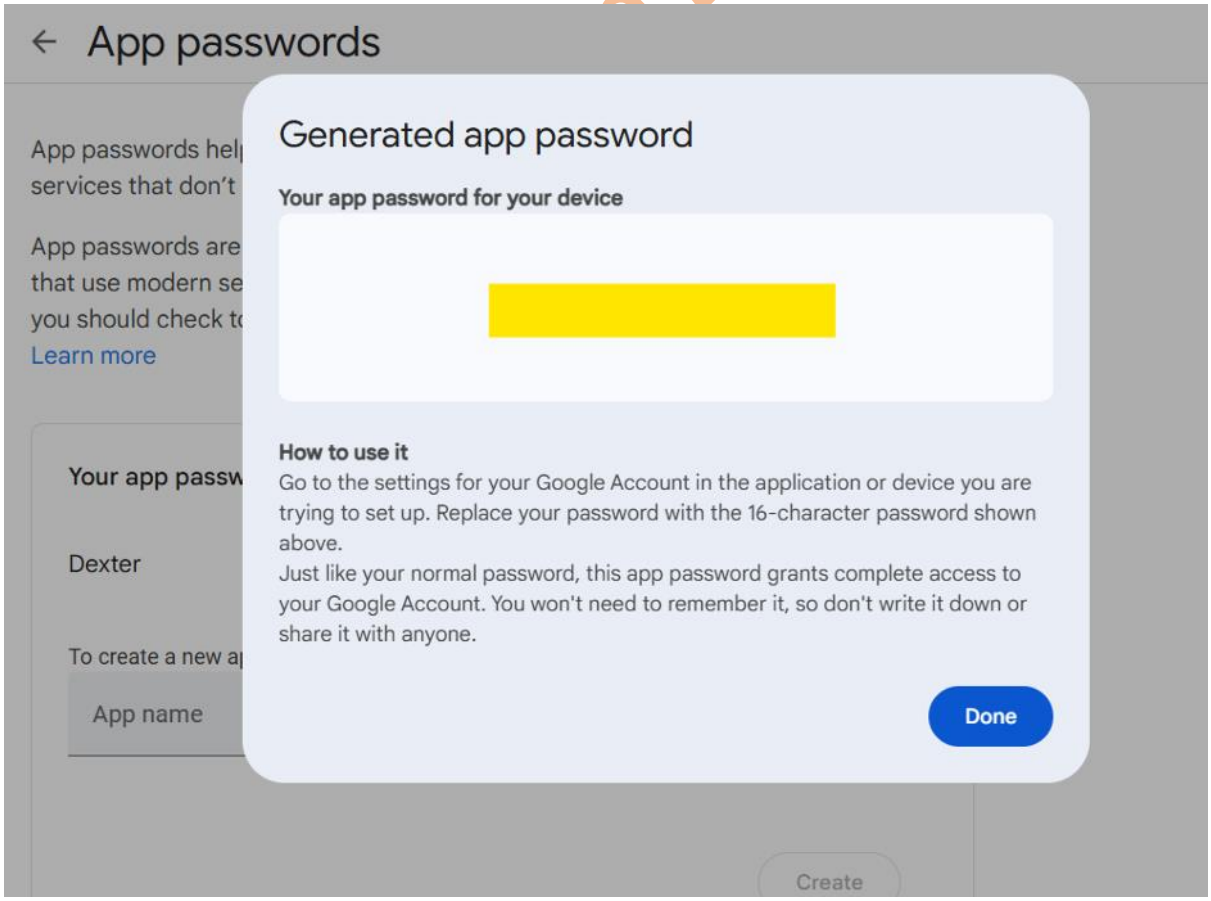
```
[root@gitlab-server ~]# gitlab-ctl status nginx
run: nginx: (pid [redacted]) 334s; run: log: (pid [redacted]) 434s
[root@gitlab-server ~]#
```

To configure Gmail to send notification to group Email ID I should have App Password for my Gmail account as shown in the screenshot attached below.

Go to your **Gmail Account > Manage your Google Account > Security** and then search for **app password** and click on **App Passwords** as shown in the screenshot attached below.




App passwords
App passwords help you sign into your Google Account on older apps and services that don't support modern security standards.
App passwords are less secure than using up-to-date apps and services that use modern security standards. Before you create an app password, you should check to see if your app needs this in order to sign in.
Learn more
You don't have any app passwords.
To create a new app specific password, type a name for it below...
App name
Dexter
Create


App passwords
Generated app password
Your app password for your device
How to use it
Go to the settings for your Google Account in the application or device you are trying to set up. Replace your password with the 16-character password shown above.
Just like your normal password, this app password grants complete access to your Google Account. You won't need to remember it, so don't write it down or share it with anyone.
Done
Dexter
App name
Create

Then I updated the GitLab SMTP information in the file **/etc/gitlab/gitlab.rb** as shown in the screenshot attached below.

```
[root@gitlab-server ~]# vim /etc/gitlab/gitlab.rb
```

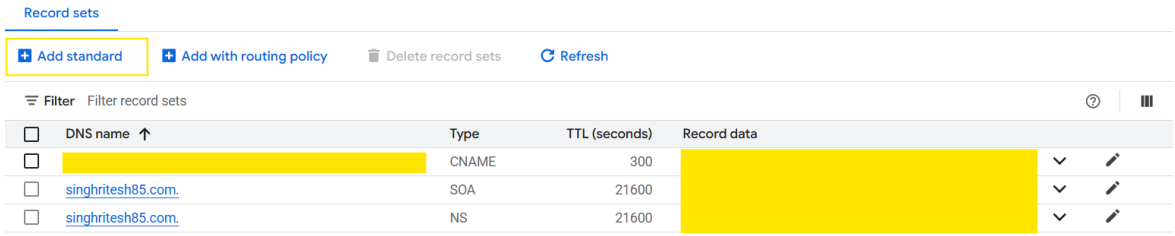
```
gitlab_rails['smtp_enable'] = true
gitlab_rails['smtp_address'] = "smtp.gmail.com"
gitlab_rails['smtp_port'] = 587
gitlab_rails['smtp_user_name'] = "[redacted]"
gitlab_rails['smtp_password'] = "[redacted]"
gitlab_rails['smtp_domain'] = "smtp.gmail.com"
gitlab_rails['smtp_authentication'] = "login"
gitlab_rails['smtp_enable_starttls_auto'] = true
gitlab_rails['smtp_tls'] = false


gitlab_rails['gitlab_email_from'] = '[redacted]'
gitlab_rails['gitlab_email_display_name'] = 'Dexter'
gitlab_rails['gitlab_email_reply_to'] = '[redacted]'
```

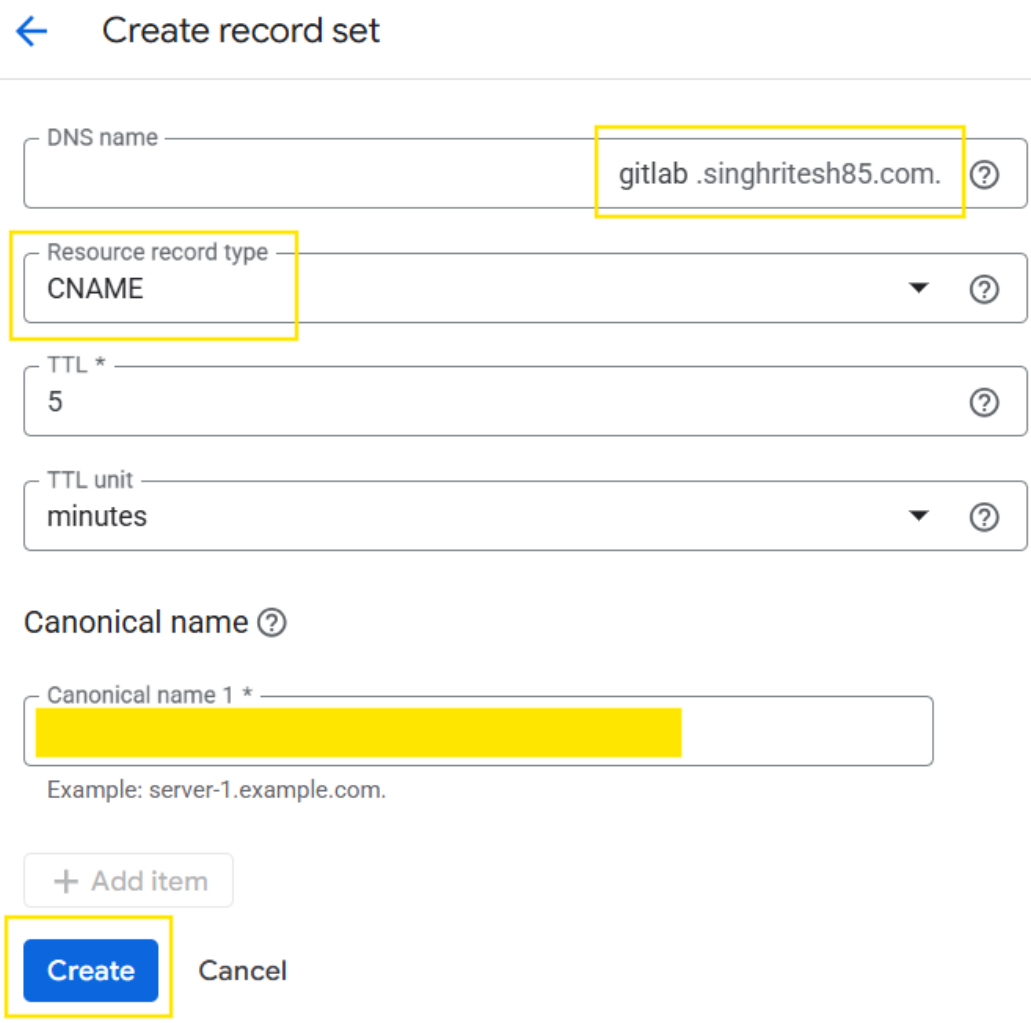
Finally, ran the command gitlab-ctl reconfigure as shown in the screenshot attached below.

```
[root@gitlab-server ~]# gitlab-ctl reconfigure
```

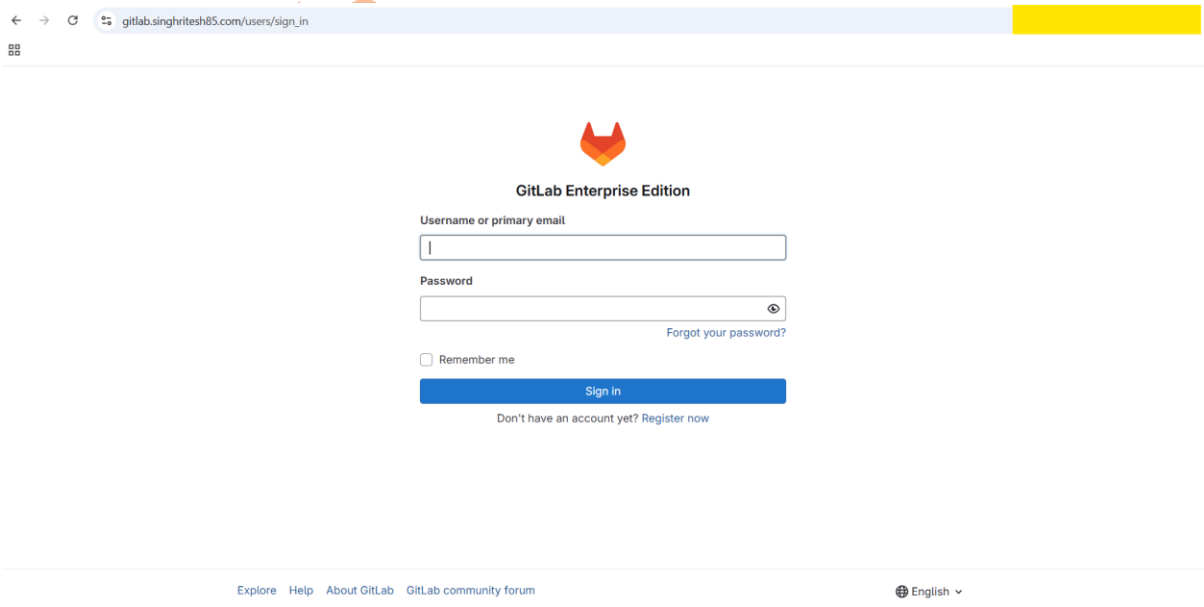
```
Running handlers:
[2025[redacted]] INFO: Running report handlers
Running handlers complete
[2025[redacted]] INFO: Report handlers complete
Infra Phase complete, 0/864 resources updated in 20 seconds
gitlab Reconfigured!
```

Then I had created the Record Set of Type CNAME in GCP Cloud DNS using the DNS Name of the AWS Application LoadBalancer as shown in the screenshot attached below.



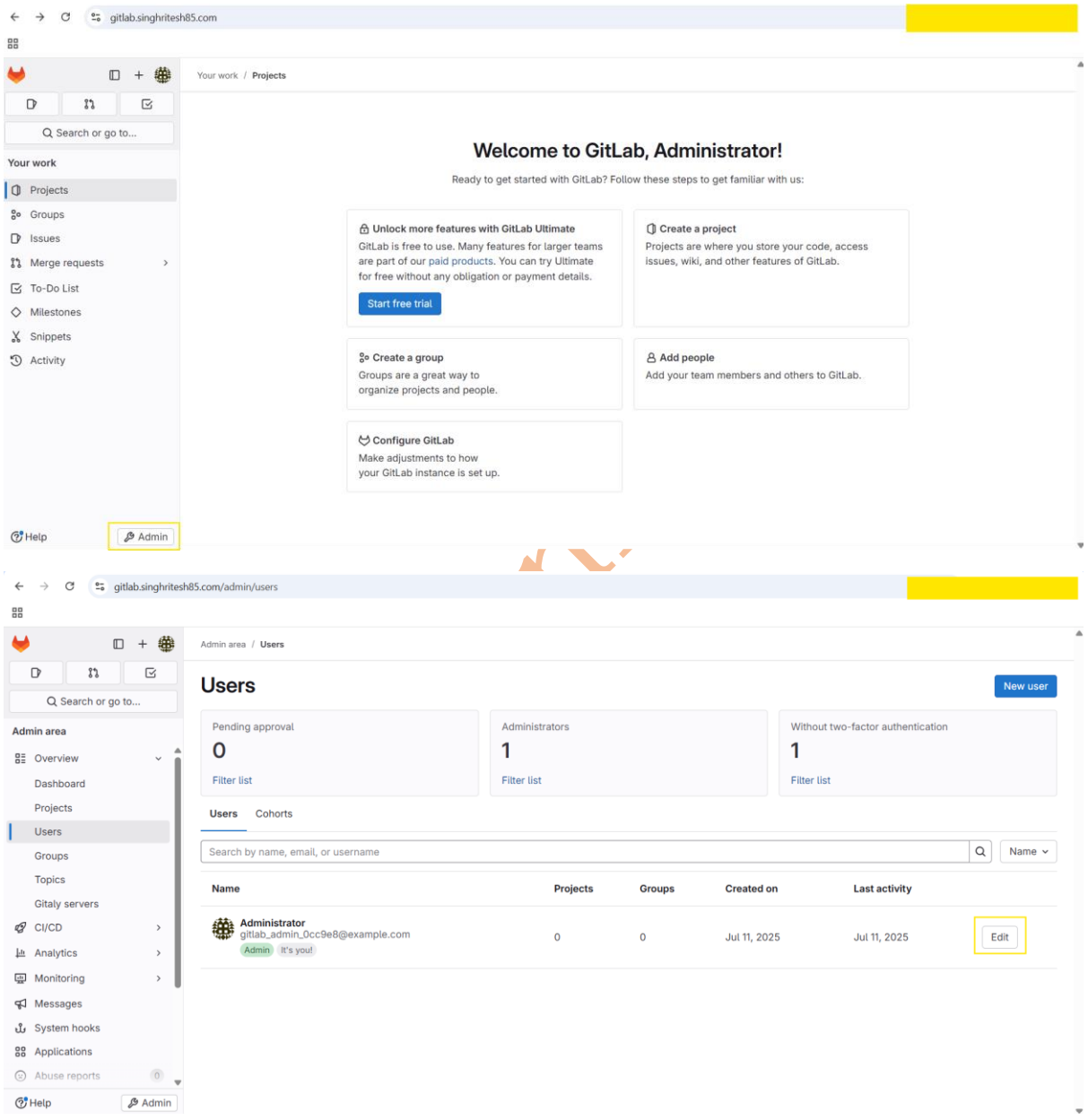


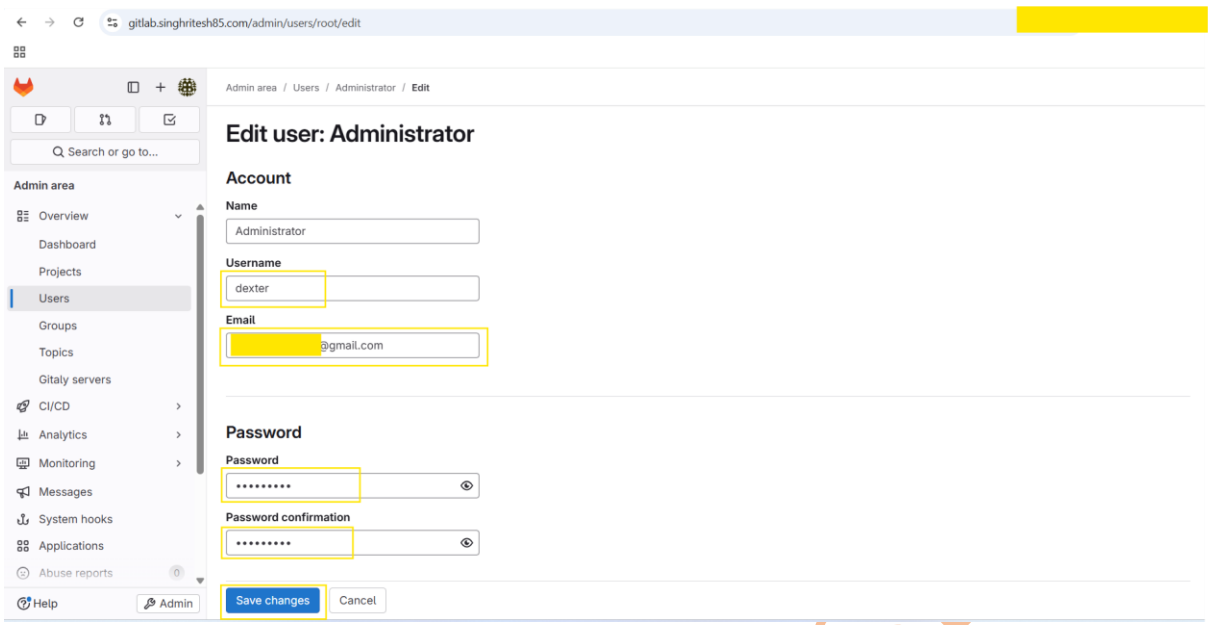
Finally, I was able to access the GitLab as shown in the screenshot attached below.



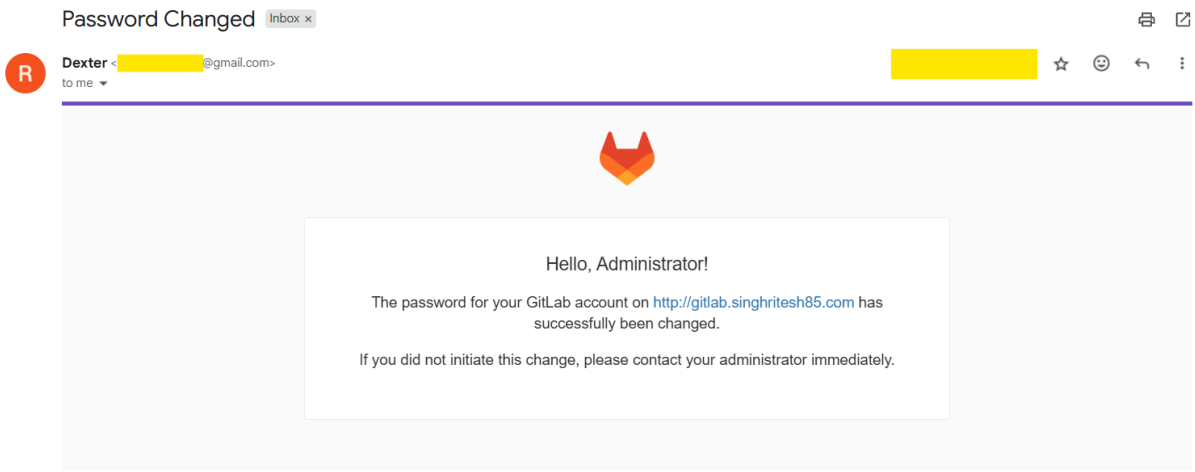
Now you can Login into the GitLab using the Root user credentials, remember the time when you configured GitLab the root user password had been generated and present in the file **/etc/gitlab/initial_root_password** which will be valid for next 24 hours So utilised it within 24 hours after its installation.

After Login change the administrator username, password, and email for that go to the admin area and edit the Administrator user as shown in the screenshot attached below.

