2.0 Checking and testing

In this section, we will test the health of our cluster and the application after installation. We'll go through the cluster management tools and look how to integrate them. We'll see how the CI/CD process works. And we will check the application functionality from sing-up to objects deletion. Also we will check functionality of monitoring system and then look how to access logs.

Contents of the current section:

Cluster management

To manage our cluster we can use one of several approaches:

1. Command line tool (kubectl)
2. AWS EKS control plane

Let's go through each item separately

kubectl

This command line utility is a universal tool for managing the cluster and its resources. Most commonly used for cluster management.

Before using this utility we need to install it:

Install Tools

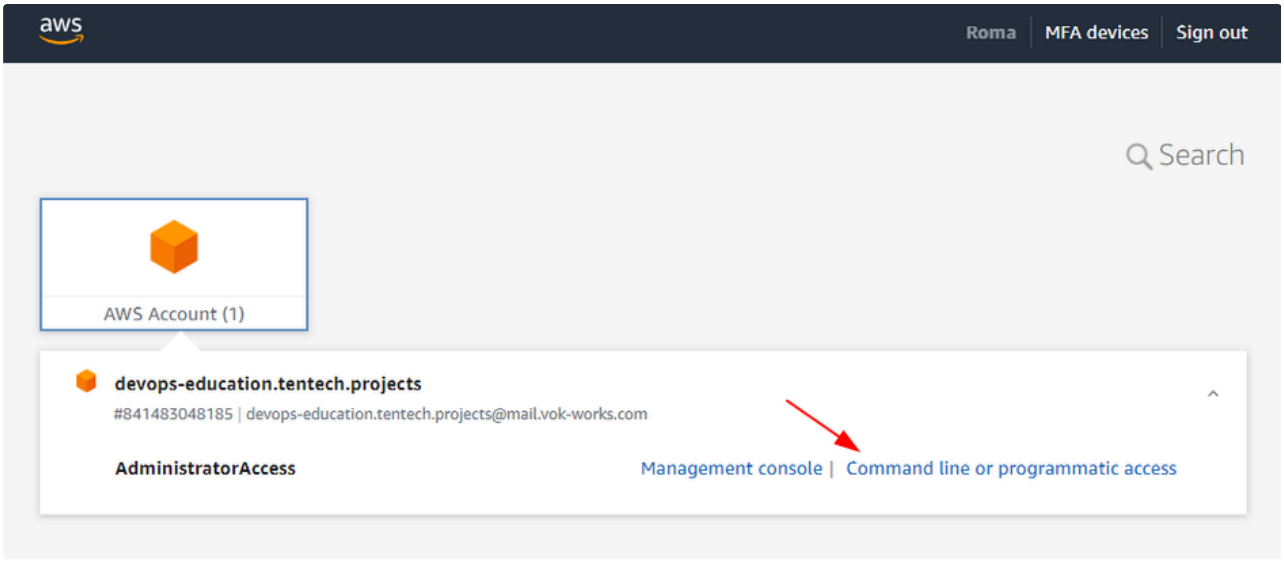
In order to manage the cluster remotely from your machine, we need to provide the cluster configuration to our kubectl utility. For this we have official documentation:

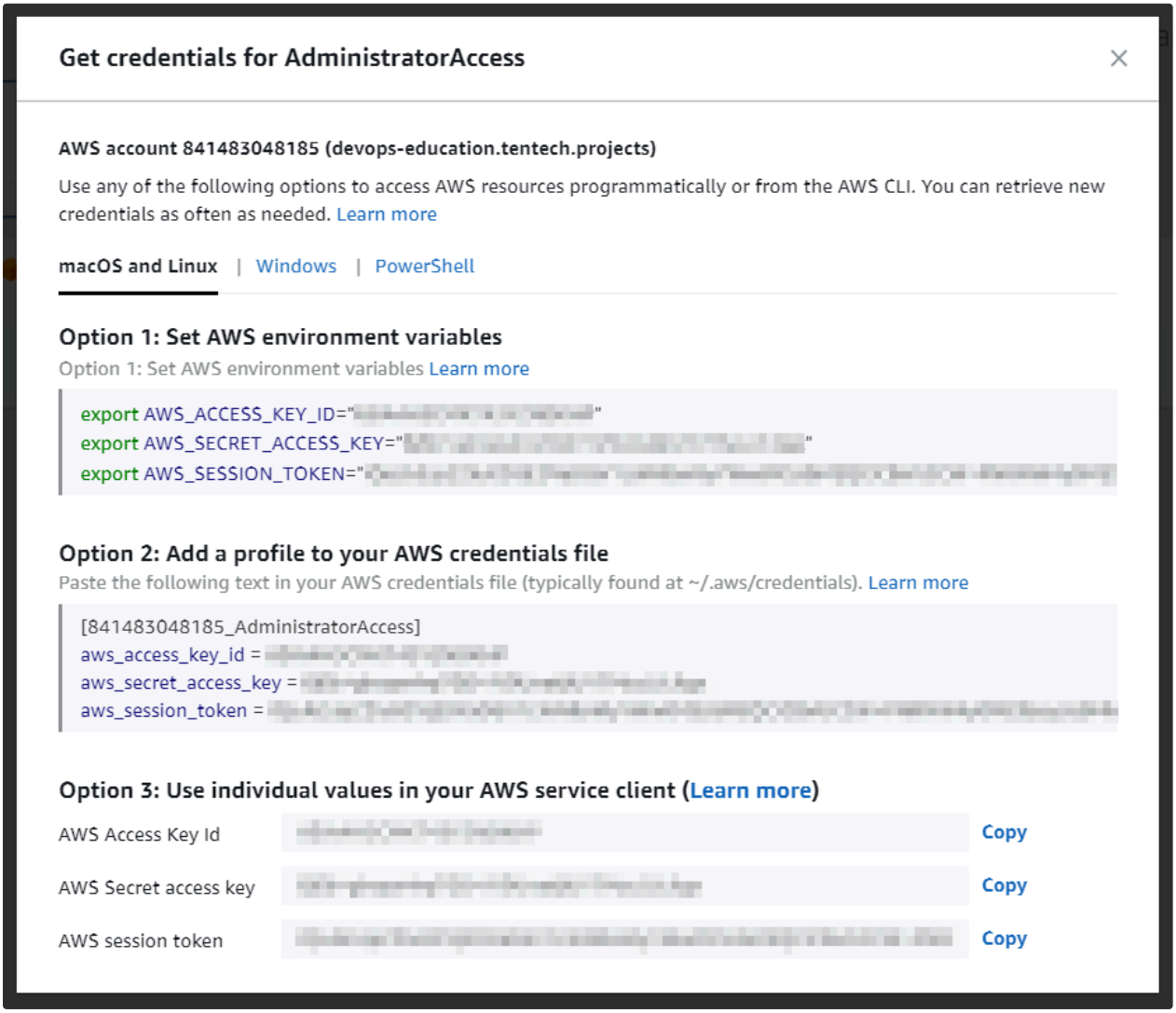
Connecting an external cluster - Amazon EKS