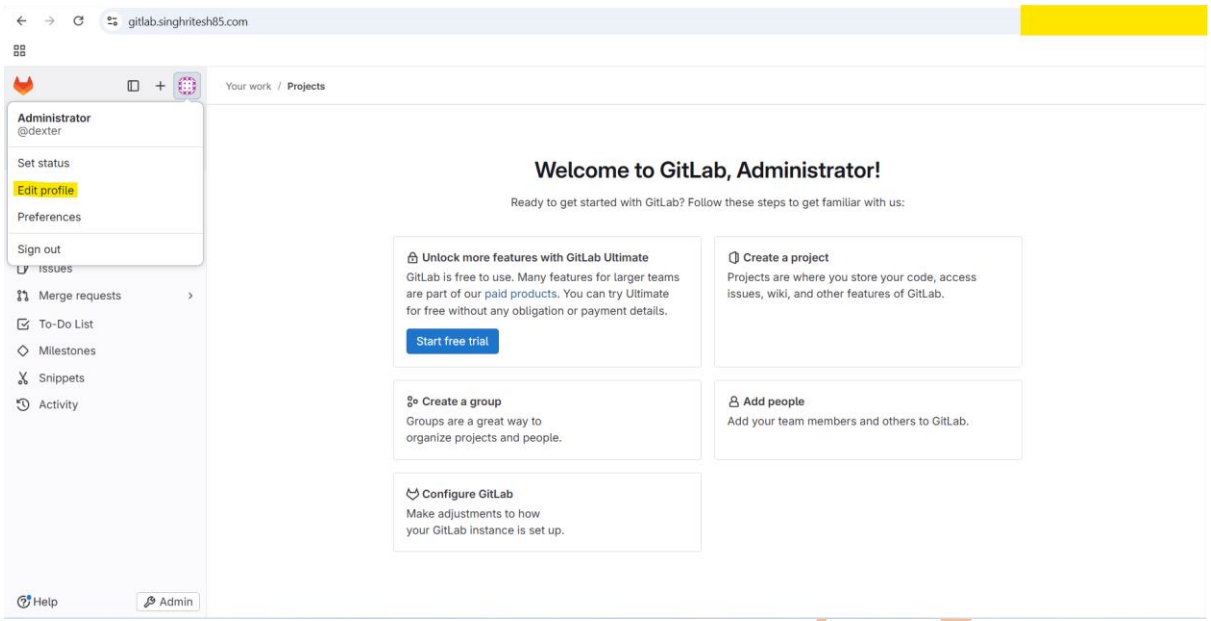


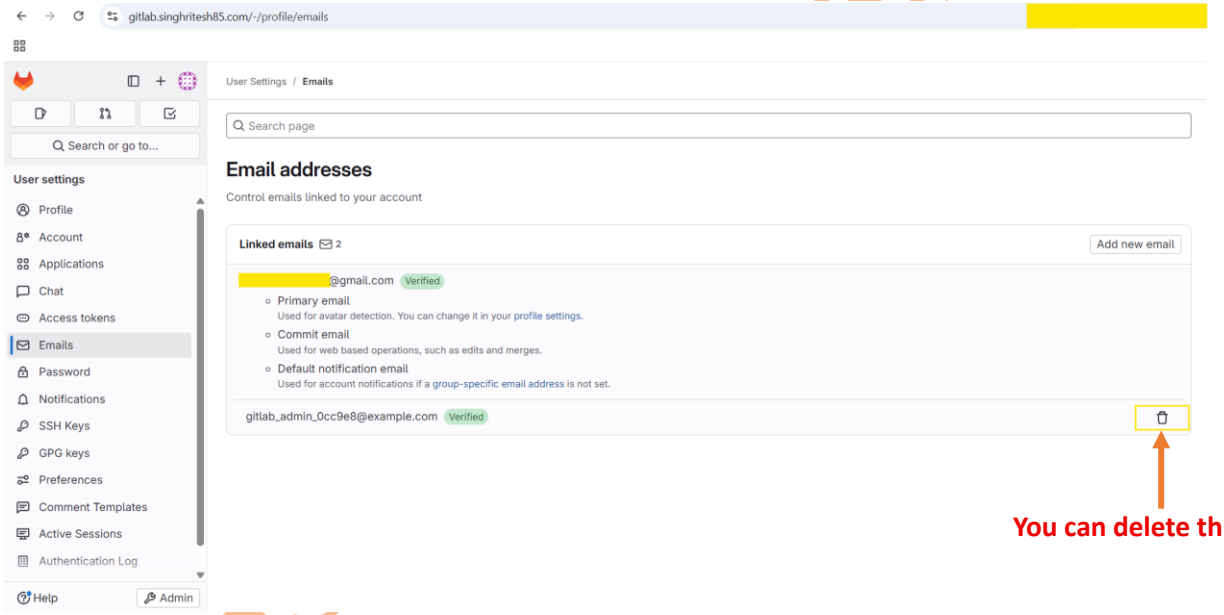


Then it will ask to sign-in again using the new credentials and a password change notification will come to your email Id as shown in the screenshot attached below.

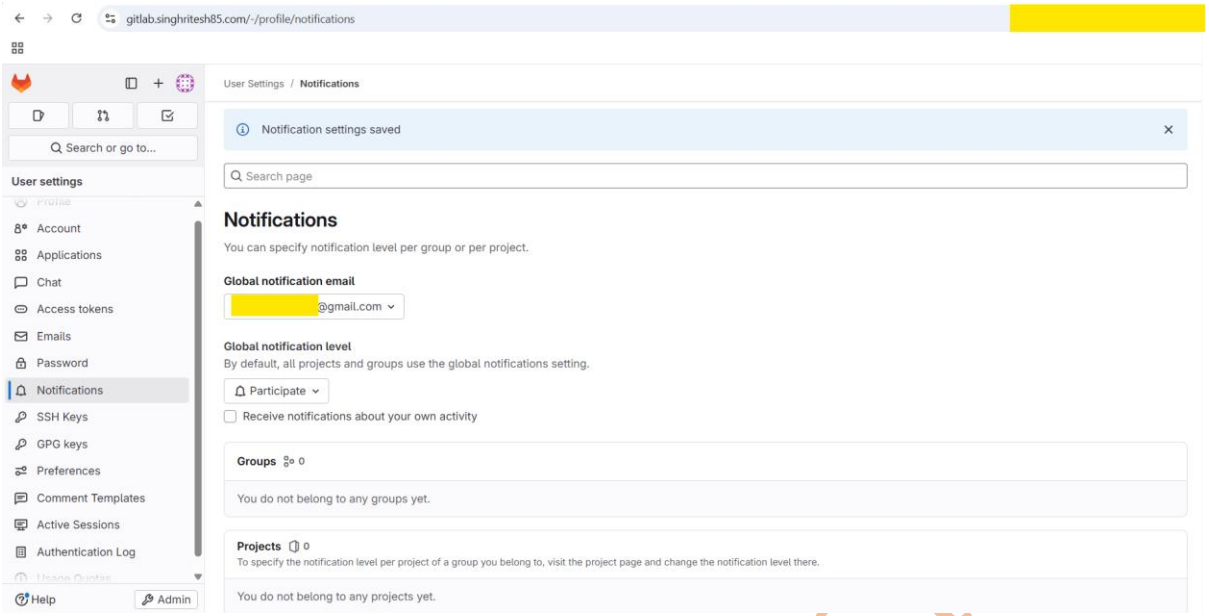


Now go to the Administrator profile and check the same from in email and notification as shown in the screenshot attached below.



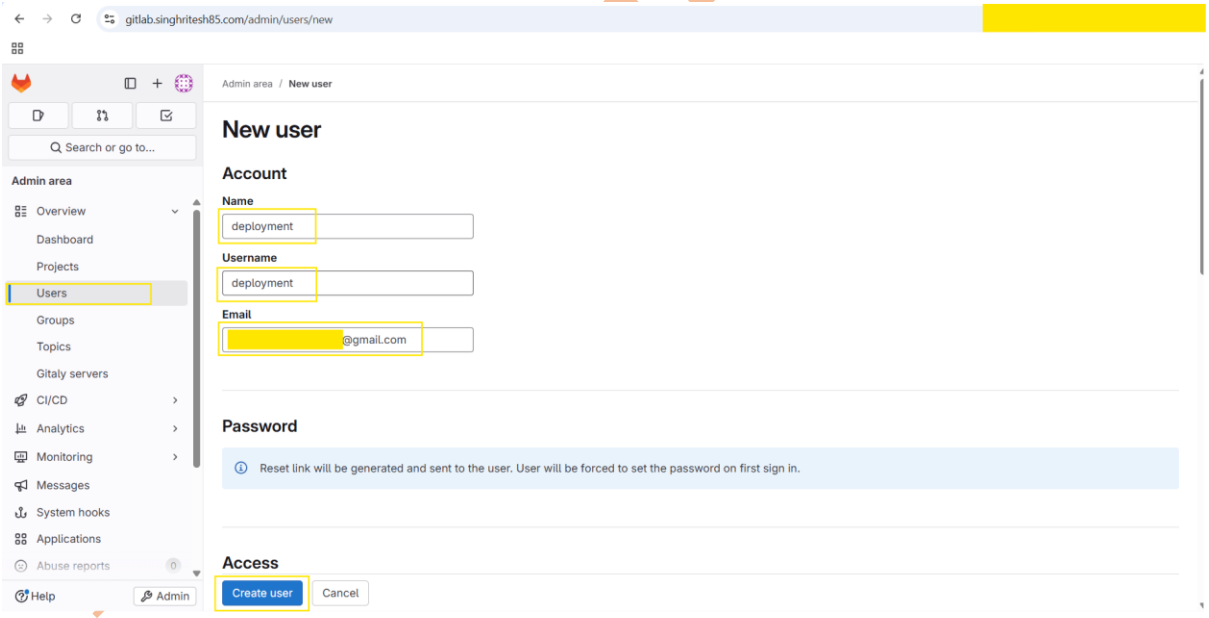


Now go to notification and update with your newly added email as shown in the screenshot attached below.

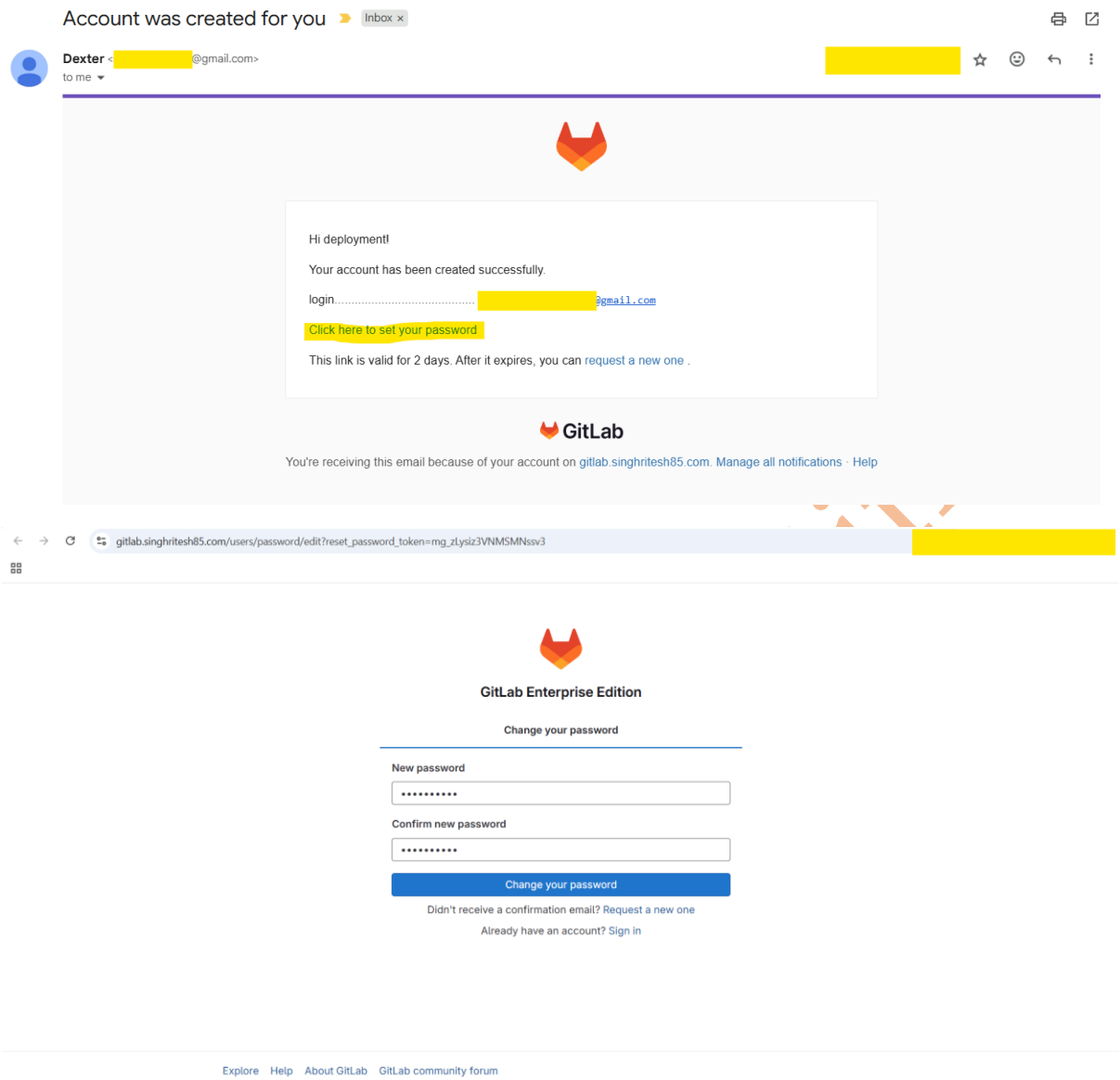


Now, the username, password and email of the Administrator was updated as shown in the screenshot attached below.

Then I had created a user named as **deployment** (regular user) which I only use in CI/CD operation. To achieve the same, I went to Admin area > Users > New User as shown in the screenshot attached below.



Now newly created user will login into his/her email ID and will reset the password as shown the screenshot attached below



Now run the terraform script to create the GKE standard cluster (multi-zone cluster), gitlab-runner (on GCP VM Instance), SonarQube Server (on EC2 Instance) and Nexus Server (on EC2 Instance). For this terraform execution I kept the state file in GCP bucket. As a part of disaster recovery, I created the Lifecycle Policy to create the EBS backed AMI periodically 11:00 AM and 11:00 PM UTC (twice daily) for SonarQube and Nexus Server, snapshot schedule for gitlab-runner and GKE backup plan to take the backup daily twice a day (11:00 AM UTC and 11:00 PM UTC). For your reference I kept the Terraform script in the GitHub Repo https://github.com/singhritesh85/DevOps-Project-BankApp-CICD-using-GitLab-GCP-and-AWS.git at the path **terraform-gke-standard-cluster**.

terraform init -------> initializes a working directory containing configuration files and installs plugins for required providers.

terraform validate --------> verify that terraform configuration file is correct or not

terraform plan ---------> Check which resources are going to be created.

Then you can run the command **terraform apply -auto-approve** -----> Finally, Create the resources.

```
module.gke.google_container_cluster.gke_cluster: Still creating... [09m50s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [10m00s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [10m10s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [10m20s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [10m30s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [10m40s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [10m50s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [11m00s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [11m10s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [11m20s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [11m30s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [11m40s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [11m50s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [12m00s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [12m10s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [12m20s elapsed]
module.gke.google_container_cluster.gke_cluster: Still creating... [12m30s elapsed]
module.gke.google_container_cluster.gke_cluster: Creation complete after 12m39s [id=projects/[redacted]/locations/us-central1/clusters/bankapp-gke-cl
uster]
module.gke.google_container_node_pool.gke_linux_nodepool_1: Creating...
module.gke.google_gke_backup_backup_plan.gke_backup: Creating...
module.gke.google_container_node_pool.gke_linux_nodepool_1: Still creating... [00m10s elapsed]
module.gke.google_gke_backup_backup_plan.gke_backup: Still creating... [00m10s elapsed]
module.gke.google_gke_backup_backup_plan.gke_backup: Creation complete after 11s [id=projects/[redacted]/locations/us-central1/backupPlans/bankapp-gk
e-backup]
module.gke.google_container_node_pool.gke_linux_nodepool_1: Still creating... [00m20s elapsed]
module.gke.google_container_node_pool.gke_linux_nodepool_1: Still creating... [00m30s elapsed]
module.gke.google_container_node_pool.gke_linux_nodepool_1: Still creating... [00m40s elapsed]
module.gke.google_container_node_pool.gke_linux_nodepool_1: Still creating... [00m50s elapsed]
module.gke.google_container_node_pool.gke_linux_nodepool_1: Still creating... [01m00s elapsed]
module.gke.google_container_node_pool.gke_linux_nodepool_1: Still creating... [01m10s elapsed]
module.gke.google_container_node_pool.gke_linux_nodepool_1: Still creating... [01m20s elapsed]
module.gke.google_container_node_pool.gke_linux_nodepool_1: Still creating... [01m30s elapsed]
module.gke.google_container_node_pool.gke_linux_nodepool_1: Still creating... [01m40s elapsed]
module.gke.google_container_node_pool.gke_linux_nodepool_1: Creation complete after 1m43s [id=projects/[redacted]/locations/us-central1/clusters/bank
app-gke-cluster/nodePools/bankapp-linux-nodepool-1]

Apply complete! Resources: 73 added, 0 changed, 0 destroyed.
```

Now, create the kubeconfig file on gitlab-runner using the command as shown in the screenshot attached below.

```
[gitlab-runner@[redacted] ~]$ gcloud auth login

You are running on a Google Compute Engine virtual machine.
It is recommended that you use service accounts for authentication.

You can run:

  $ gcloud config set account `ACCOUNT`

to switch accounts if necessary.

Your credentials may be visible to others with access to this
virtual machine. Are you sure you want to authenticate with
your personal account?

Do you want to continue (Y/n)?  Y

Go to the following link in your browser, and complete the sign-in prompts:

[redacted]

Once finished, enter the verification code provided in your browser: [redacted]

You are now logged in as [[redacted]].
Your current project is [[redacted]].  You can change this setting by running:
  $ gcloud config set project PROJECT_ID
```

```
[gitlab-runner@bankapp-gitlab-runner ~]$ gcloud container clusters get-credentials bankapp-gke-cluster --region us-central1 --project [redacted]
Fetching cluster endpoint and auth data.
kubeconfig entry generated for bankapp-gke-cluster.
```

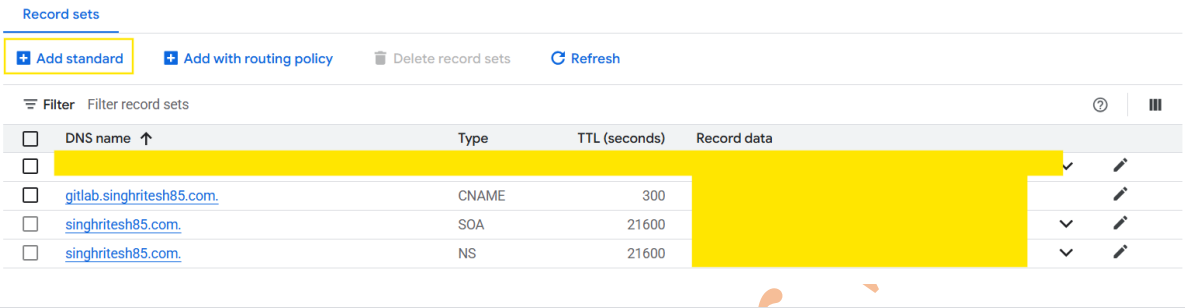
```
[gitlab-runner@bankapp-gitlab-runner ~]$ kubectl get nodes
NAME                                                  STATUS   ROLES    AGE     VERSION
gke-bankapp-gke-clus-bankapp-linux-no-[redacted]      Ready    <none>   5h      v1.33.1-gke.1744000
gke-bankapp-gke-clus-bankapp-linux-no-[redacted]      Ready    <none>   4h59m   v1.33.1-gke.1744000
gke-bankapp-gke-clus-bankapp-linux-no-[redacted]      Ready    <none>   4h59m   v1.33.1-gke.1744000
gke-bankapp-gke-clus-bankapp-linux-no-[redacted]      Ready    <none>   5h      v1.33.1-gke.1744000
```

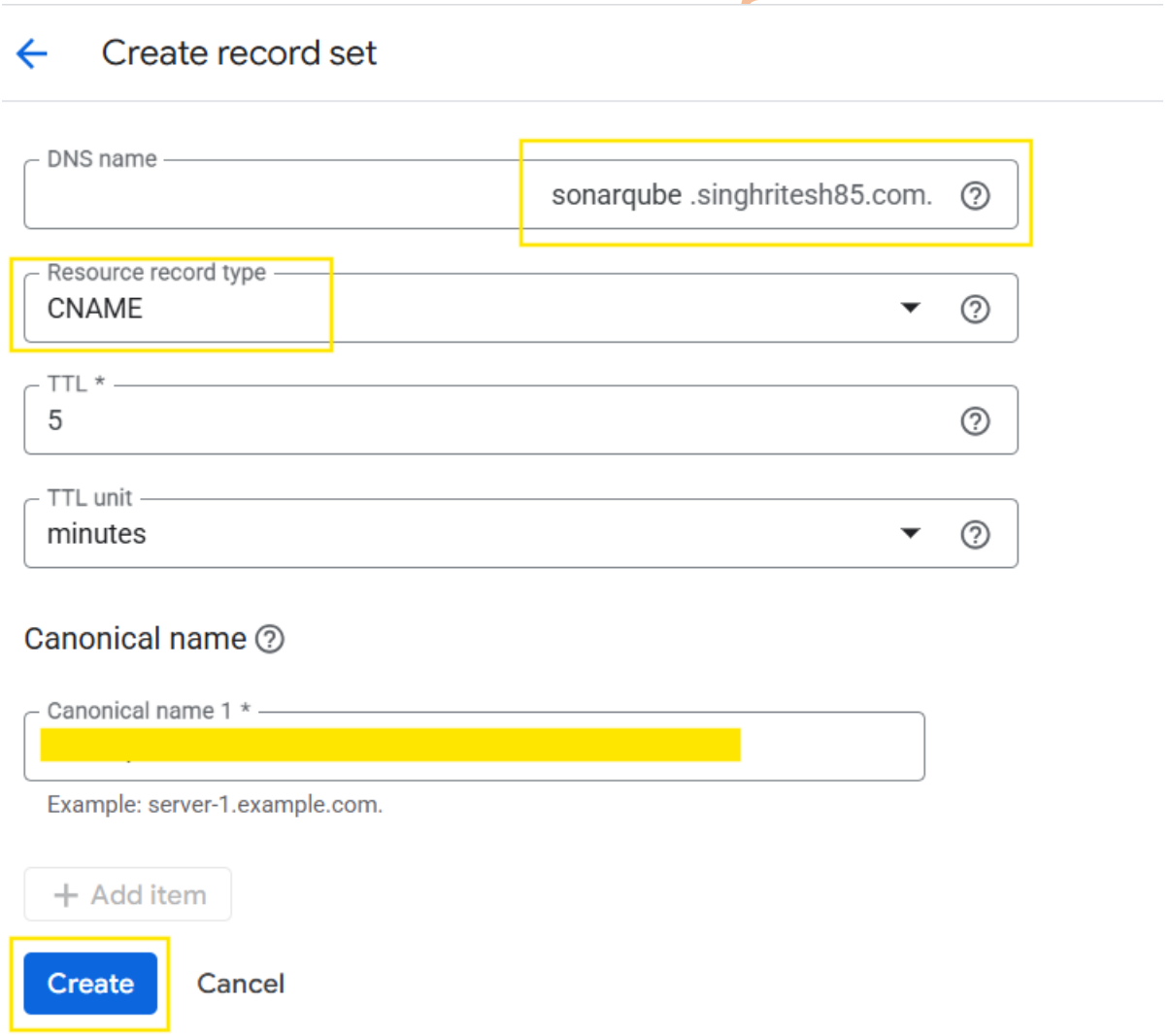
To push Docker Images from gitlab-runner to GCP Artifact Registry (earlier known as GCP Container Registry), you need to authenticate it first using the command as written below.

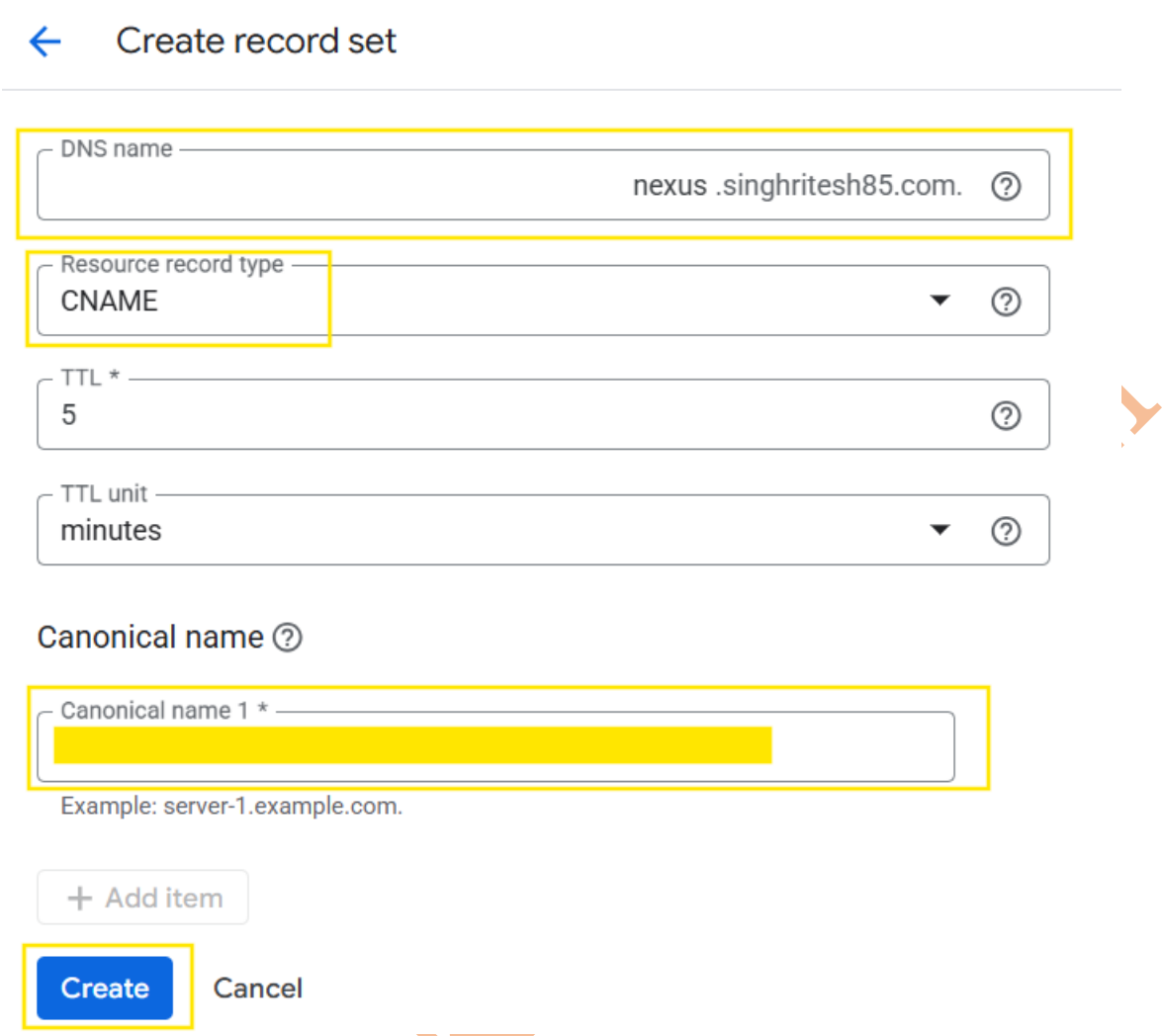
gcloud auth configure-docker us-central1-docker.pkg.dev

```
[gitlab-runner@bankapp-gitlab-runner ~]$ gcloud auth configure-docker us-central1-docker.pkg.dev
Adding credentials for: us-central1-docker.pkg.dev
After update, the following will be written to your Docker config file located at [/home/gitlab-runner/.docker/config.json]:
 {
  "credHelpers": {
    "us-central1-docker.pkg.dev": "gcloud"
  }
}

Do you want to continue (Y/n)?  Y

Docker configuration file updated.
```

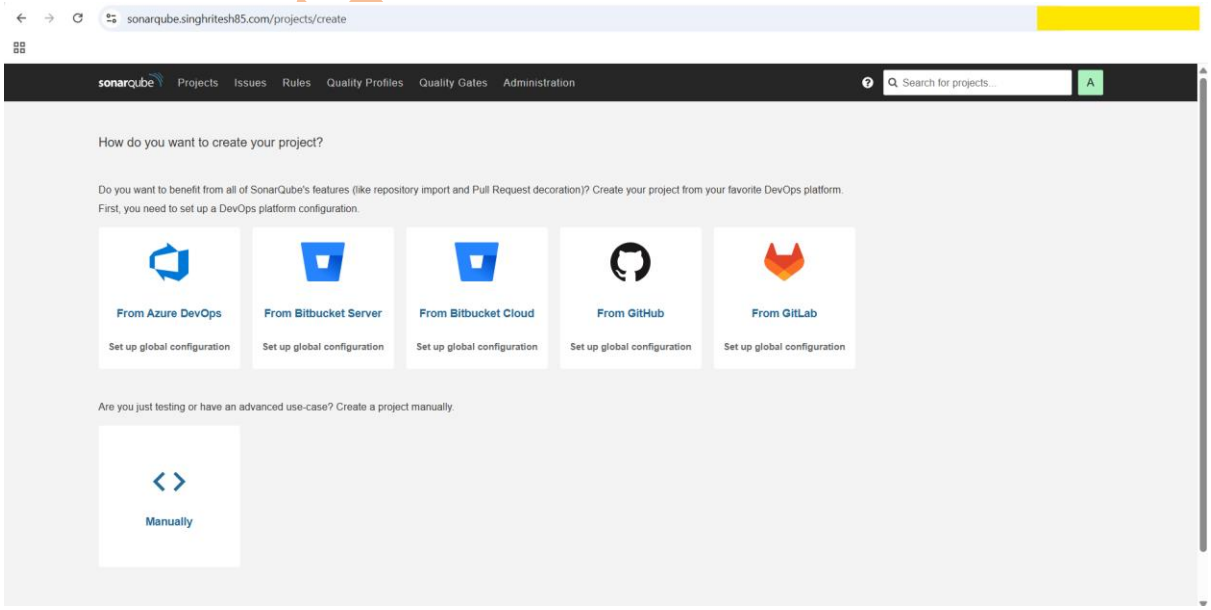
I create the URL for SonarQube and Nexus Server by doing the entry of DNS Name of the LoadBalancer sonarqube and nexus in the GCP Cloud DNS to create the Record Set of Type CNAME as shown in the screenshot attached below.

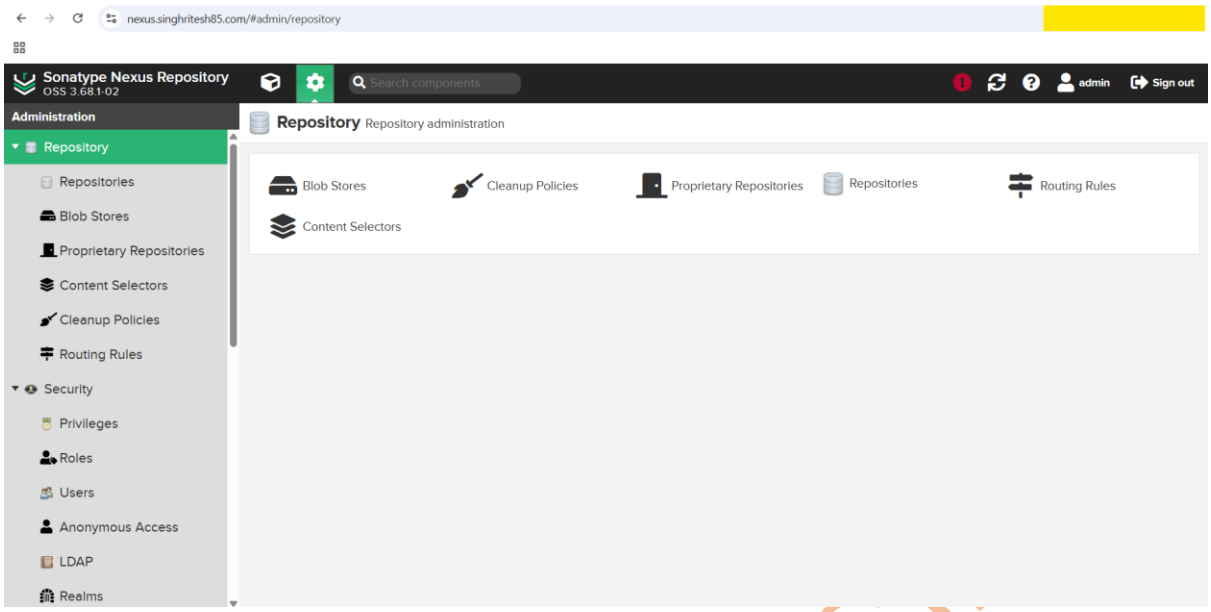




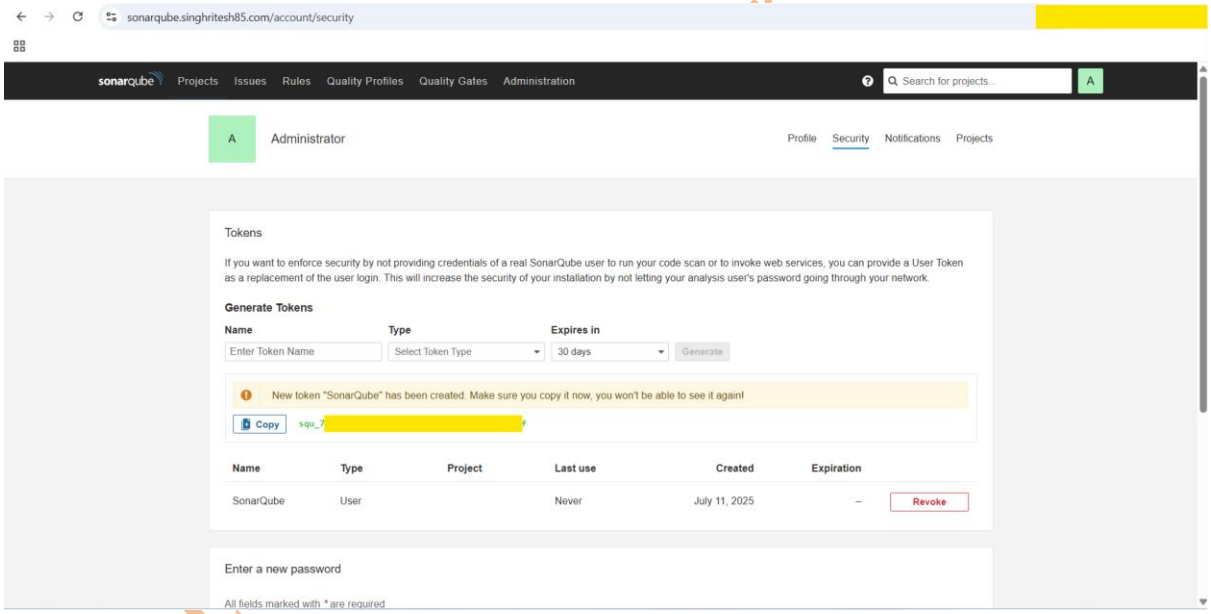


Finally, I was able to access SonarQube and Nexus as shown in the screenshot attached below.

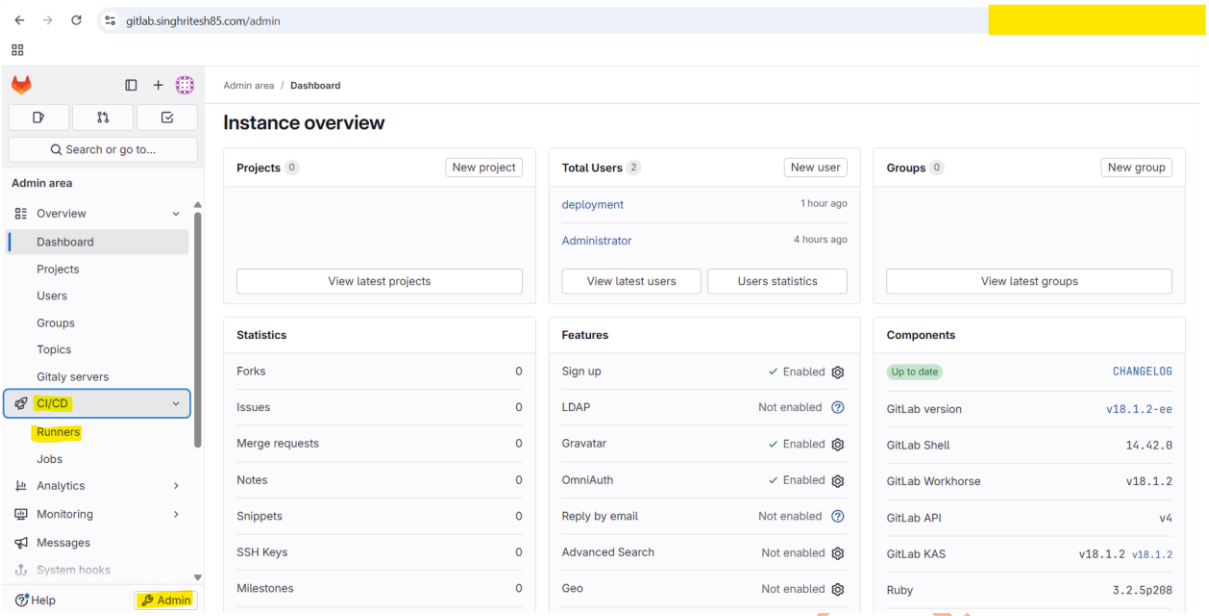




In Nexus I created two Repositories with the name of **maven-snapshot** and **maven-release** and in SonarQube I generated the Token as shown in the screenshot attached below.



I added the GitLab Runner to the GitLab Server as shown in the screenshot attached below. Go to Admin area > CI/CD > Runners > Create Instance runner as shown in the screenshot attached below.

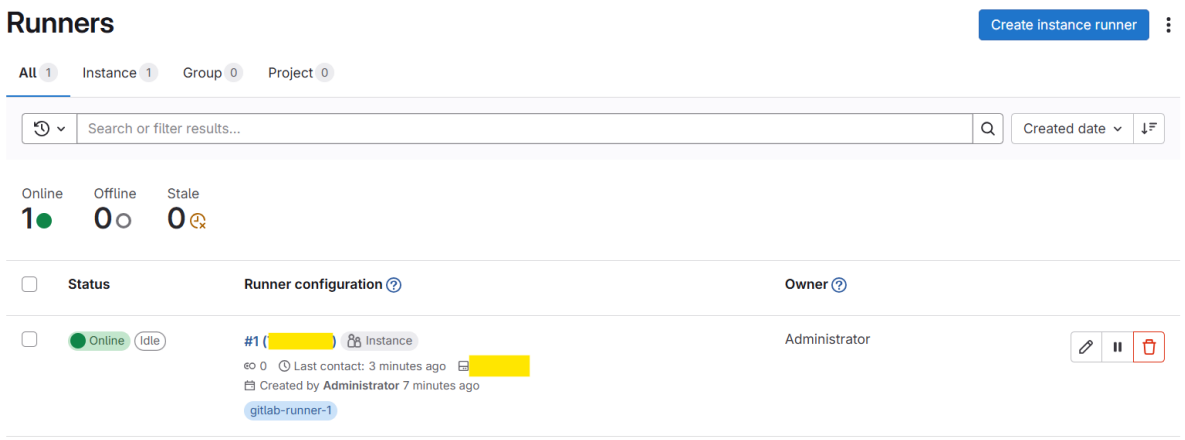


In the Tags provide **gitlab-runner-1** as the tag name and then click on create runner and select Operating System as Linux then go to your gitlab-runner instance and run the command **gitlab-runner register** to register the gitlab-runner with the gitlab server and subsequently provide the GitLab URL and Runner Authentication Token as shown in the screenshot attached below. Then you can check the status of gitlab-runner using the command **gitlab-runner status**.

```
[root@bankapp-gitlab-runner ~]# gitlab-runner register
Runtime platform                                    arch=amd64 os=linux pid=[redacted] revision=[redacted] version=18.1.1
Running in system-mode.

Enter the GitLab instance URL (for example, https://gitlab.com/):
https://gitlab.singhritesh85.com/
Enter the registration token:
[redacted]
Verifying runner... is valid                        correlation_id=[redacted] runner=[redacted]
Enter a name for the runner. This is stored only in the local config.toml file:
[bankapp-gitlab-runner]: gitlab-runner-1
Enter an executor: kubernetes, docker-autoscaler, instance, custom, shell, virtualbox, docker+machine, ssh, parallels, docker, docker-windows:
shell
Runner registered successfully. Feel free to start it, but if it's running already the config should be automatically reloaded!

Configuration (with the authentication token) was saved in "/etc/gitlab-runner/config.toml"
[root@bankapp-gitlab-runner ~]# gitlab-runner status
Runtime platform                                    arch=amd64 os=linux pid=[redacted] revision=[redacted] version=18.1.1
gitlab-runner: Service is running
```

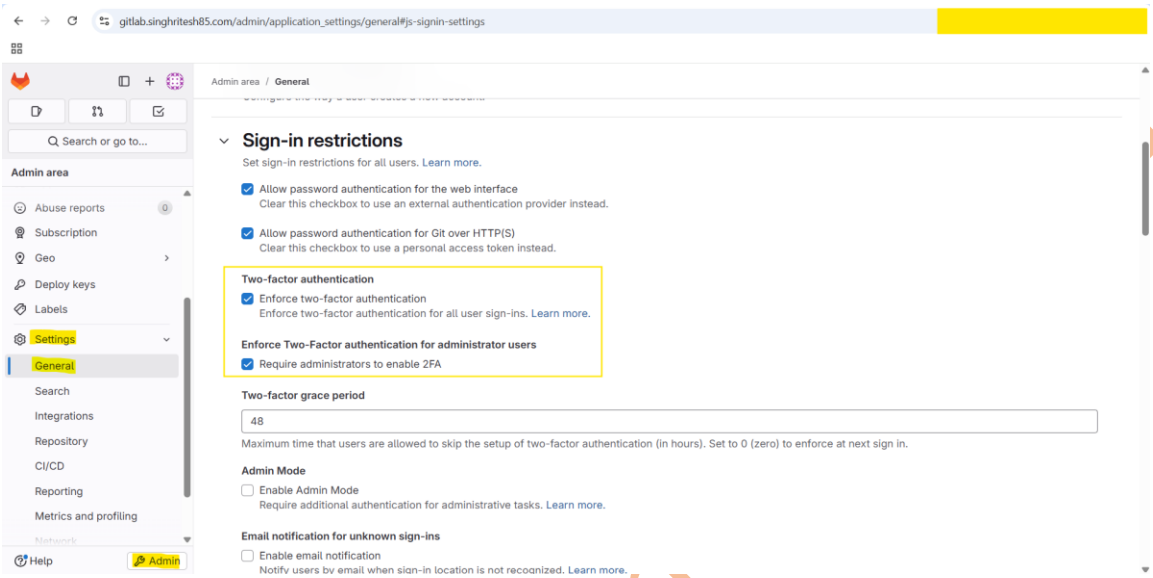
Then click on view Runner and you will find Runner is in Online state as shown in the screenshot attached below.