We are interested in the option where AWS cli used to access AWS resources. We need to install it at first. The official documentation on how to install it we can find here:

Install or update to the latest version of the AWS CLI - AWS Command Line Interface

For start using AWS cli with your resourses, you need to provide credentials which can be found at your user's AWS control panel provided to you for this project.





As described above we see that for getting programmatic or cli access to AWS you just need to add environment variables or you can use other options described above.

```
> export AWS_ACCESS_KEY_ID="
  export AWS_SECRET_ACCESS_KEY="
  export AWS_SESSION_TOKEN="
```

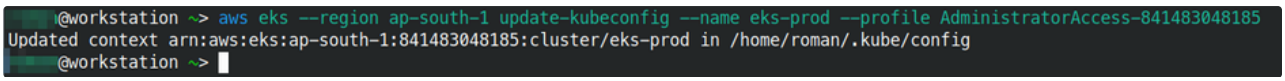
You may also add profile ~/.aws/credential as described above and configure SSO for stability.

After that we can connect our cluster with the kubectl utility by getting config data from AWS EKS:

```
> aws eks update-kubeconfig --name demo-app-eks-eks-cluster
```

If you need to connect to the cluster using by IAM user please read this documentation:

Enabling IAM principal access to your cluster - Amazon EKS



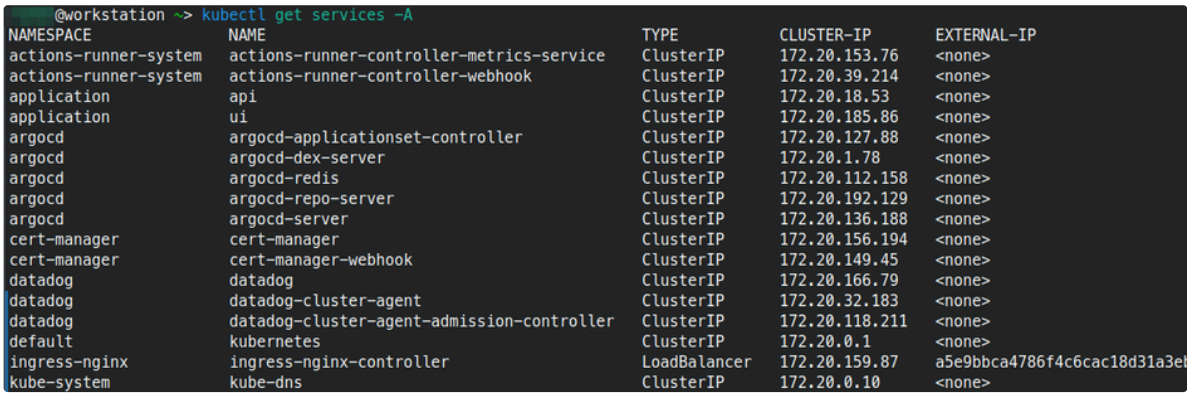
As a result, you will get a configuration of your cluster on the specified path and now we can review it:

```
> kubectl config view
```

```
apiVersion: v1
clusters:
- cluster:
    certificate-authority-data: DATA+OMITTED
    server: https://C4A18BE5E95FE9BFAD842B90713638BE.gr7.ap-south-1.eks.amazonaws.com
  name: arn:aws:eks:ap-south-1:841483048185:cluster/demo-app-eks-eks-cluster
- cluster:
    certificate-authority-data: DATA+OMITTED
    server: https://10.193.2.1/k8s/clusters/c-m-lktwgdmc
  name: dbpaas
contexts:
- context:
    cluster: arn:aws:eks:ap-south-1:841483048185:cluster/demo-app-eks-eks-cluster
    user: arn:aws:eks:ap-south-1:841483048185:cluster/demo-app-eks-eks-cluster
  name: arn:aws:eks:ap-south-1:841483048185:cluster/demo-app-eks-eks-cluster
- context:
    cluster: dbpaas
    user: dbpaas
  name: dbpaas
current-context: arn:aws:eks:ap-south-1:841483048185:cluster/demo-app-eks-eks-cluster
kind: Config
preferences: {}
users:
- name: arn:aws:eks:ap-south-1:841483048185:cluster/demo-app-eks-eks-cluster
  user:
    exec:
      apiVersion: client.authentication.k8s.io/v1beta1
      args:
      - --region
      - ap-south-1
      - eks
      - get-token
      - --cluster-name
      - demo-app-eks-eks-cluster
      command: aws
      env: null
      interactiveMode: IfAvailable
      provideClusterInfo: false
- name: dbpaas
  user:
    token: REDACTED
```