Enable

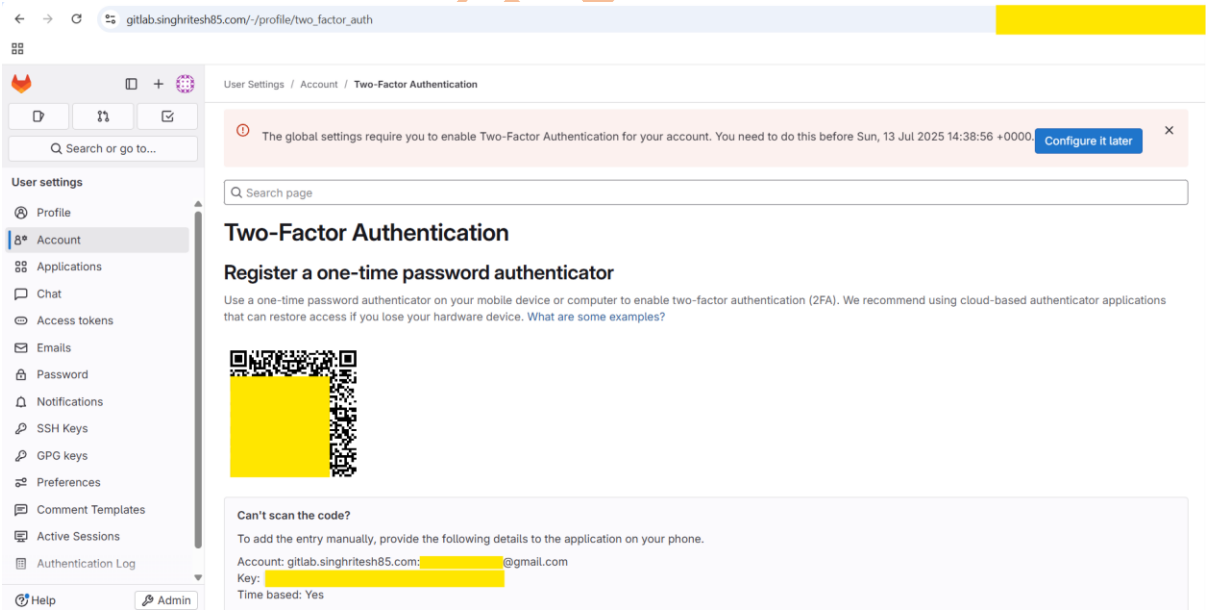


Enable two-factor Authentication in GitLab for All the users

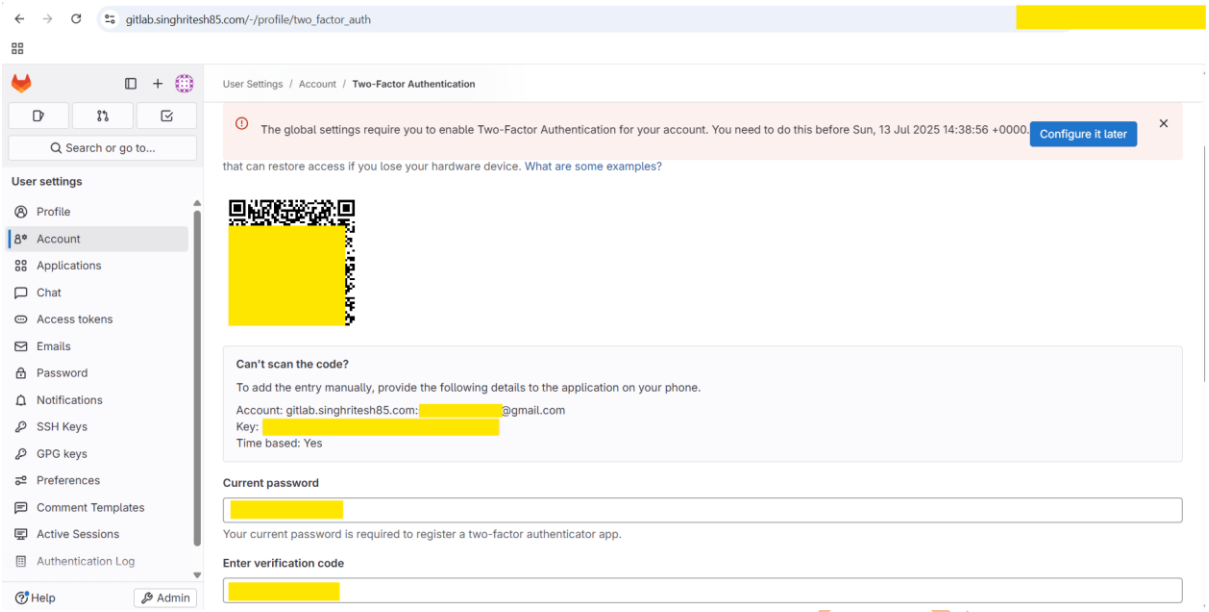
I had enabled **Two-Factor authentication** for All the users as shown in the screenshot attached below. This configuration will forcefully enable 2FA (two-factor authentication for all the users). If you need to enable 2FA for Administrator then enable the option **Enforce Two-Factor authentication for administrator users** Go to Admin area > Settings > General > Sign-in restrictions check the two options and then save changes.

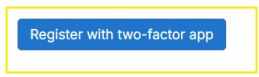


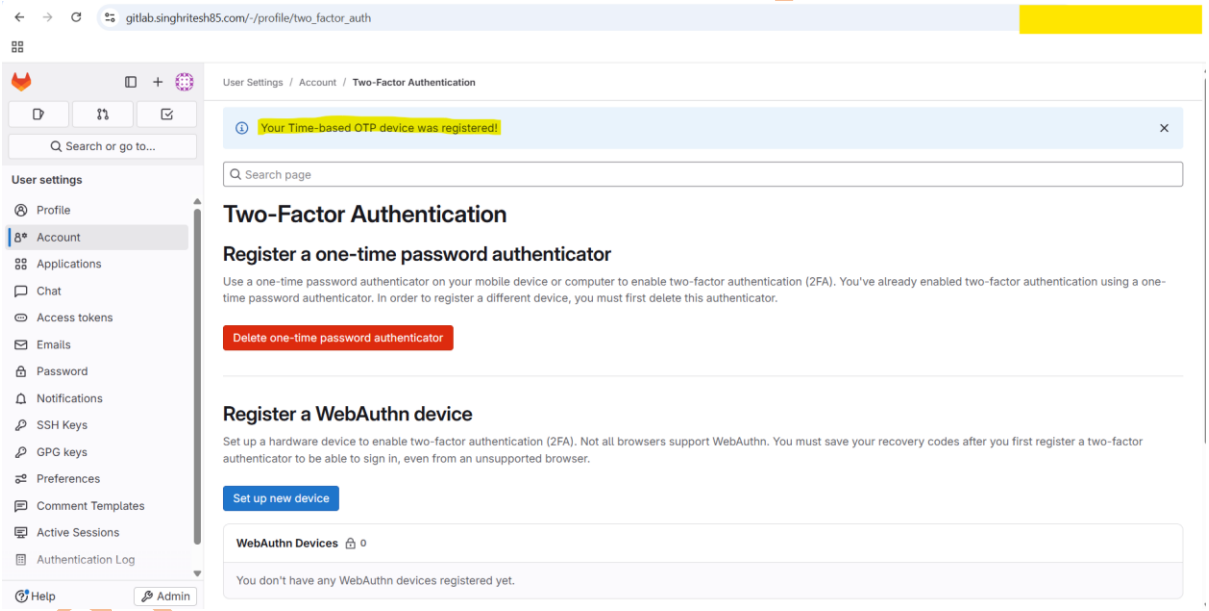
Now it will ask you to configure 2FA/MFA as shown in the screenshot attached below.



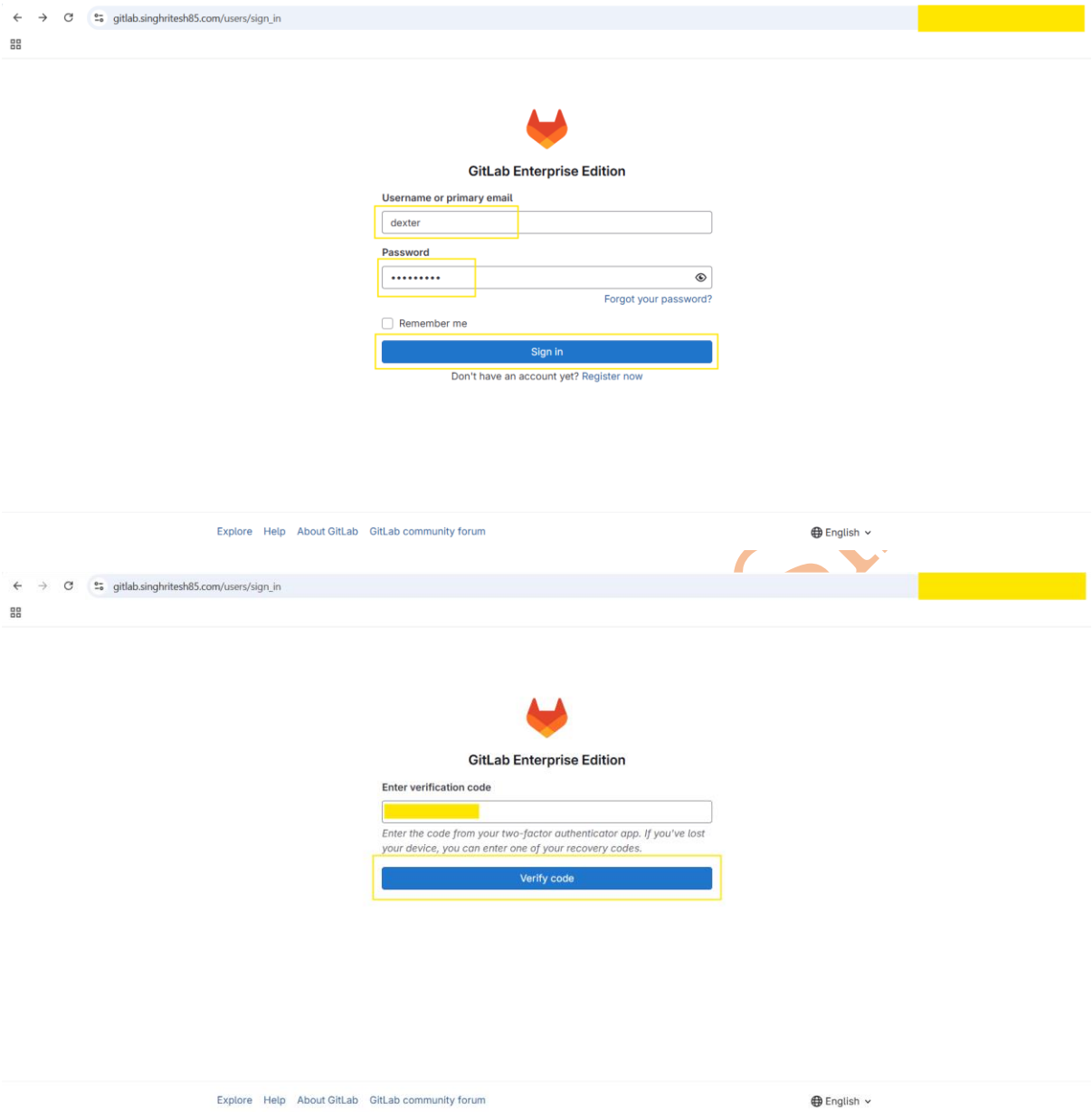
Now you can configure 2FA/MFA from your device, in the current scenario I used my mobile phone and installed octa for 2FA and scan the image from octa App installed in my mobile and provided the generated 6 digits number from the octa App and the current password of the user then clicked on register with two-factor app as shown in the screenshot attached below finally 2FA/MFA had been configured as shown in the screenshot attached below.



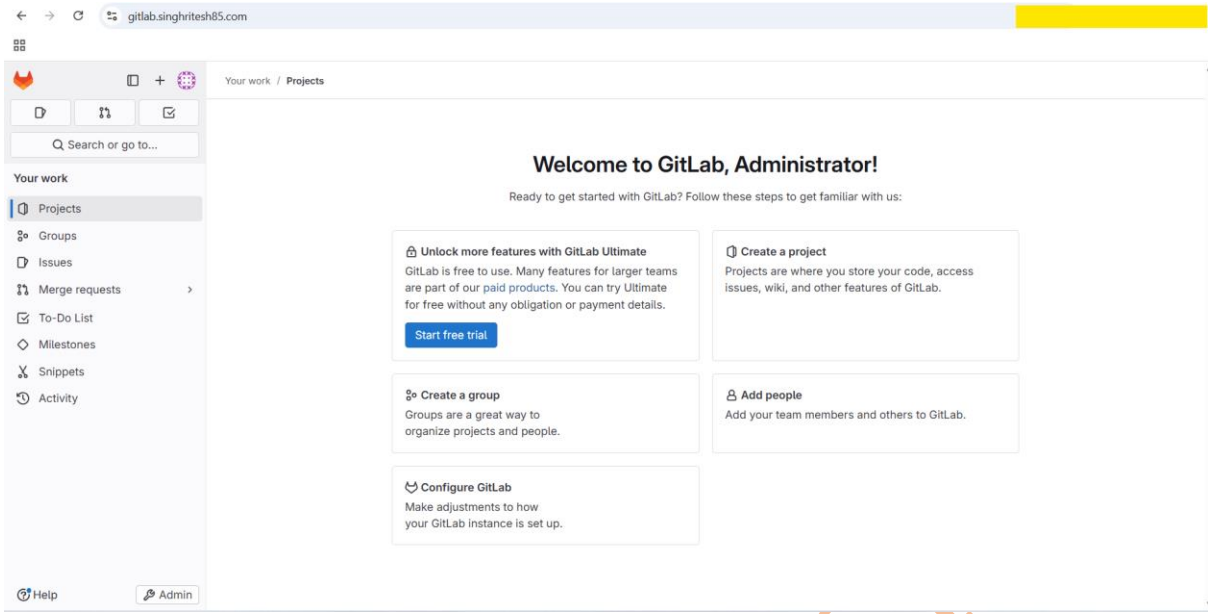




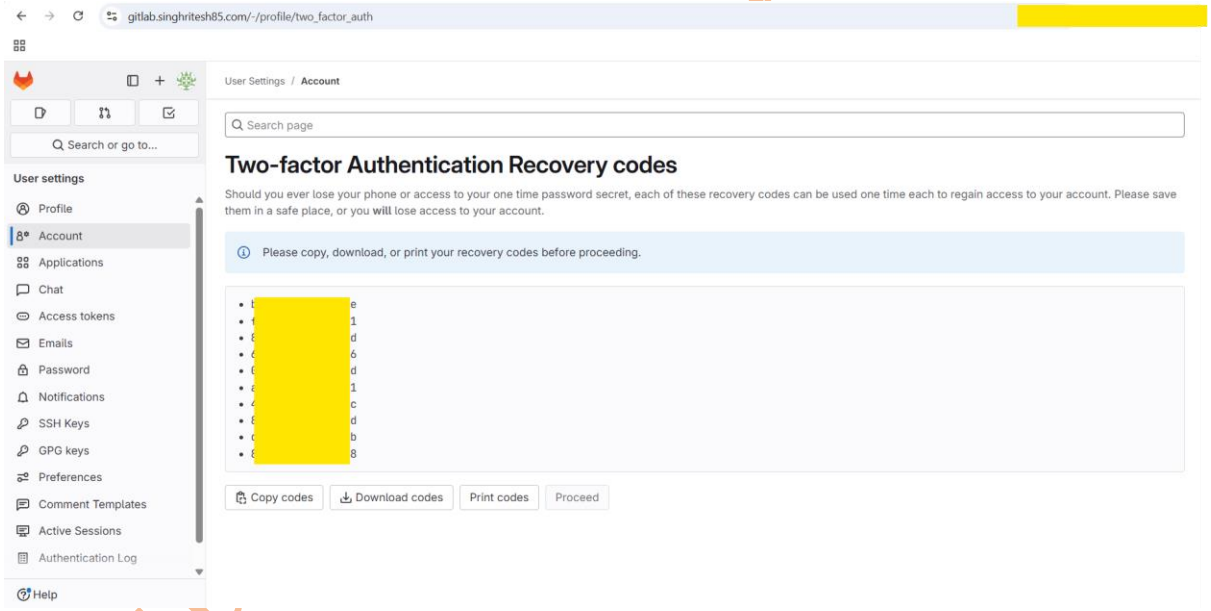
Next time when the user will login then user need to provide the username, password and then the OTP generated in octa App installed on users mobile/device.



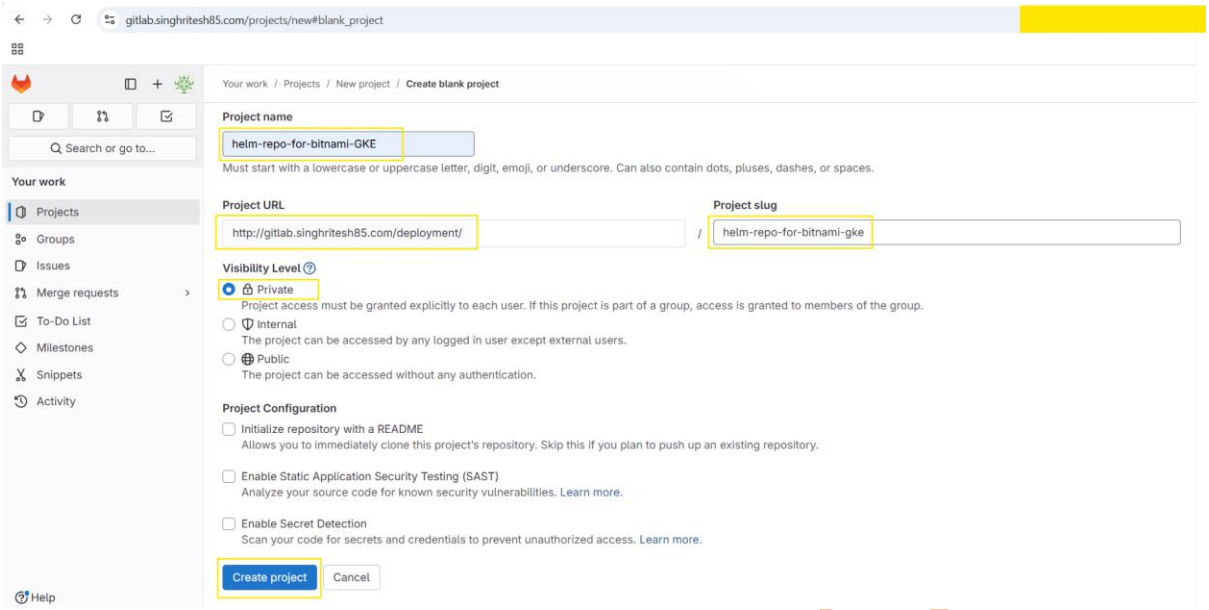
Finally, user was logged-in into their GitLab Account as shown in the screenshot attached below.

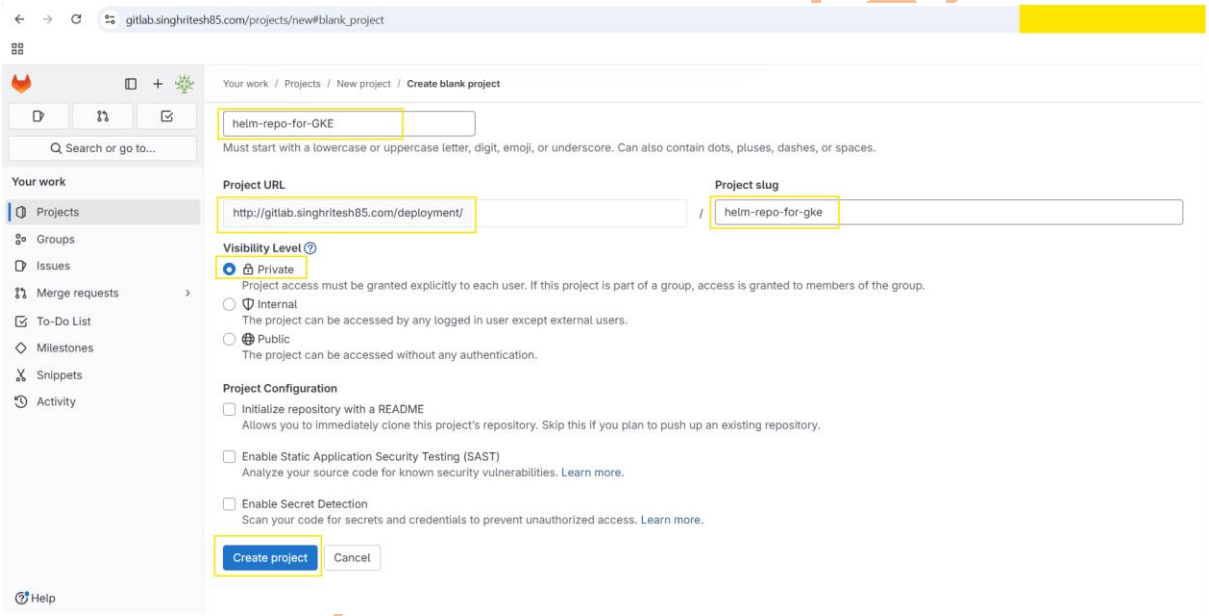


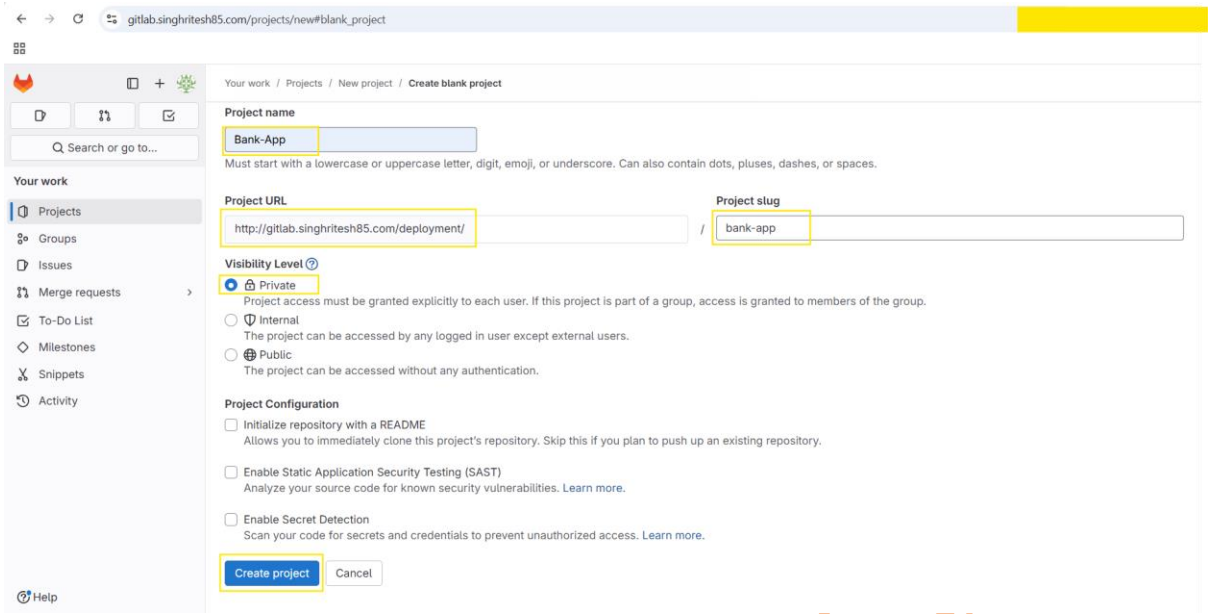
In the same way when you login with deployment user it will ask you to configure 2FA/MFA and you can configure the 2FA in the same as discussed above. The final screenshot is as shown below.