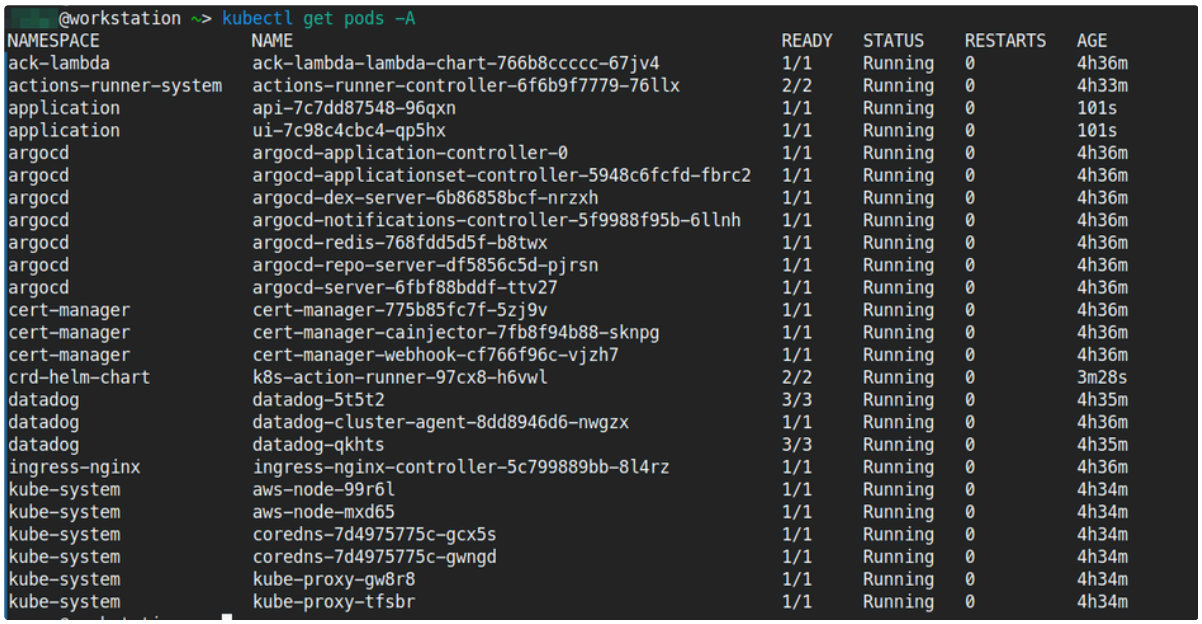
Now you can access the cluster by cli interface.

For example, to see all available services:



```
@workstation ~> kubectl get services -A
NAMESPACE              NAME                                        TYPE           CLUSTER-IP       EXTERNAL-IP
actions-runner-system  actions-runner-controller-metrics-service    ClusterIP      172.20.153.76    <none>
actions-runner-system  actions-runner-controller-webhook           ClusterIP      172.20.39.214    <none>
application            api                                         ClusterIP      172.20.18.53     <none>
application            ui                                          ClusterIP      172.20.185.86    <none>
argocd                 argocd-applicationset-controller            ClusterIP      172.20.127.88    <none>
argocd                 argocd-dex-server                           ClusterIP      172.20.1.78      <none>
argocd                 argocd-redis                                ClusterIP      172.20.112.158   <none>
argocd                 argocd-repo-server                          ClusterIP      172.20.192.129   <none>
argocd                 argocd-server                               ClusterIP      172.20.136.188   <none>
cert-manager           cert-manager                                ClusterIP      172.20.156.194   <none>
cert-manager           cert-manager-webhook                        ClusterIP      172.20.149.45    <none>
datadog                datadog                                     ClusterIP      172.20.166.79    <none>
datadog                datadog-cluster-agent                       ClusterIP      172.20.32.183    <none>
datadog                datadog-cluster-agent-admission-controller  ClusterIP      172.20.118.211   <none>
default                kubernetes                                  ClusterIP      172.20.0.1       <none>
ingress-nginx          ingress-nginx-controller                    LoadBalancer   172.20.159.87    a5e9bbca4786f4c6cac18d31a3eb
kube-system            kube-dns                                    ClusterIP      172.20.0.10      <none>
```

Or you can look at all available pods:



```
@workstation ~> kubectl get pods -A
NAMESPACE              NAME                                                READY   STATUS    RESTARTS   AGE
ack-lambda             ack-lambda-lambda-chart-766b8ccccc-67jv4            1/1     Running   0          4h36m
actions-runner-system  actions-runner-controller-6f6b9f7779-76llx          2/2     Running   0          4h33m
application            api-7c7dd87548-96qxn                                1/1     Running   0          101s
application            ui-7c98c4cbc4-qp5hx                                 1/1     Running   0          101s
argocd                 argocd-application-controller-0                     1/1     Running   0          4h36m
argocd                 argocd-applicationset-controller-5948c6fcfd-fbrc2   1/1     Running   0          4h36m
argocd                 argocd-dex-server-6b86858bcf-nrzxh                  1/1     Running   0          4h36m
argocd                 argocd-notifications-controller-5f9988f95b-6llnh    1/1     Running   0          4h36m
argocd                 argocd-redis-768fdd5d5f-b8twx                       1/1     Running   0          4h36m
argocd                 argocd-repo-server-df5856c5d-pjrsn                  1/1     Running   0          4h36m
argocd                 argocd-server-6fbf88bddf-ttv27                      1/1     Running   0          4h36m
cert-manager           cert-manager-775b85fc7f-5zj9v                       1/1     Running   0          4h36m
cert-manager           cert-manager-cainjector-7fb8f94b88-sknpg            1/1     Running   0          4h36m
cert-manager           cert-manager-webhook-cf766f96c-vjzh7                1/1     Running   0          4h36m
crd-helm-chart         k8s-action-runner-97cx8-h6vwl                       2/2     Running   0          3m28s
datadog                datadog-5t5t2                                       3/3     Running   0          4h35m
datadog                datadog-cluster-agent-8dd8946d6-nwgzx               1/1     Running   0          4h36m
datadog                datadog-qkhts                                       3/3     Running   0          4h35m
ingress-nginx          ingress-nginx-controller-5c799889bb-8l4rz           1/1     Running   0          4h36m
kube-system            aws-node-99r6l                                      1/1     Running   0          4h34m
kube-system            aws-node-mxd65                                      1/1     Running   0          4h34m
kube-system            coredns-7d4975775c-gcx5s                            1/1     Running   0          4h34m
kube-system            coredns-7d4975775c-gwngd                            1/1     Running   0          4h34m
kube-system            kube-proxy-gw8r8                                    1/1     Running   0          4h34m
kube-system            kube-proxy-tfsbr                                    1/1     Running   0          4h34m
```

As you can see all services and related pods are up and running.

Now you can not only get information but do stateful commands providing cluster configuration and resource changes.

We recommend you to learn this tool first as the primary control utility and then switch to third-party controls with the UI.

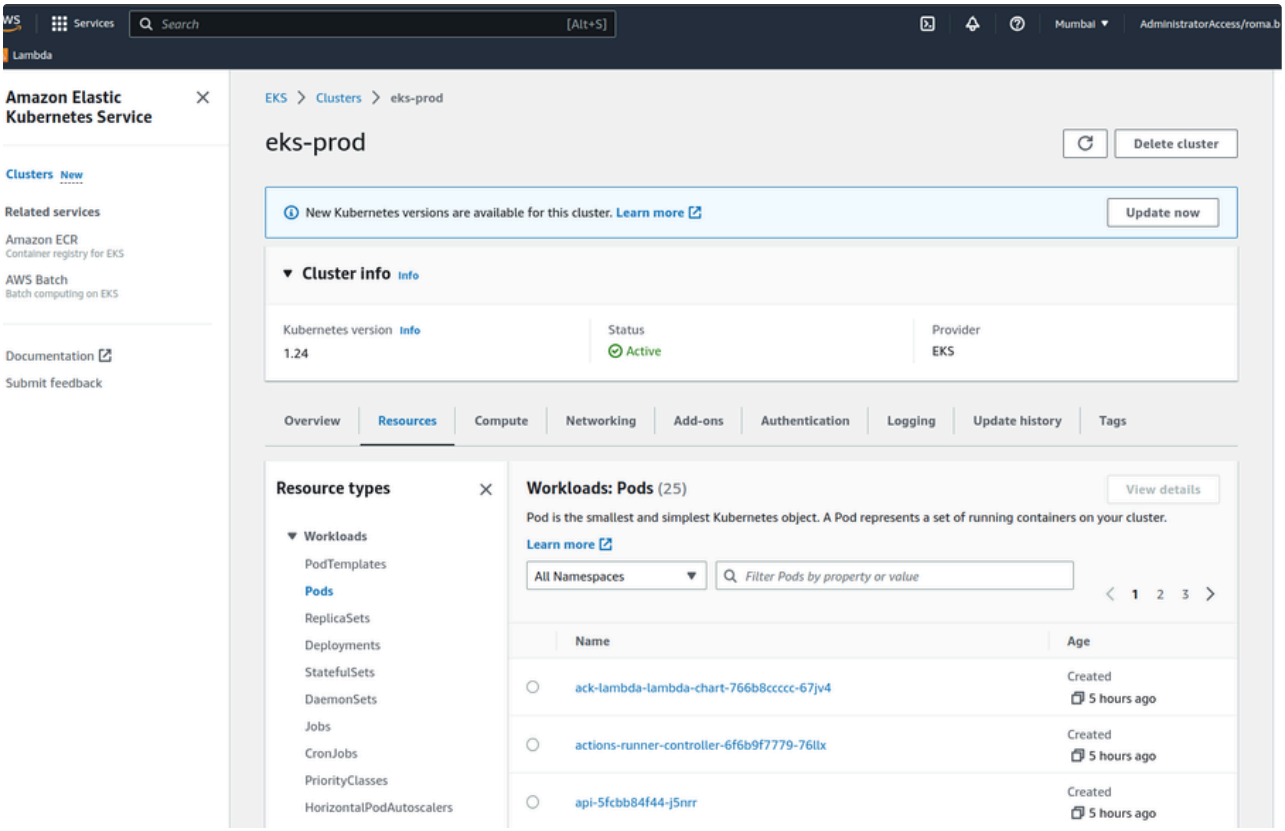
You can find out more about the kubectrl here:

Command line tool (kubectl)

Lets look at third-party control panels with the UI. We will consider AWS EKS control plane.

AWS EKS management console

Available at EKS → Clusters → eks-prod



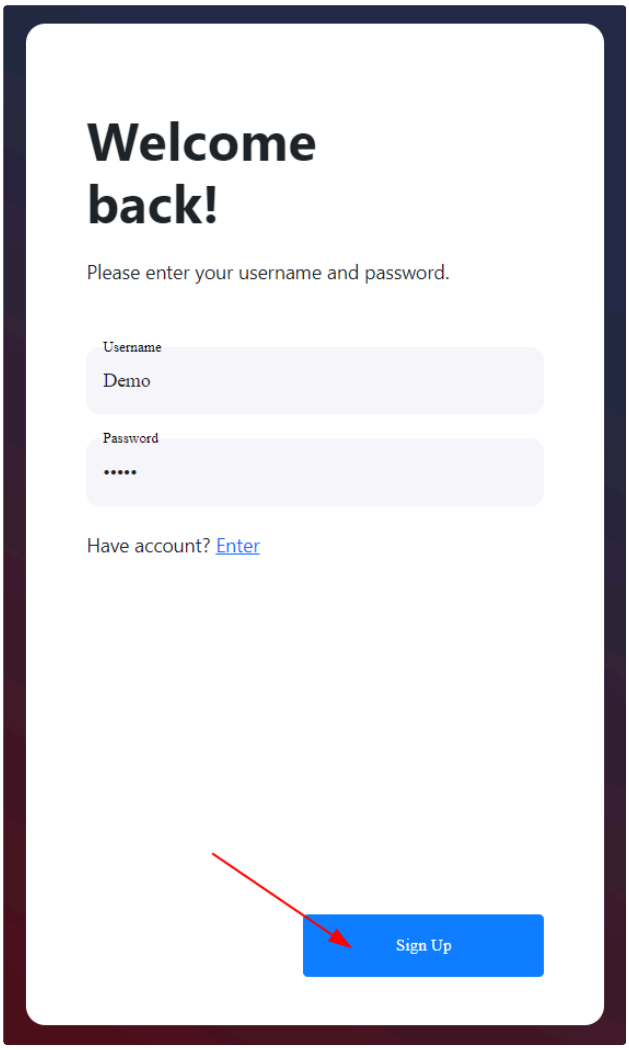
We will not dive into cluster management. Because it is a separate extensive topic. We've just shown you how you can integrate cluster management tools and have access to the cluster. Later in this section we will show you how to access logs and use console.