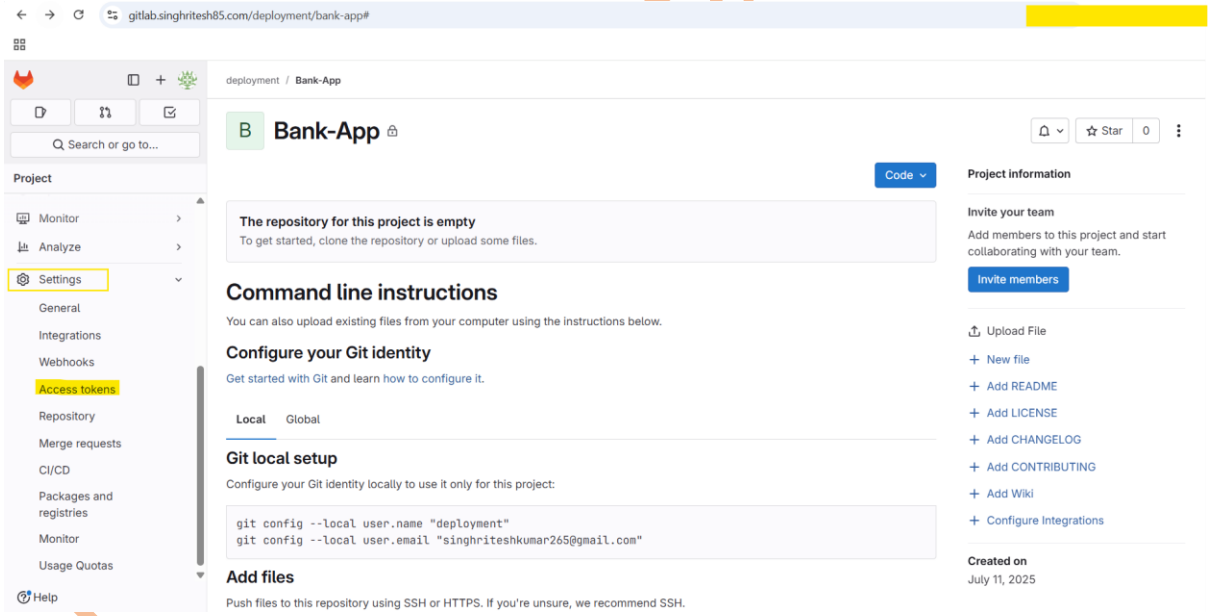
Using the **deployment** user, I had created the three GitLab Private Repos named as **helm-repo-for-bitnami-GKE**, **helm-repo-for-GKE** and **Bank-App** as shown in the screenshot shot attached below.

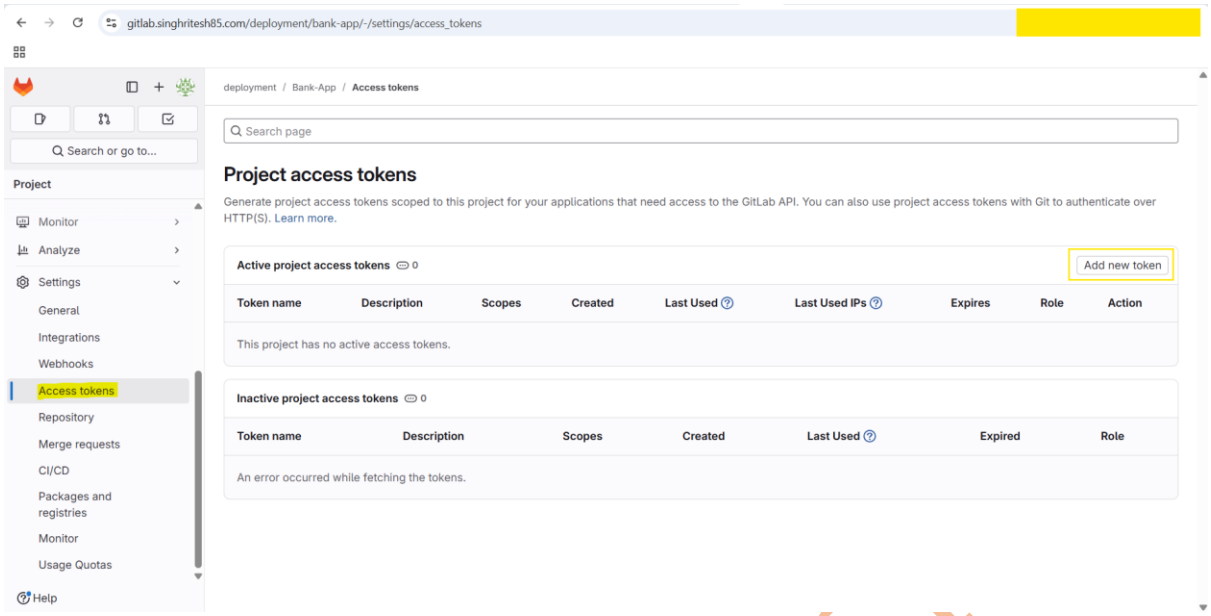

gitlab.singhritesh85.com/projects/new#blank_project
Your work / Projects / New project / Create blank project
Search or go to...
Your work
Projects
Groups
Issues
Merge requests
To-Do List
Milestones
Snippets
Activity
Help
Project name
helm-repo-for-bitnami-GKE
Must start with a lowercase or uppercase letter, digit, emoji, or underscore. Can also contain dots, pluses, dashes, or spaces.
Project URL
http://gitlab.singhritesh85.com/deployment/
Project slug
helm-repo-for-bitnami-gke
Visibility Level
Private
Project access must be granted explicitly to each user. If this project is part of a group, access is granted to members of the group.
Internal
The project can be accessed by any logged in user except external users.
Public
The project can be accessed without any authentication.
Project Configuration
Initialize repository with a README
Allows you to immediately clone this project's repository. Skip this if you plan to push up an existing repository.
Enable Static Application Security Testing (SAST)
Analyze your source code for known security vulnerabilities. Learn more.
Enable Secret Detection
Scan your code for secrets and credentials to prevent unauthorized access. Learn more.
Create project
Cancel

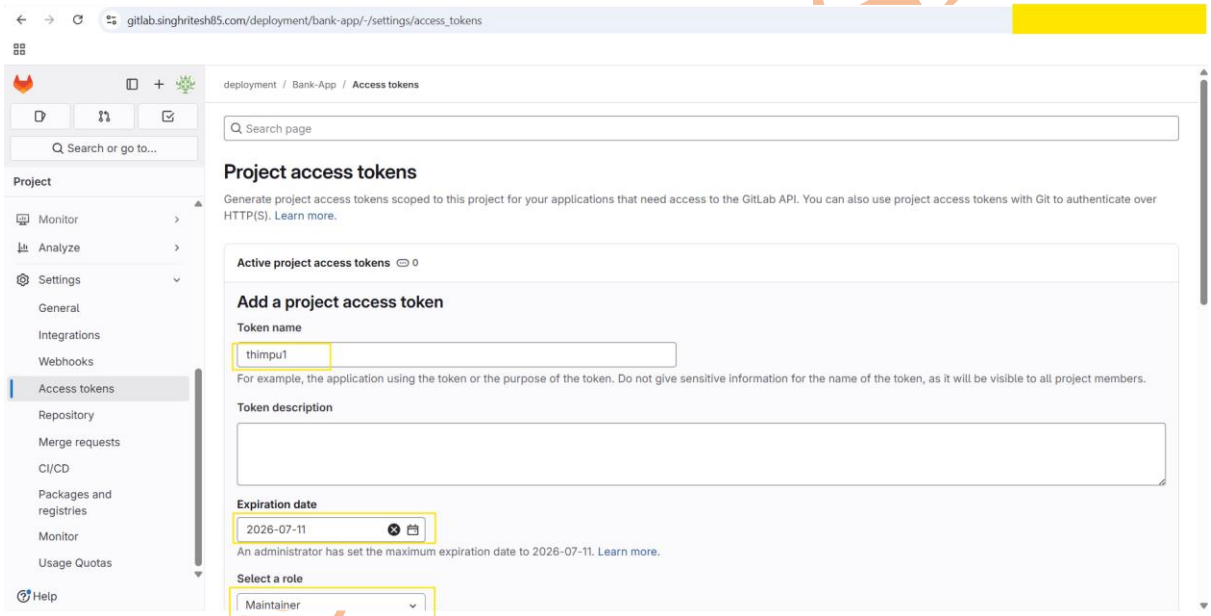

gitlab.singhritesh85.com/projects/new#blank_project
Your work / Projects / New project / Create blank project
Search or go to...
Your work
Projects
Groups
Issues
Merge requests
To-Do List
Milestones
Snippets
Activity
Help
helm-repo-for-GKE
Must start with a lowercase or uppercase letter, digit, emoji, or underscore. Can also contain dots, pluses, dashes, or spaces.
Project URL
http://gitlab.singhritesh85.com/deployment/
Project slug
helm-repo-for-gke
Visibility Level
Private
Project access must be granted explicitly to each user. If this project is part of a group, access is granted to members of the group.
Internal
The project can be accessed by any logged in user except external users.
Public
The project can be accessed without any authentication.
Project Configuration
Initialize repository with a README
Allows you to immediately clone this project's repository. Skip this if you plan to push up an existing repository.
Enable Static Application Security Testing (SAST)
Analyze your source code for known security vulnerabilities. Learn more.
Enable Secret Detection
Scan your code for secrets and credentials to prevent unauthorized access. Learn more.
Create project
Cancel

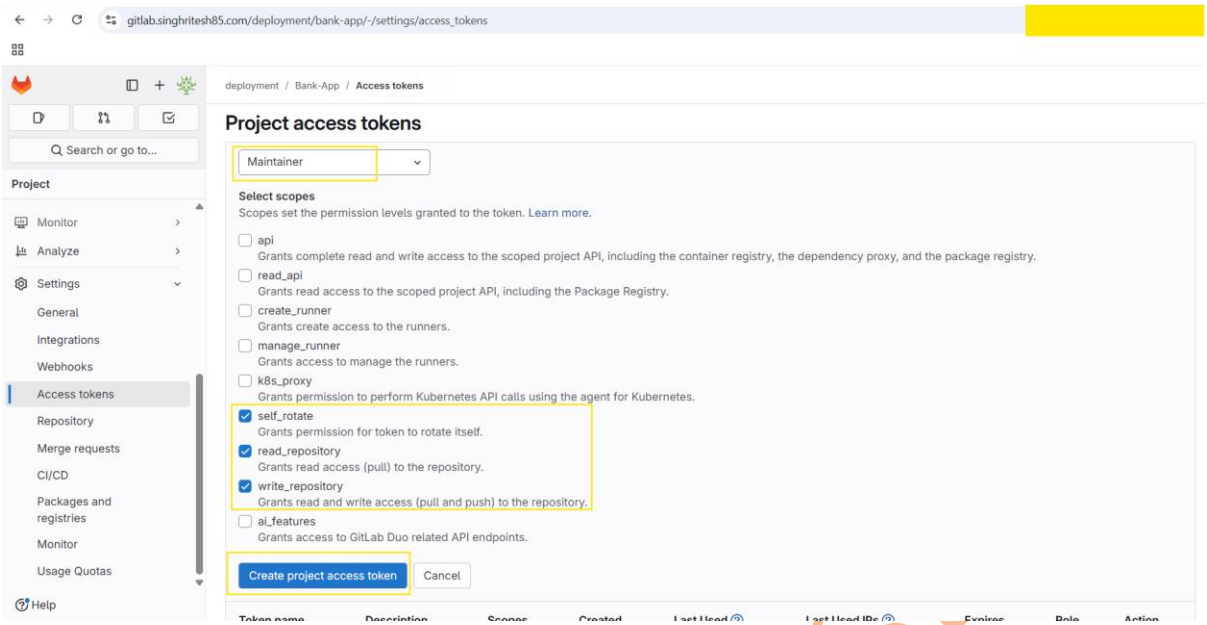


Using the **deployment** user, I created the access token in each of the GitLab Repo as shown in the screenshot attached below. Go to the GitLab Repo > Settings > Access Tokens > Add new token as shown in the screenshot attached below.

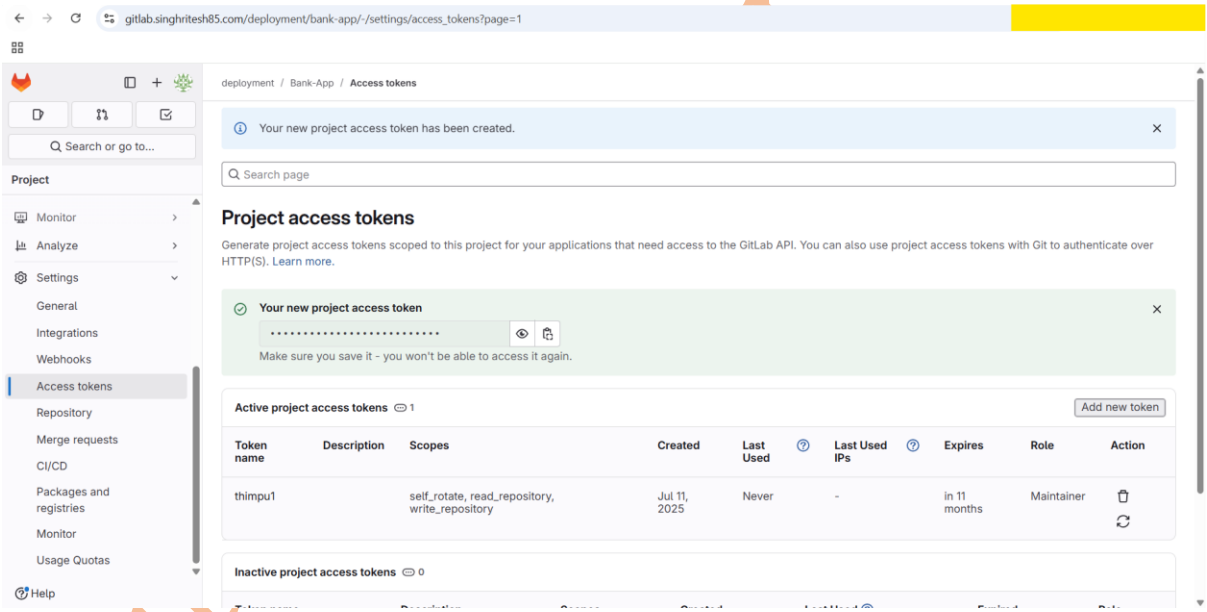



gitlab.singhritesh85.com/deployment/bank-app/-/settings/access_tokens
deployment / Bank-App / Access tokens
Search or go to...
Search page
Project
Monitor
Analyze
Settings
General
Integrations
Webhooks
Access tokens
Repository
Merge requests
CI/CD
Packages and registries
Monitor
Usage Quotas
Help
Project access tokens
Generate project access tokens scoped to this project for your applications that need access to the GitLab API. You can also use project access tokens with Git to authenticate over HTTP(S). Learn more.
Active project access tokens 0
Add new token
Token name
Description
Scopes
Created
Last Used
Last Used IPs
Expires
Role
Action
This project has no active access tokens.
Inactive project access tokens 0
Token name
Description
Scopes
Created
Last Used
Expired
Role
An error occurred while fetching the tokens.


gitlab.singhritesh85.com/deployment/bank-app/-/settings/access_tokens
deployment / Bank-App / Access tokens
Search or go to...
Search page
Project
Monitor
Analyze
Settings
General
Integrations
Webhooks
Access tokens
Repository
Merge requests
CI/CD
Packages and registries
Monitor
Usage Quotas
Help
Project access tokens
Generate project access tokens scoped to this project for your applications that need access to the GitLab API. You can also use project access tokens with Git to authenticate over HTTP(S). Learn more.
Active project access tokens 0
Add a project access token
Token name
thimpu1
For example, the application using the token or the purpose of the token. Do not give sensitive information for the name of the token, as it will be visible to all project members.
Token description
Expiration date
2026-07-11
An administrator has set the maximum expiration date to 2026-07-11. Learn more.
Select a role
Maintainer



In the above screenshot I created the access token for the project **Bank-App** and for the other two projects **helm-repo-for-bitnami-GKE** and **helm-repo-for-GKE** you can create in the similar manner.



I cloned the source code and helm charts from GitHub Public Repo (https://github.com/singhritesh85/Bank-App.git, https://github.com/singhritesh85/helm-repo-for-GKE.git and https://github.com/singhritesh85/helm-repo-for-bitnami-GKE.git) and then pushed the code to the GitLab private Repo as shown in the screenshot attached below.

```
[root@                    ~]# mkdir banku
[root@                    ~]# cd banku/
[root@                    banku]# git init
hint: Using 'master' as the name for the initial branch. This default branch name
hint: is subject to change. To configure the initial branch name to use in all
hint: of your new repositories, which will suppress this warning, call:
hint:
hint:   git config --global init.defaultBranch <name>
hint:
hint: Names commonly chosen instead of 'master' are 'main', 'trunk' and
hint: 'development'. The just-created branch can be renamed via this command:
hint:
hint:   git branch -m <name>
Initialized empty Git repository in /root/banku/.git/
[root@                    banku]# git remote add origin https://deployment:                    @gitlab.singhritesh85.com/deployment/bank-app.git
[root@                    banku]# git checkout -b main
Switched to a new branch 'main'
```

```
[root@                    banku]# git config --local user.name "deployment"
[root@                    banku]# git config --local user.email "                    "
[root@                    banku]# git add .
[root@                    banku]# git commit -m "dexter"
```

```
[root@                    banku]# git push origin main
Enumerating objects: 42, done.
Counting objects: 100% (42/42), done.
Compressing objects: 100% (29/29), done.
Writing objects: 100% (42/42), 18.11 KiB | 3.02 MiB/s, done.
Total 42 (delta 2), reused 0 (delta 0), pack-reused 0
To https://gitlab.singhritesh85.com/deployment/bank-app.git
 * [new branch]      main -> main
[root@                    banku]# git remote -v
origin  https://deployment:                    @gitlab.singhritesh85.com/deployment/bank-app.git (fetch)
origin  https://deployment:                    @gitlab.singhritesh85.com/deployment/bank-app.git (push)
```

```
[root@                    ~]# mkdir bolo
```

```
[root@                    ~]# cd bolo/
[root@                    bolo]# git init
hint: Using 'master' as the name for the initial branch. This default branch name
hint: is subject to change. To configure the initial branch name to use in all
hint: of your new repositories, which will suppress this warning, call:
hint:
hint:   git config --global init.defaultBranch <name>
hint:
hint: Names commonly chosen instead of 'master' are 'main', 'trunk' and
hint: 'development'. The just-created branch can be renamed via this command:
hint:
hint:   git branch -m <name>
Initialized empty Git repository in /root/bolo/.git/
[root@                    bolo]# git remote add origin https://deployment:                    @gitlab.singhritesh85.com/deployment/helm-repo-for-bitnami-gke.git
[root@                    bolo]# cp -r ~/helm-repo-for-bitnami/* .
[root@                    bolo]# git remote -v
origin  https://deployment:                    @gitlab.singhritesh85.com/deployment/helm-repo-for-bitnami-gke.git (fetch)
origin  https://deployment:                    @gitlab.singhritesh85.com/deployment/helm-repo-for-bitnami-gke.git (push)
[root@bankapp-gitlab-runner bolo]# git checkout -b main
Switched to a new branch 'main'
[root@bankapp-gitlab-runner bolo]# git config --local user.name "deployment"
[root@bankapp-gitlab-runner bolo]# git config --local user.email "                    "
[root@bankapp-gitlab-runner bolo]# git add .
[root@bankapp-gitlab-runner bolo]# git commit -m "mederma"
```

```
[root@                    bolo]# git push origin main
Enumerating objects: 138, done.
Counting objects: 100% (138/138), done.
Compressing objects: 100% (136/136), done.
Writing objects: 100% (138/138), 518.56 KiB | 7.30 MiB/s, done.
Total 138 (delta 68), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (68/68), done.
To https://gitlab.singhritesh85.com/deployment/helm-repo-for-bitnami-gke.git
 * [new branch]      main -> main
```

```
[root@                    ~]# mkdir mangus
```

```
[root@                    ~]# cp -r helm-repo-for-GKE/* mangus/
```

```
[root@                    mangus]# git init
hint: Using 'master' as the name for the initial branch. This default branch name
hint: is subject to change. To configure the initial branch name to use in all
hint: of your new repositories, which will suppress this warning, call:
hint:
hint:   git config --global init.defaultBranch <name>
hint:
hint: Names commonly chosen instead of 'master' are 'main', 'trunk' and
hint: 'development'. The just-created branch can be renamed via this command:
hint:
hint:   git branch -m <name>
Initialized empty Git repository in /root/mangus/.git/
```

```
[root@                    mangus]# git config --local user.name "deployment"
[root@                    mangus]# git config --local user.email "                    "
```

```
[root@ mangus]# git remote add origin https://deployment: @gitlab.singhritesh85.com/deployment/helm-repo-for-gke
.git
[root@ mangus]# git remote -v
origin  https://deployment: @gitlab.singhritesh85.com/deployment/helm-repo-for-gke.git (fetch)
origin  https://deployment: @gitlab.singhritesh85.com/deployment/helm-repo-for-gke.git (push)
```

```
[root@ mangus]# git add .
[root@ mangus]# git commit -m "therema"
```