App functionality cycle.

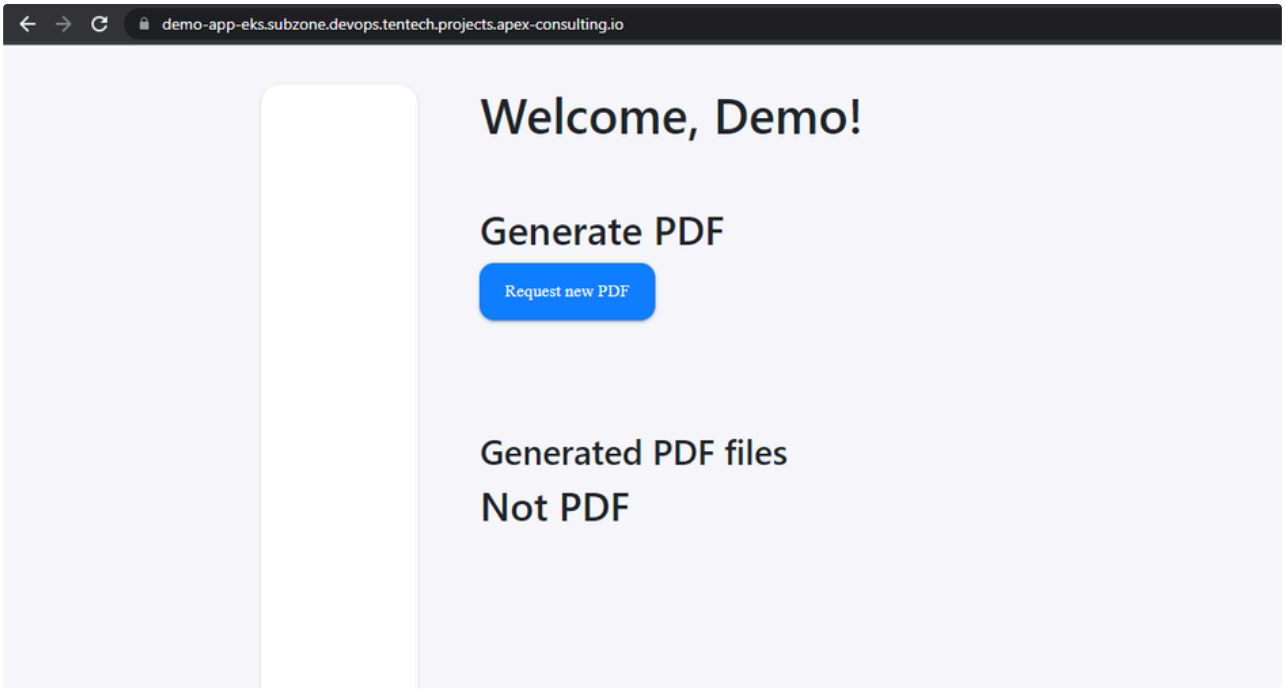
Now let's check functionality of our application and look how it works with objects and communicates with infrastructure components.

At first we need to sign-up.

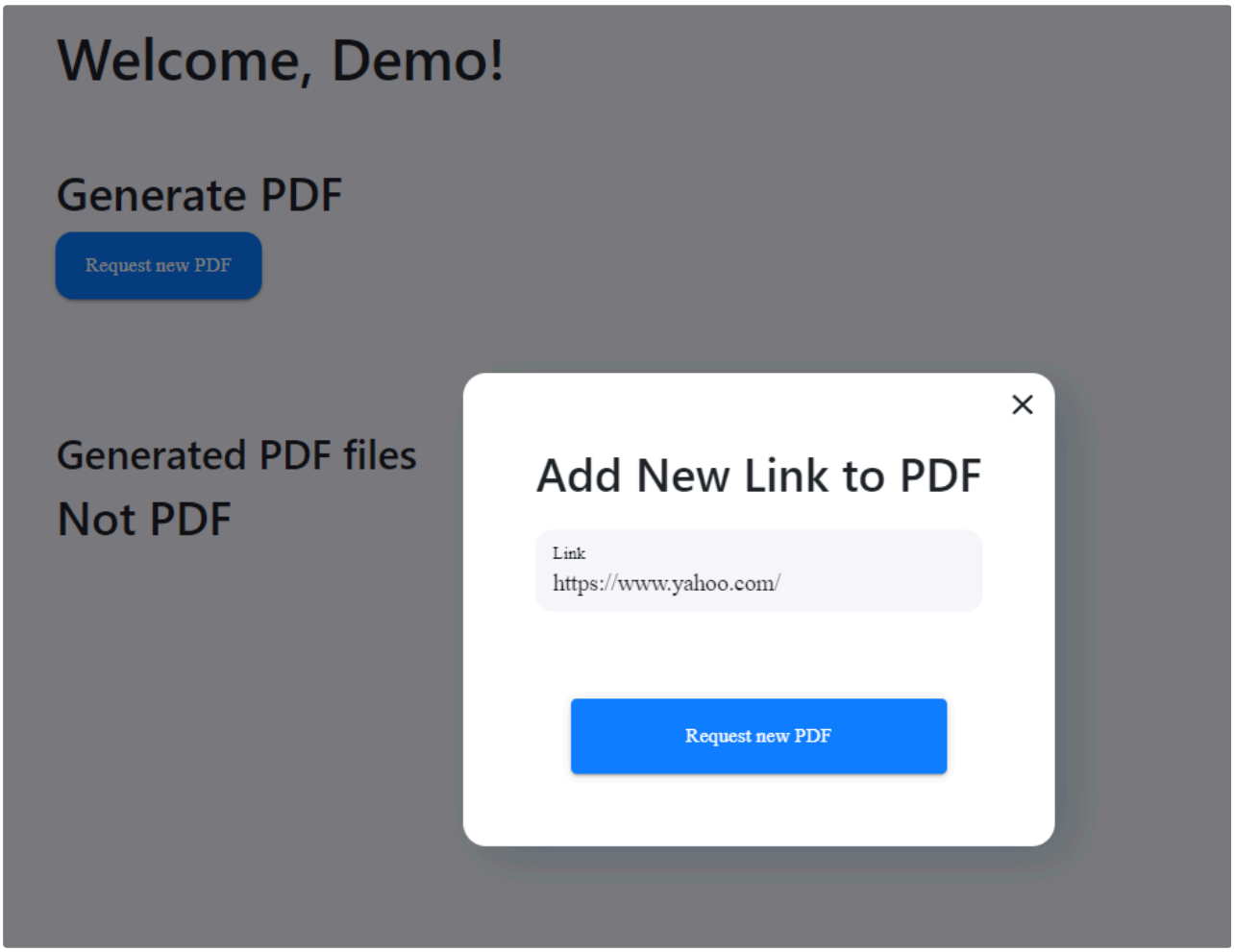
Press the sign-up button and proceed to the registration process.