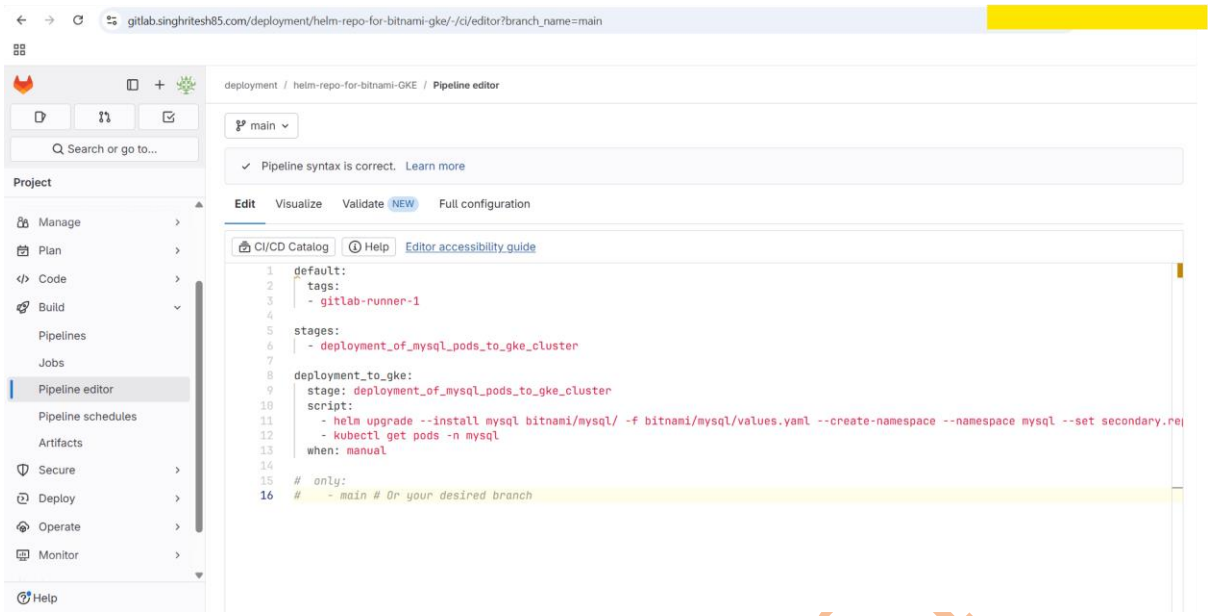
```
[root@ mangus]# git push origin main
Enumerating objects: 17, done.
Counting objects: 100% (17/17), done.
Compressing objects: 100% (15/15), done.
Writing objects: 100% (17/17), 9.15 KiB | 4.58 MiB/s, done.
Total 17 (delta 0), reused 0 (delta 0), pack-reused 0
To https://gitlab.singhritesh85.com/deployment/helm-repo-for-gke.git
 * [new branch]      main -> main
```

Now go to gitlab-runner instance and update the file /etc/gitlab-runner/config.toml with the line clone_url as shown in the screenshot attached below.

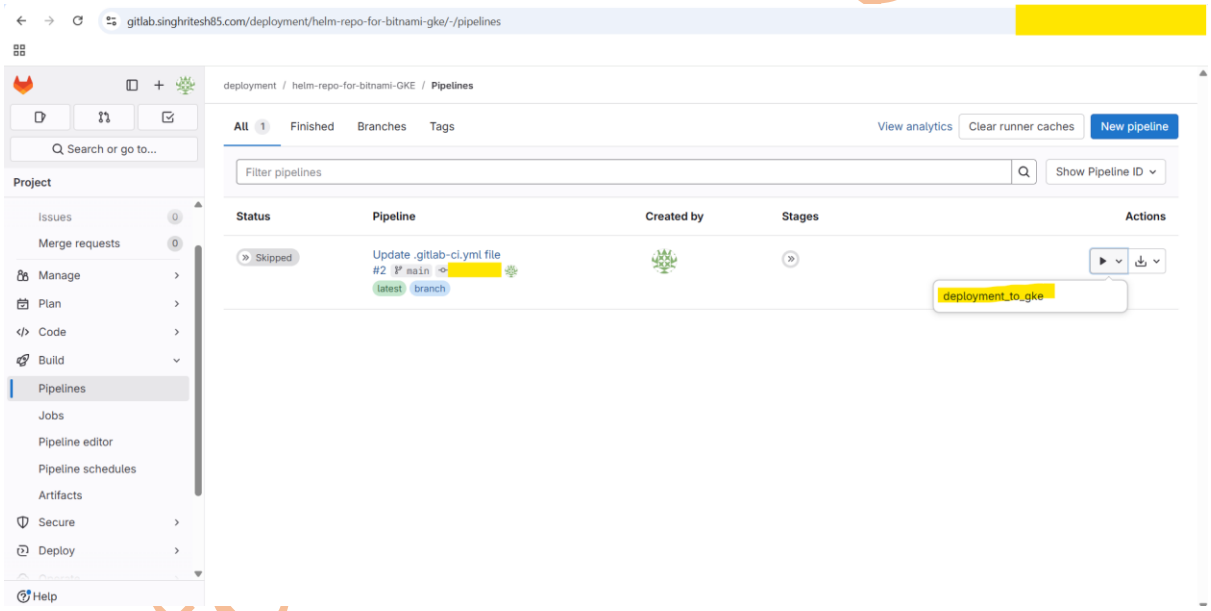
```
[root@bankapp-gitlab-runner ~]# vim /etc/gitlab-runner/config.toml
```

```
concurrent = 1
check_interval = 0
connection_max_age = "15m0s"
shutdown_timeout = 0

[session_server]
  session_timeout = 1800

[[runners]]
  name = "gitlab-runner-1"
  url = "https://gitlab.singhritesh85.com/"
  clone_url = "https://gitlab.singhritesh85.com/"
  id = 1
  token = "                                                                    "
  token_obtained_at = 2025
  token_expires_at = 0001-01-01T00:00:00Z
  executor = "shell"
  [runners.cache]
    MaxUploadedArchiveSize = 0
    [runners.cache.s3]
    [runners.cache.gcs]
    [runners.cache.azure]
```

Now create the GitLab CI/CD Pipeline. Go to the file GitLab Repo **helm-repo-for-bitnami-GKE** > Build > Pipeline editor > Configure Pipeline and create the .gitlab-ci.yml file as shown in the screenshot attached below.



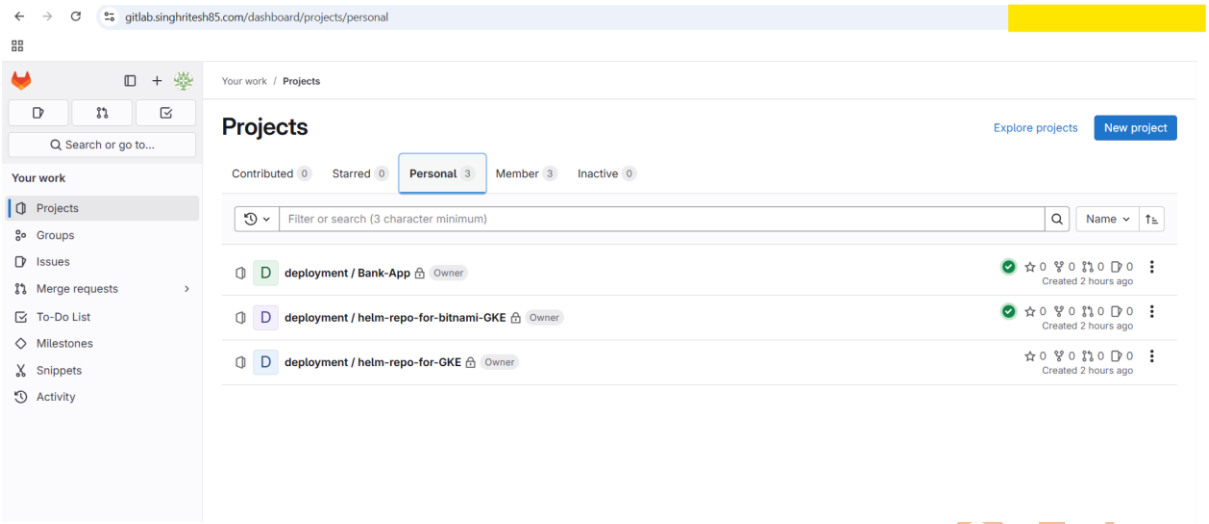
Now go to the Pipelines and run it manually as shown in the screenshot attached below.



After successful execution of the pipeline pods were created as shown in the screenshot attached below.

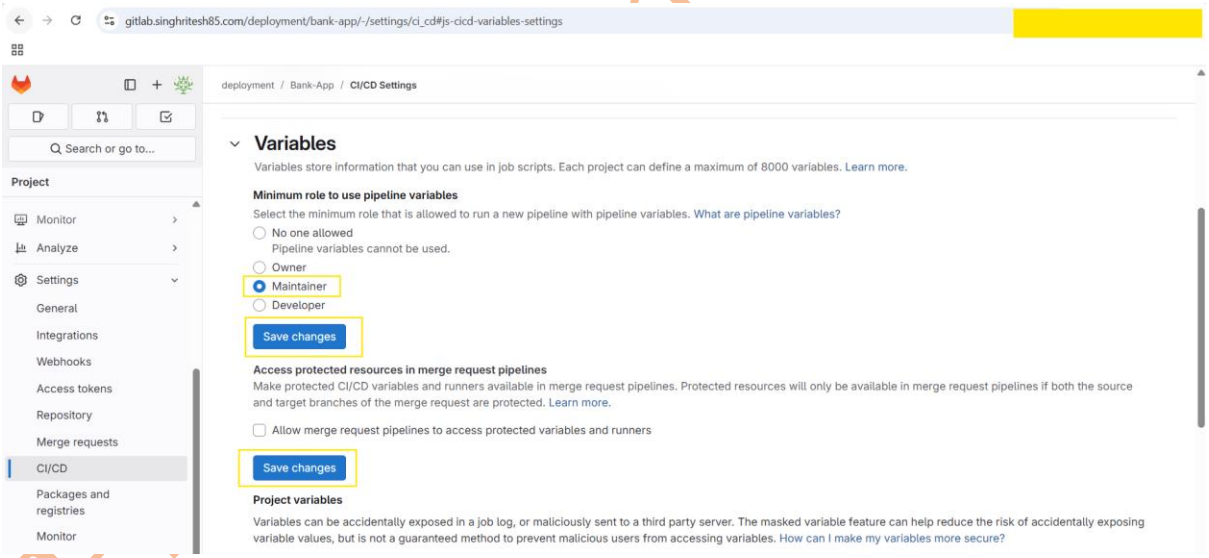
```
[gitlab-runner@bankapp-gitlab-runner ~]$ kubectl get pods -n mysql --watch
NAME                READY   STATUS    RESTARTS   AGE
mysql-primary-0     1/1     Running   0          83s
mysql-secondary-0   1/1     Running   0          83s
^C[gitlab-runner@bankapp-gitlab-runner ~]$
[gitlab-runner@bankapp-gitlab-runner ~]$
[gitlab-runner@bankapp-gitlab-runner ~]$ kubectl get pvc -n mysql --watch
NAME                     STATUS   VOLUME                                     CAPACITY   ACCESS MODES   STORAGECLASS   VOLUMEATTRIBUTESCLASS   AGE
data-mysql-primary-0     Bound    pvc-[redacted]                             1Gi        RWO            standard-rwo   <unset>                 92s
data-mysql-secondary-0   Bound    pvc-[redacted]                             1Gi        RWO            standard-rwo   <unset>                 92s
```

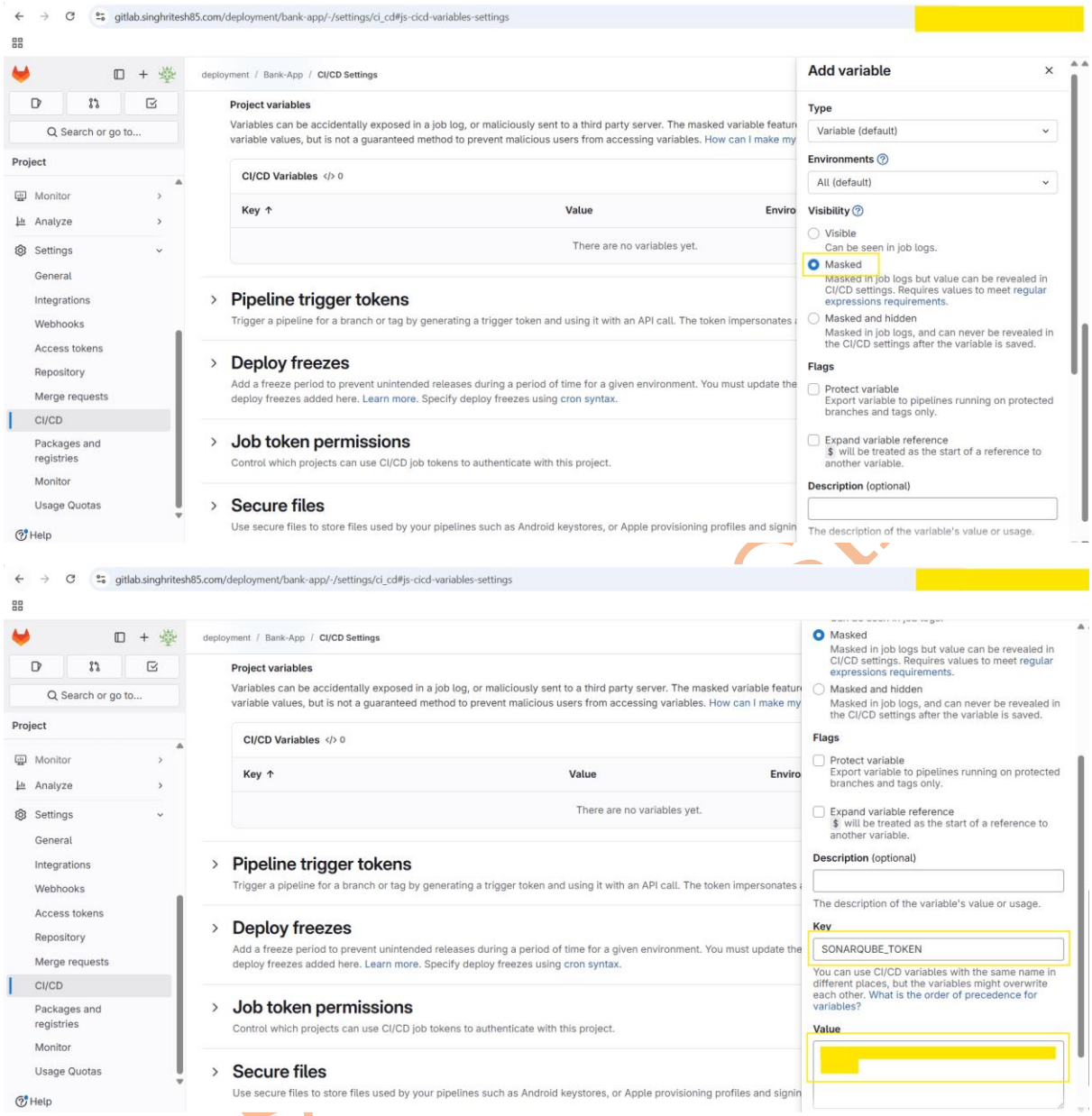
Now to the GitLab Repo Bank-App > Build > Pipeline editor > Configure pipeline to create the GitLab CI/CD Pipeline as shown in the screenshot attached below. For your reference these two .gitlab-ci.yml file I had provided in the GitHub Repo https://github.com/singhritesh85/Bank-App-GKE.git and https://github.com/singhritesh85/helm-repo-for-bitnami-GKE.git.



Hardcoding username and password in gitlab ci/cd pipeline are not a good idea so I added the pipeline variables in each of the GitLab Project which I utilized during the CI/CD Pipeline as shown in the screenshot attached below. Go to each of the GitLab Projects/Repository > Settings > CI/CD > Variables and start adding the pipeline variables.

One point I want to clarify here that deployment user is the owner of the GitLab Project/Repository as that user had created the project otherwise you can make the user as maintainer and proceed to the deployment.




gitlab.singhritesh85.com/deployment/bank-app/-/settings/ci_cd#js-cicd-variables-settings
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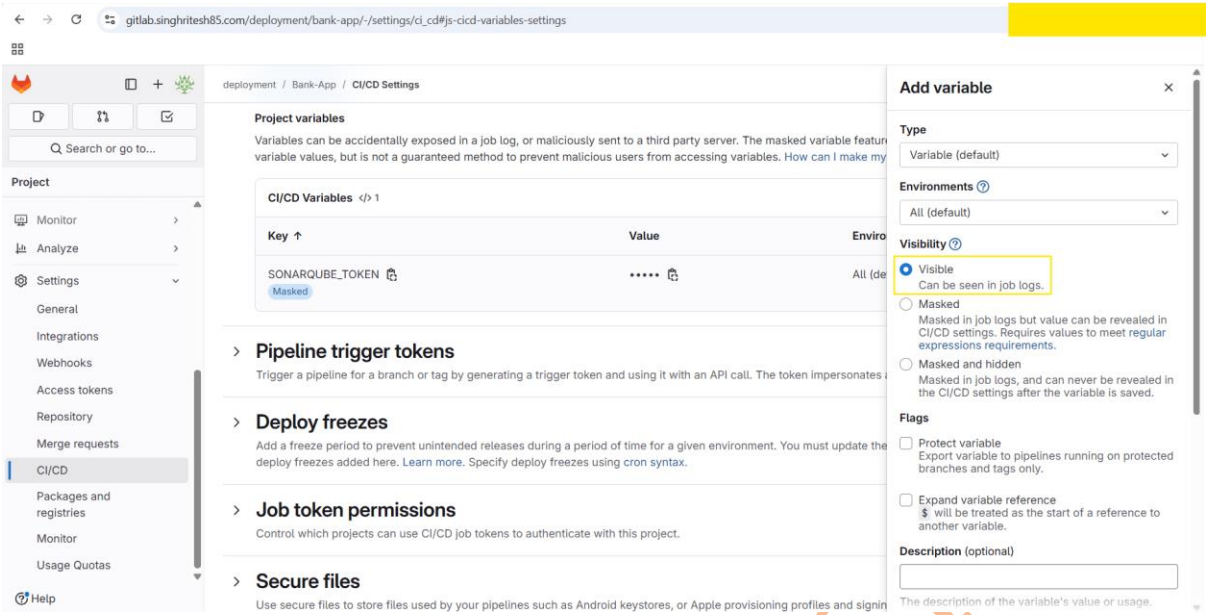
Variables can be accidentally exposed in a job log, or maliciously sent to a third party server. The masked variable feature
variable values, but is not a guaranteed method to prevent malicious users from accessing variables. How can I make my
CI/CD Variables 0
Key
Value
Enviro
There are no variables yet.
Pipeline trigger tokens
Trigger a pipeline for a branch or tag by generating a trigger token and using it with an API call. The token impersonates
Deploy freezes
Add a freeze period to prevent unintended releases during a period of time for a given environment. You must update the
deploy freezes added here. Learn more. Specify deploy freezes using cron syntax.
Job token permissions
Control which projects can use CI/CD job tokens to authenticate with this project.
Secure files
Use secure files to store files used by your pipelines such as Android keystores, or Apple provisioning profiles and signin
Add variable
Type
Variable (default)
Environments
All (default)
Visibility
Visible
Can be seen in job logs.
Masked
Masked in job logs but value can be revealed in CI/CD settings. Requires values to meet regular expressions requirements.
Masked and hidden
Masked in job logs, and can never be revealed in the CI/CD settings after the variable is saved.
Flags
Protect variable
Export variable to pipelines running on protected branches and tags only.
Expand variable reference
$ will be treated as the start of a reference to another variable.
Description (optional)
The description of the variable's value or usage.
Key
SONARQUBE_TOKEN
You can use CI/CD variables with the same name in different places, but the variables might overwrite each other. What is the order of precedence for variables?
Value