Since it’s a learning project we aren’t using email auth. So after pressing sign-up button you will be redirected to sign-in. After signing in you will see the main page.

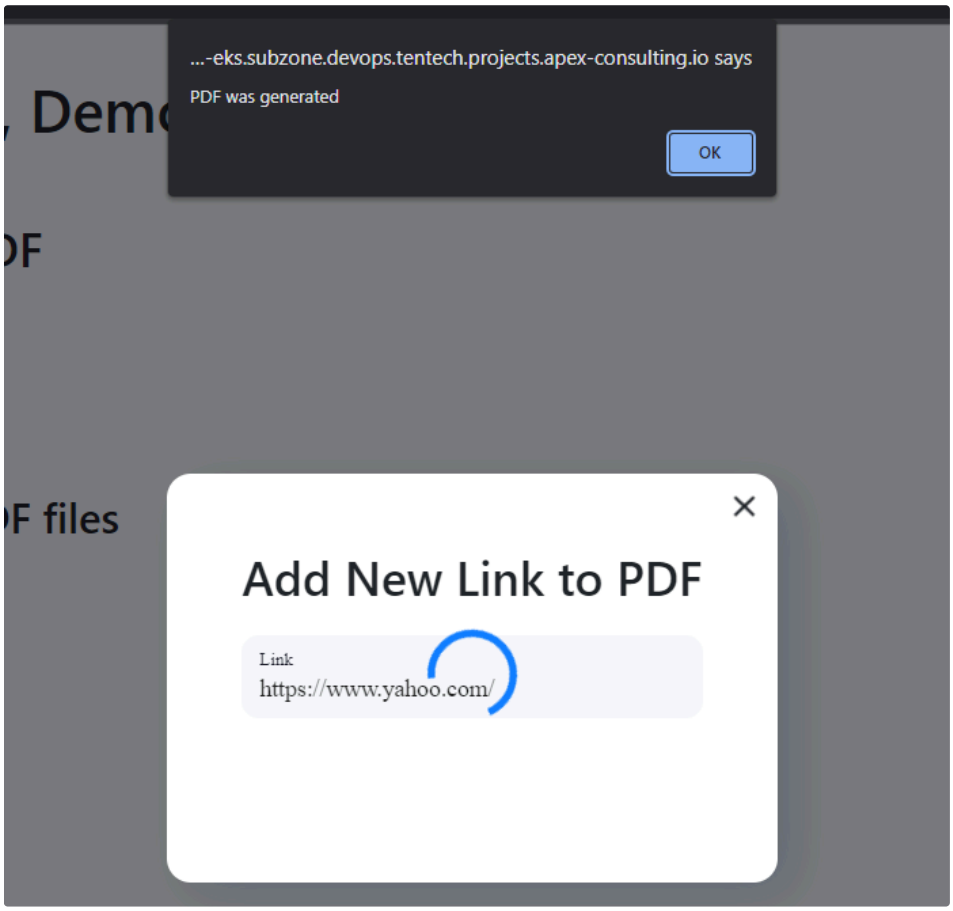


By pressing the Request button you will see the modal form where you can enter any URL for processing.

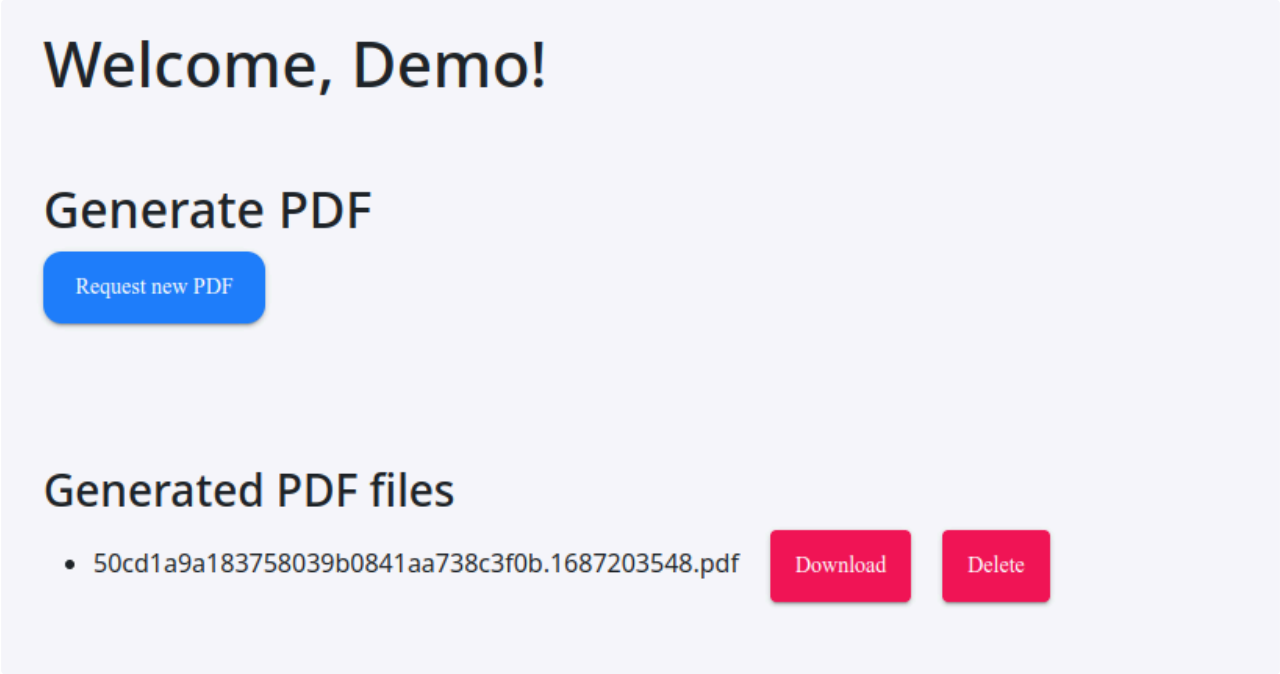


After pressing the request button of modal form the the backend will transfer this URL to SQS and then to Lambda until the PDF file will generated and stored to the S3 storage as along with name of this file which will stored to the DynamoDB database.

After all chain of actions performed by backend and Lambda function we will see the alert message.

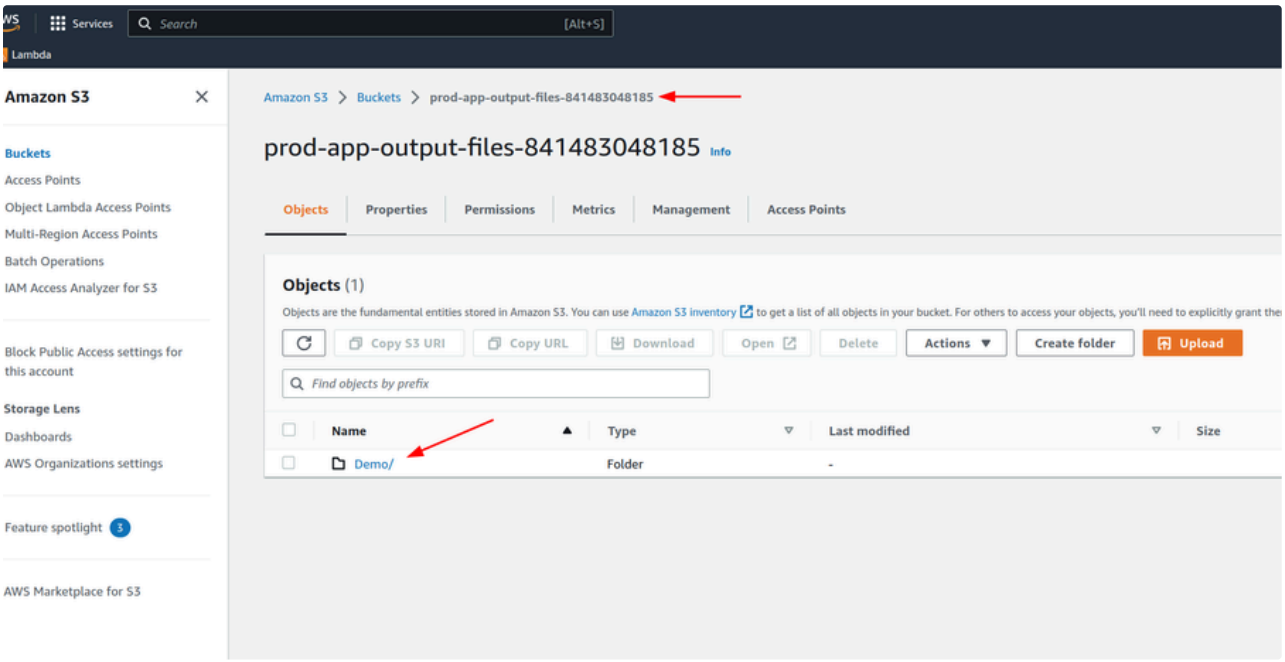


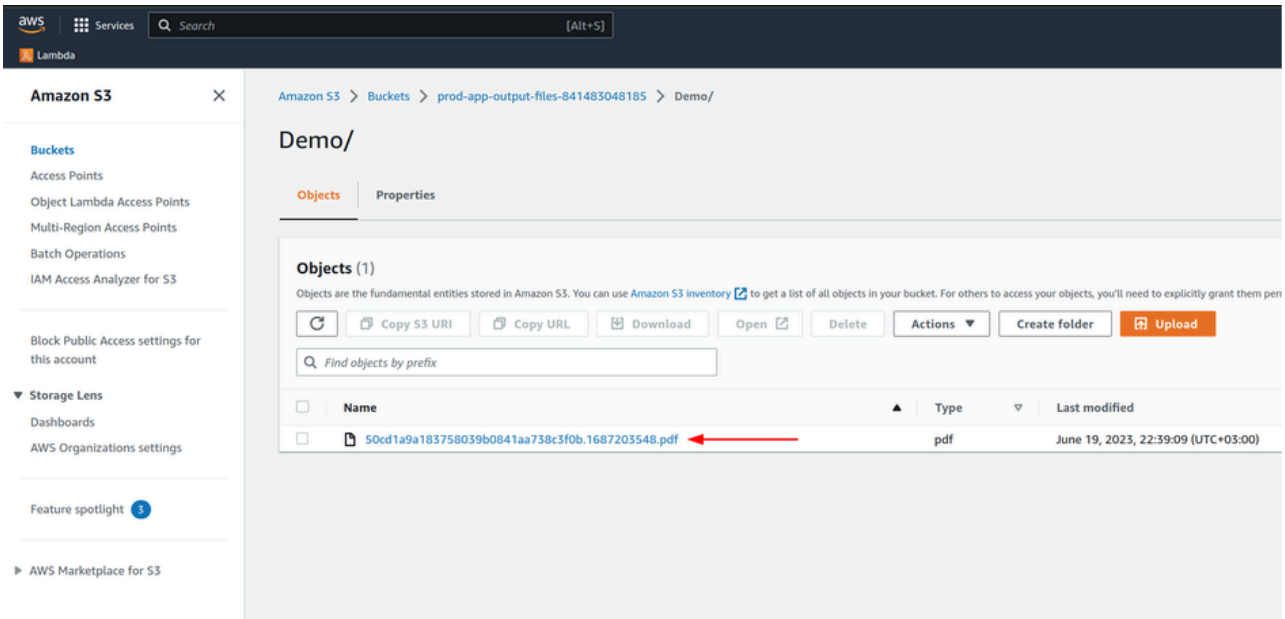
Then you will see the generated file in the list below.