gitlab.singhritesh85.com/deployment/bank-app/-/settings/ci_cd#js-cicd-variables-settings
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All (de
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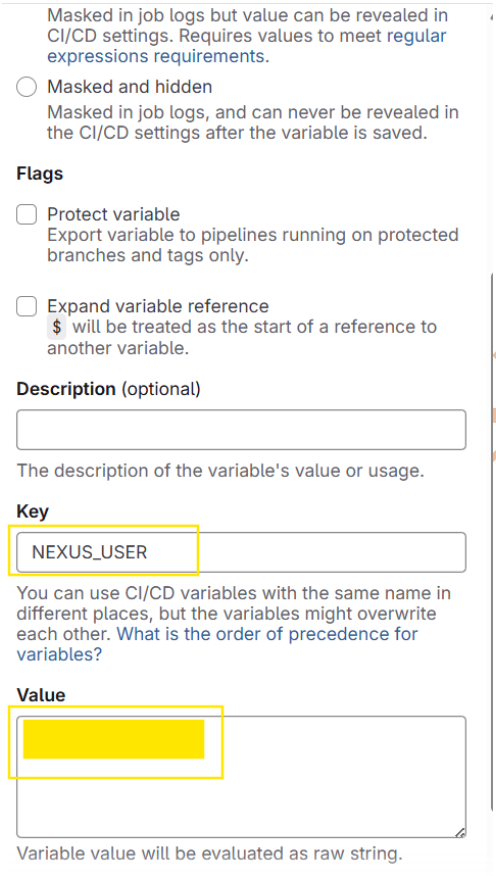
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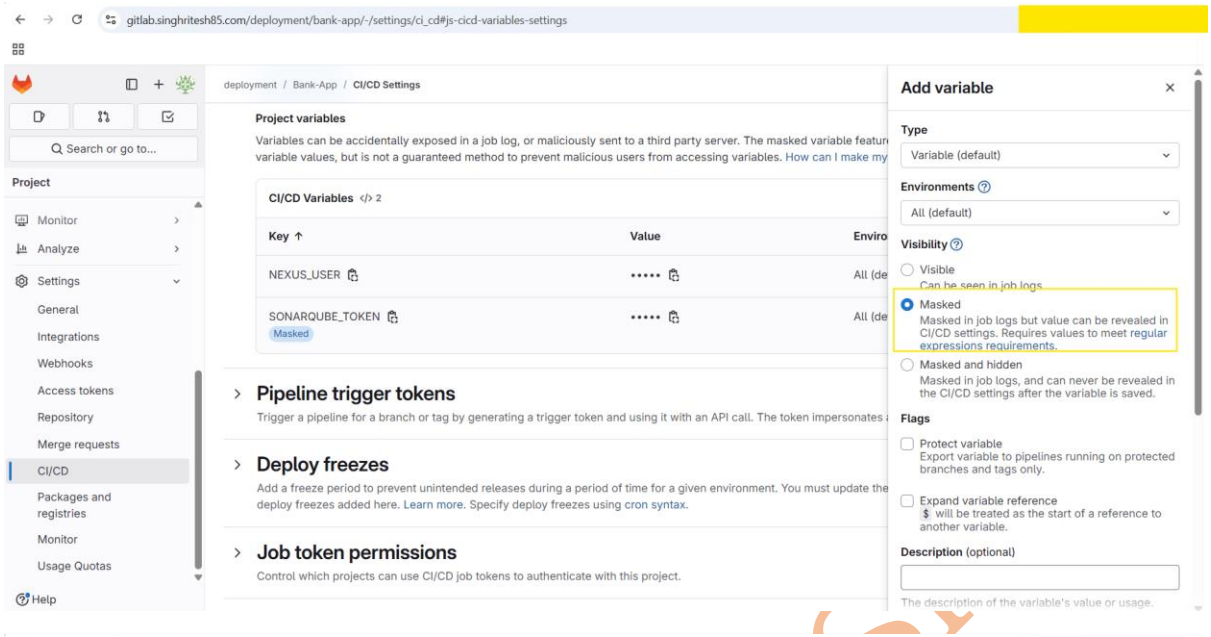
Value
Variable value will be evaluated as raw string.


gitlab.singhritesh85.com/deployment/bank-app/-/settings/ci_cd#js-cicd-variables-settings
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CI/CD Variables 2
Key
Value
Enviro
NEXUS_USER
SONARQUBE_TOKEN
Masked
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Environments
All (default)
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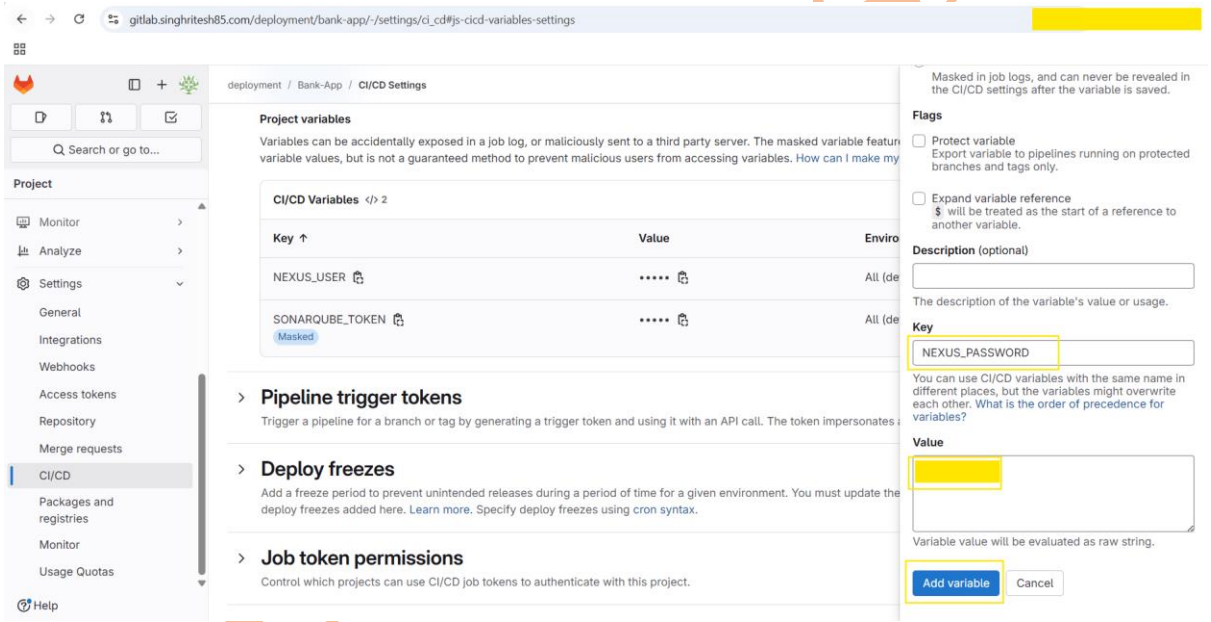
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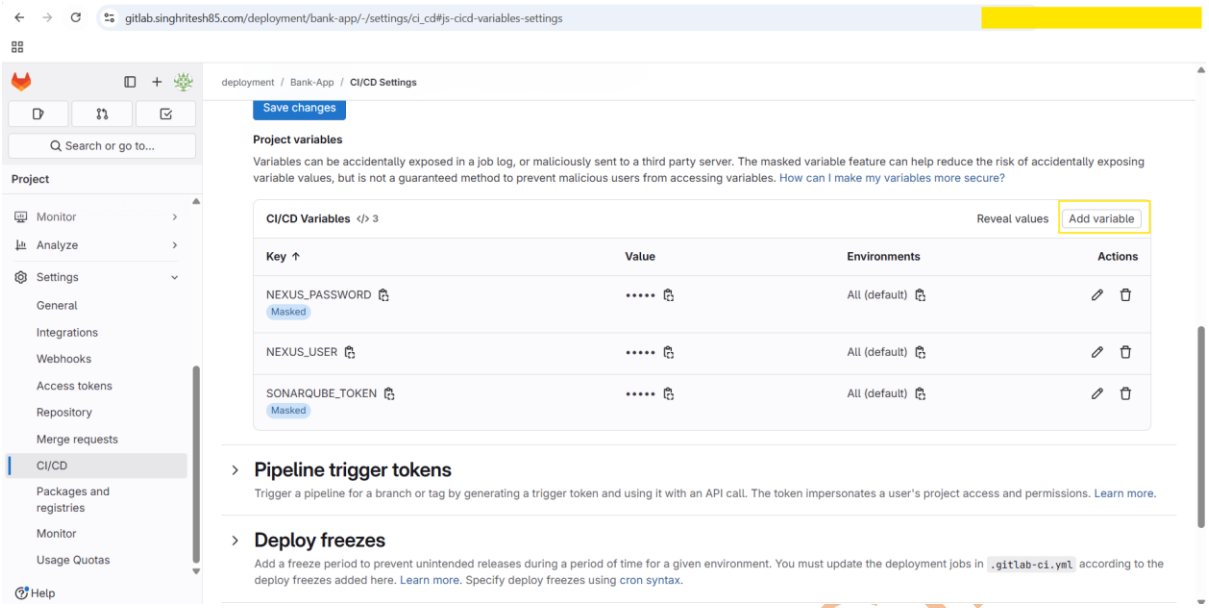
Value
Variable value will be evaluated as raw string.
Add variable
Cancel


gitlab.singhritesh85.com/deployment/bank-app/-/settings/ci_cd#js-cicd-variables-settings
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Save changes
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Masked
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Masked
All (default)
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Trigger a pipeline for a branch or tag by generating a trigger token and using it with an API call. The token impersonates a user's project access and permissions. Learn more.
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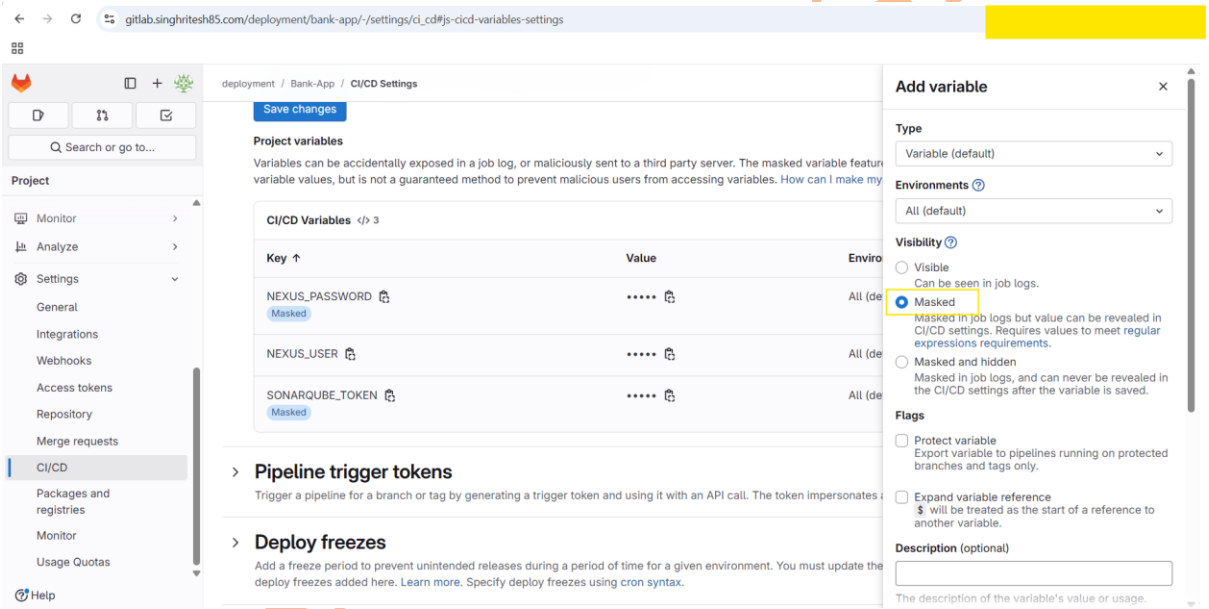
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Deploy freezes
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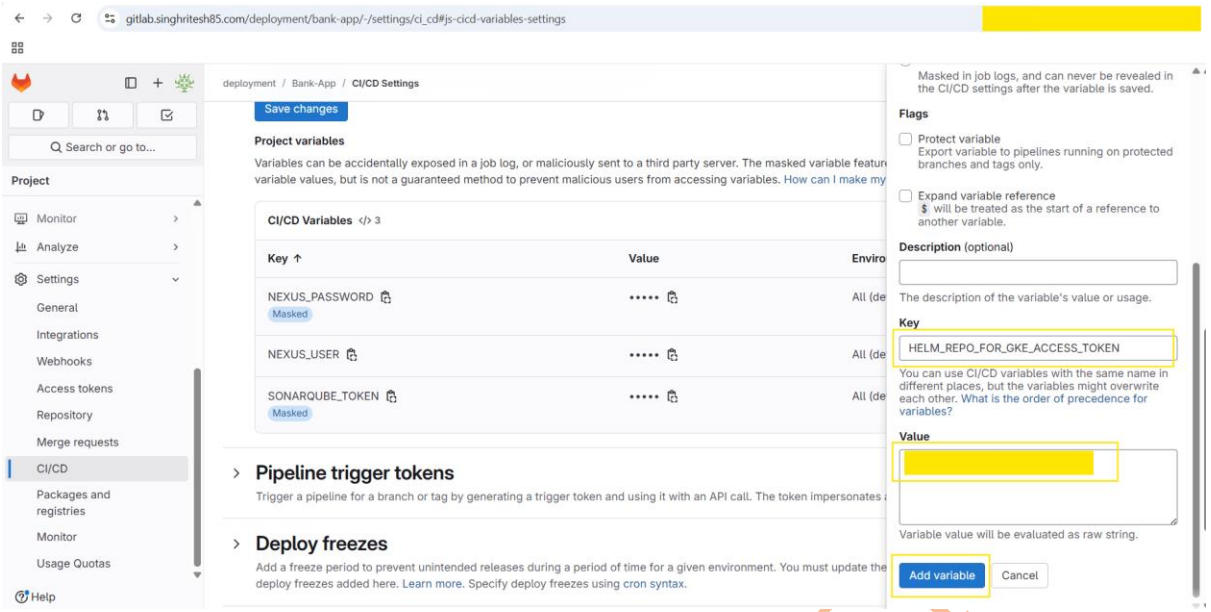
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Key
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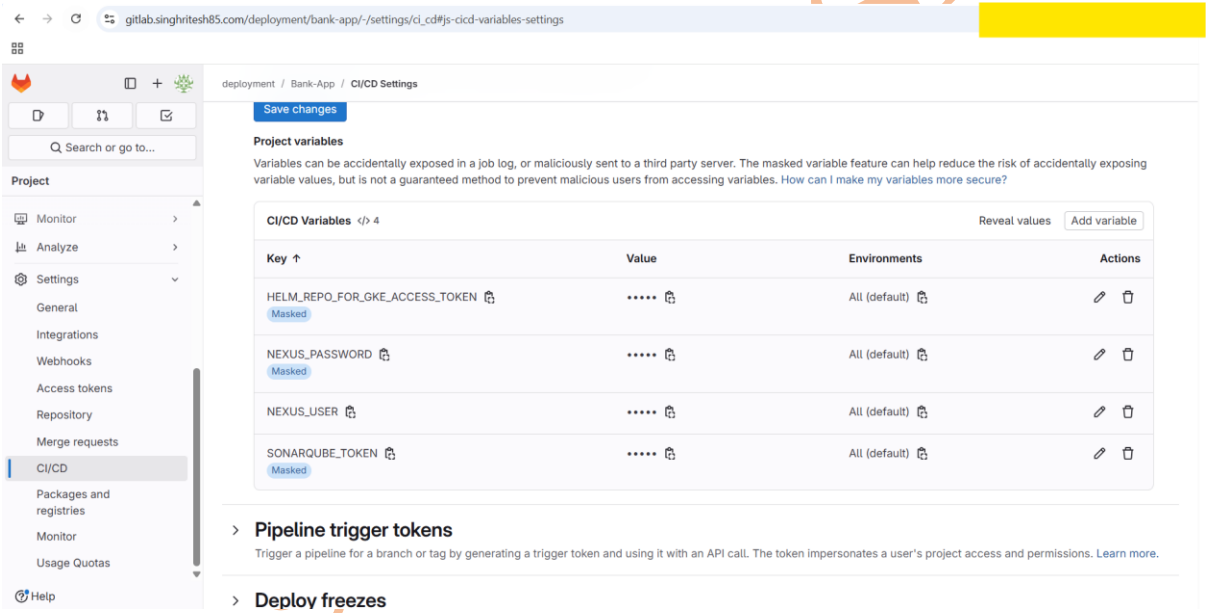
You can use CI/CD variables with the same name in different places, but the variables might overwrite each other. What is the order of precedence for variables?
Value
Variable value will be evaluated as raw string.
Add variable
Cancel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deployment / Bank-App / CI/CD Settings
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Reveal values
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HELM_REPO_FOR_GKE_ACCESS_TOKEN
Masked
NEXUS_PASSWORD
Masked
NEXUS_USER
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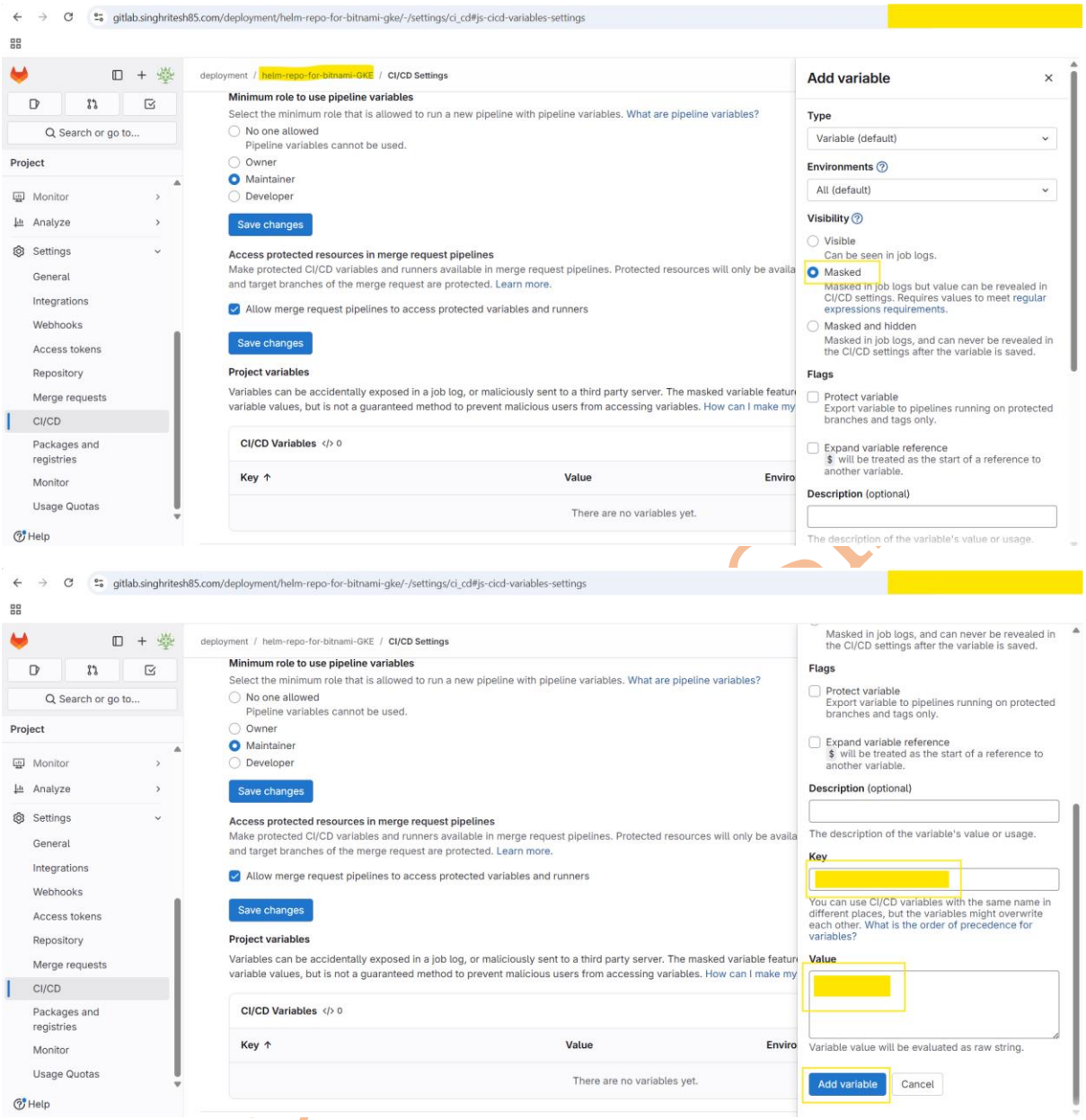
Masked
All (default)
Pipeline trigger tokens
Trigger a pipeline for a branch or tag by generating a trigger token and using it with an API call. The token impersonates a user's project access and permissions. Learn more.
Deploy freezes


gitlab.singhritesh85.com/deployment/helm-repo-for-bitnami-gke/-/settings/ci_cd#js-cicd-variables-settings
deployment / helm-repo-for-bitnami-GKE / CI/CD Settings
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Packages and registries
Monitor
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Help
Minimum role to use pipeline variables
Select the minimum role that is allowed to run a new pipeline with pipeline variables. What are pipeline variables?
No one allowed
Pipeline variables cannot be used.
Owner
Maintainer
Developer
Save changes
Access protected resources in merge request pipelines
Make protected CI/CD variables and runners available in merge request pipelines. Protected resources will only be availa
and target branches of the merge request are protected. Learn more.
Allow merge request pipelines to access protected variables and runners
Save changes
Project variables
Variables can be accidentally exposed in a job log, or maliciously sent to a third party server. The masked variable featur
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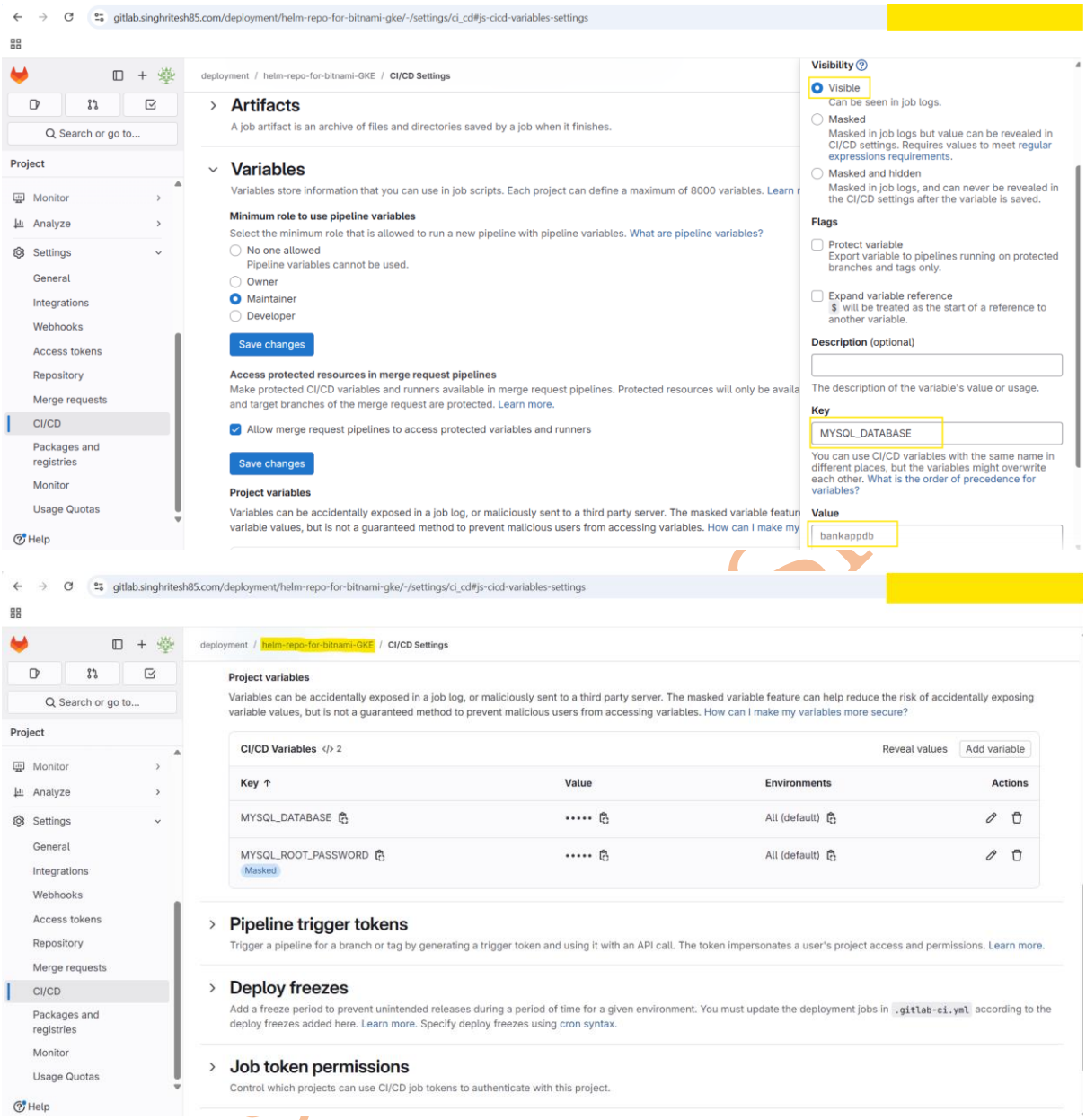
There are no variables yet.
Add variable
Type
Variable (default)
Environments
All (default)
Visibility
Visible
Can be seen in job logs.
Masked
Masked in job logs but value can be revealed in CI/CD settings. Requires values to meet regular expressions requirements.
Masked and hidden
Masked in job logs, and can never be revealed in the CI/CD settings after the variable is saved.
Flags
Protect variable
Export variable to pipelines running on protected branches and tags only.
Expand variable reference
$ will be treated as the start of a reference to another variable.
Description (optional)
The description of the variable's value or usage.
Key
You can use CI/CD variables with the same name in different places, but the variables might overwrite each other. What is the order of precedence for variables?
Value
Variable value will be evaluated as raw string.
Add variable
Cancel



After successful execution of gitlab ci/cd pipeline the bankapp pod had been created as shown in the screenshot attached below.

```
[gitlab-runner@bankapp-gitlab-runner ~]$ kubectl get pods -n bankapp --watch
NAME                          READY   STATUS    RESTARTS   AGE
bankapp-folo-                 1/1     Running   0          12m
^C[gitlab-runner@bankapp-gitlab-runner ~]$
[gitlab-runner@bankapp-gitlab-runner ~]$
[gitlab-runner@bankapp-gitlab-runner ~]$
[gitlab-runner@bankapp-gitlab-runner ~]$ kubectl get svc -n bankapp
NAME           TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)   AGE
bankapp-folo   ClusterIP   172.            <none>        80/TCP    12m
```

Then I had created the Kubernetes Secrets and Ingress Rule as shown in the screenshot attached below.

kubectl create secret tls ingress-tls --key server.key --cert 2XXXXXXXXXXXXXXX.crt --namespace bankapp

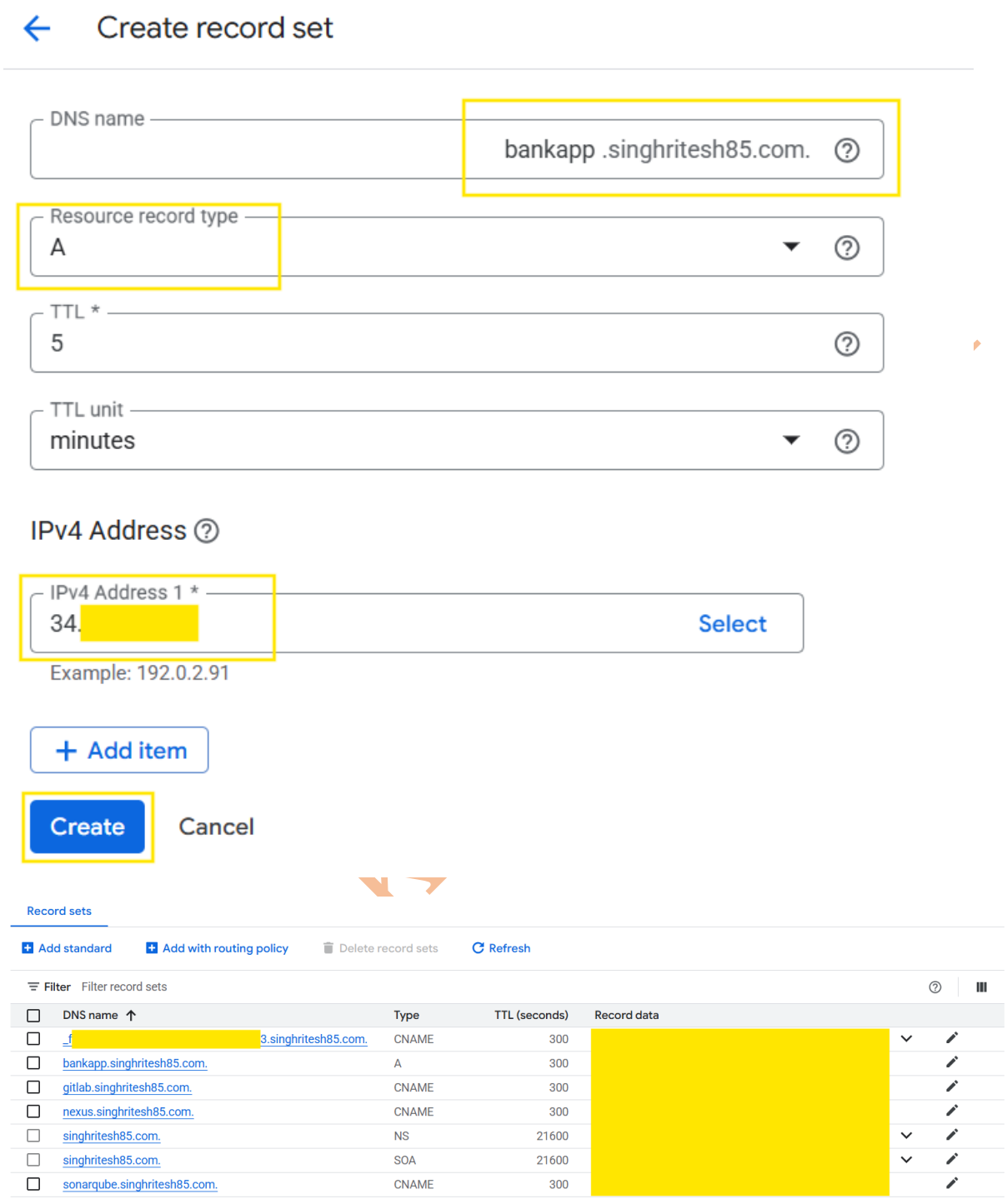
```
[gitlab-runner@bankapp-gitlab-runner ~]$ kubectl create secret tls ingress-tls --key server.key --cert 2d972e3ffe62a0f8.crt --namespace bankapp
secret/ingress-tls created
```

```
[gitlab-runner@bankapp-gitlab-runner ~]$ cat ingress-rule.yaml
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: dexter-ingress
  namespace: bankapp
  annotations:
    kubernetes.io/ingress.class: "gce" # Specify the Ingress class
    kubernetes.io/ingress.allow-http: "false"
#    cloud.google.com/backend-config: '{"default": "bankapp-backendconfig"}'
spec:
  ingressClassName: "gce"
  tls:
  - hosts:
    - bankapp.singhritesh85.com
    secretName: ingress-tls
  rules:
  - host: "bankapp.singhritesh85.com"
    http:
      paths:
      - path: /
        pathType: Prefix
        backend:
          service:
            name: bankapp-folo
            port:
              number: 80
```

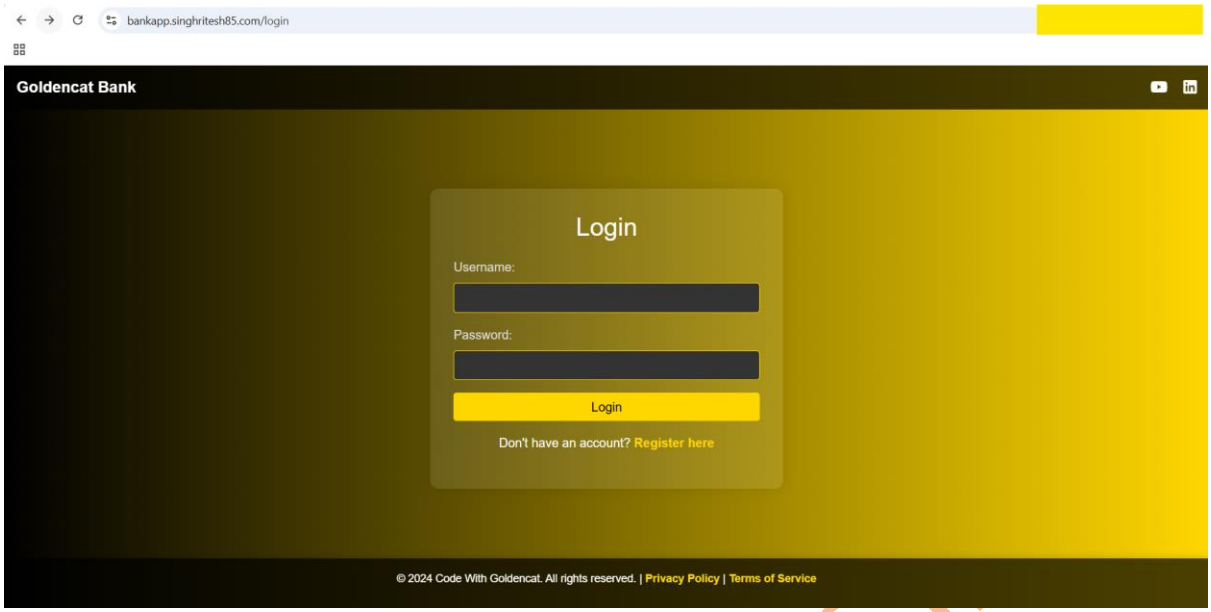
```
cat ingress-rule.yaml
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: dexter-ingress
  namespace: bankapp
  annotations:
    kubernetes.io/ingress.class: "gce" # Specify the Ingress class
    kubernetes.io/ingress.allow-http: "false"
#    cloud.google.com/backend-config: '{"default": "bankapp-backendconfig"}'
spec:
  ingressClassName: "gce"
  tls:
  - hosts:
    - bankapp.singhritesh85.com
    secretName: ingress-tls
  rules:
  - host: "bankapp.singhritesh85.com"
    http:
      paths:
      - path: /
        pathType: Prefix
        backend:
          service:
            name: bankapp-folo
            port:
              number: 80
```

```
[gitlab-runner@bankapp-gitlab-runner ~]$ kubectl get ing -A --watch
NAMESPACE   NAME             CLASS   HOSTS                      ADDRESS          PORTS     AGE
bankapp     dexter-ingress   gce     bankapp.singhritesh85.com   34.[redacted]   80, 443   3m53s
```

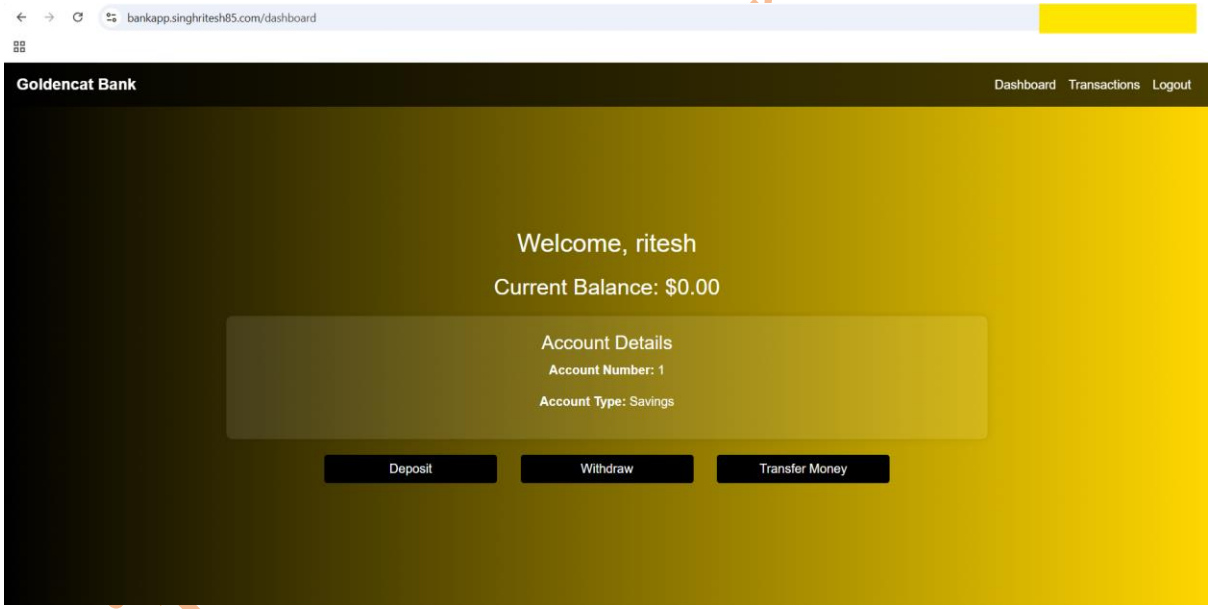
I did the entry for this IP Address with HOSTS in GCP Cloud DNS to create the Record Set of Type-A as shown in the screenshot attached below.



Finally, I was able to access the Bank Application using the URL as shown in the screenshot attached below.



Then registered with a user and checked its entry in the mysql pod and found the same as shown in the screenshot attached below.




```
[gitlab-runner@bankapp-gitlab-runner ~]$ kubectl exec -it mysql-primary-0 -n mysql -- bash
Defaulted container "mysql" out of: mysql, preserve-logs-symlinks (init)
I have no name!@mysql-primary-0:/$ mysql -h localhost -u root --password
Enter password:
ERROR 1045 (28000): Access denied for user 'root'@'localhost' (using password: YES)
I have no name!@mysql-primary-0:/$ mysql -h localhost -u root --password
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 849
Server version: 8.4.0 Source distribution

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show datbases;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'dat
bases' at line 1
mysql> show databases;
```

```
mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| bankappdb          |
| information_schema |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
5 rows in set (0.01 sec)

mysql> use bankappdb;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> show tables;
+---------------------+
| Tables_in_bankappdb |
+---------------------+
| account             |
| transaction         |
+---------------------+
2 rows in set (0.00 sec)

mysql> select * from account;
+----+---------+-----------------------------------------------------------------+----------+
| id | balance | password                                                        | username |
+----+---------+-----------------------------------------------------------------+----------+
|  1 |    0.00 | [redacted]                                                      | ritesh   |
+----+---------+-----------------------------------------------------------------+----------+
1 row in set (0.01 sec)

mysql>
```

For your reference I am providing here the .gitlab-ci.yml file for deployment of mysql pods and bankapp respectively.

These two .gitlab-ci.yml files are also present in the GitHub Repo https://github.com/singhritesh85/helm-repo-for-bitnami-GKE.git and https://github.com/singhritesh85/Bank-App-GKE.git.

```
default:
  tags:
  - gitlab-runner-1

stages:
  - deployment_of_mysql_pods_to_gke_cluster

deployment_to_gke:
  stage: deployment_of_mysql_pods_to_gke_cluster
  script:
    - helm upgrade --install mysql bitnami/mysql/ -f bitnami/mysql/values.yaml --create-namespace --namespace mysql --set secondary.replicaCount=1,primary.persistence.enabled=true,primary.persistence.size=1Gi,architecture=replication,secondary.persistence.enabled=true,secondary.persistence.size=1Gi,global.storageClass=standard-rwo,primary.service.type=ClusterIP,auth.rootPassword=$MYSQL_ROOT_PASSWORD,auth.database=$MYSQL_DATABASE
    - kubectl get pods -n mysql
  when: manual

#  only:
#    - main # Or your desired branch
```

```
default:
  tags:
  - gitlab-runner-1


stages:
  - build_and_sonarqube_analysis
  - nexus_artifact_upload
  - docker_image_build
  - deployment_to_gke_cluster


build_job:
  stage: build_and_sonarqube_analysis
  before_script:
    - export JAVA_HOME="/usr/lib/jvm/java-17-openjdk-17.0.15.0.6-2.el8.x86_64"
    - export PATH="$PATH:$JAVA_HOME/bin:/opt/apache-maven/bin:/opt/node-v16.0.0/bin:/usr/local/bin"
  script:
    - echo "Building artifact..."
    - mvn clean install sonar:sonar -Dsonar.qualitygate.wait=true -Dsonar.qualitygate.timeout=600 -Dsonar.projectKey=bankapp -Dsonar.projectName='bankapp' -Dsonar.host.url=https://sonarqube.singhritesh85.com -Dsonar.login=$SONARQUBE_TOKEN
  artifacts:
    paths:
      - target/*.jar


upload_job:
  stage: nexus_artifact_upload
  script:
    - echo "Uploading artifact to Nexus..."
    - curl -v -u $NEXUS_USER:$NEXUS_PASSWORD --upload-file target/*.jar https://nexus.singhritesh85.com/repository/maven-snapshot/
  dependencies:
```

```
  - build_job


docker_image:
  stage: docker_image_build
  before_script:
    - export JAVA_HOME="/usr/lib/jvm/java-17-openjdk-17.0.15.0.6-2.el8.x86_64"
    - export PATH="$PATH:$JAVA_HOME/bin:/opt/apache-maven/bin:/opt/node-v16.0.0/bin:/usr/local/bin"
    - mvn clean install
  script:
    - docker build -t us-central1-docker.pkg.dev/wise-trainer-244916/bankapp-gcr-dev/dexter:latest -f Dockerfile-Project-1 .
    - docker push us-central1-docker.pkg.dev/wise-trainer-244916/bankapp-gcr-dev/dexter:latest
  dependencies:
    - upload_job


deployment_to_gke:
  stage: deployment_to_gke_cluster
  script:
    - git clone https://deployment:$HELM_REPO_FOR_GKE_ACCESS_TOKEN@gitlab.singhritesh85.com/deployment/helm-repo-for-gke.git
    - helm upgrade --install bankapp helm-repo-for-gke/folo --create-namespace --namespace=bankapp --set image.repository=us-central1-docker.pkg.dev/wise-trainer-244916/bankapp-gcr-dev/dexter,image.tag=latest,replicaCount=1,service.type=ClusterIP,service.port=80
    - kubectl get pods -n bankapp
  dependencies:
    - docker_image


#  only:
#    - main # Or your desired branch
```

In the worst scenario if the Access Token which you had created for the GitLab Project/Repository was compromised then for security reasons rotate it but do not forget to change it wherever you used it in your project.

For security reasons as per your Organisation you need to Rotate it on a Periodic basis but do not forget to change it on those places wherever you used it.

Source Code: https://github.com/singhritesh85/Bank-App-GKE.git

GitHub Repo: https://github.com/singhritesh85/DevOps-Project-BankApp-CICD-using-GitLab-GCP-and-AWS.git

Helm Chart: https://github.com/singhritesh85/helm-repo-for-bitnami-GKE.git

https://github.com/singhritesh85/helm-repo-for-GKE.git

Terraform Script: https://github.com/singhritesh85/terraform-google-cloud-platform.git

https://github.com/singhritesh85/terraform-gitlab-server.git

https://github.com/singhritesh85/DevOps-Project-BankApp-CICD-using-GitLab-GCP-and-AWS.git

References: https://github.com/Goldencat98/Bank-App.git