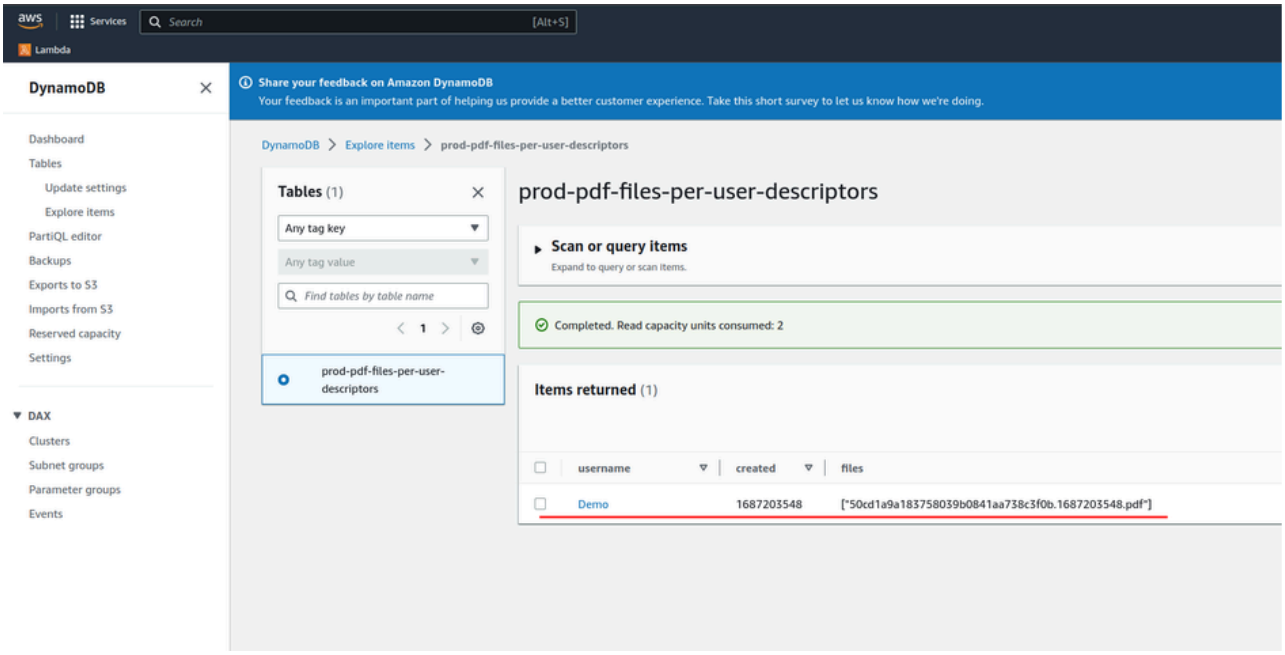
We can check where the related files and records are sored.

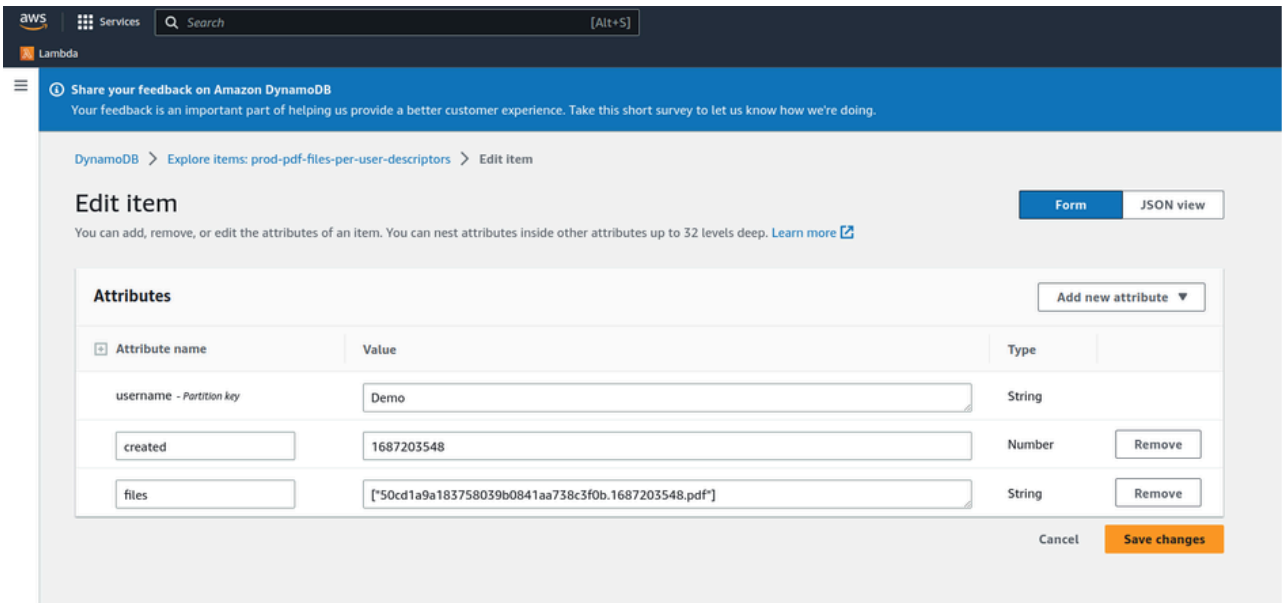
Here you can find generated files on the S3 bucket in the corresponding user folder:



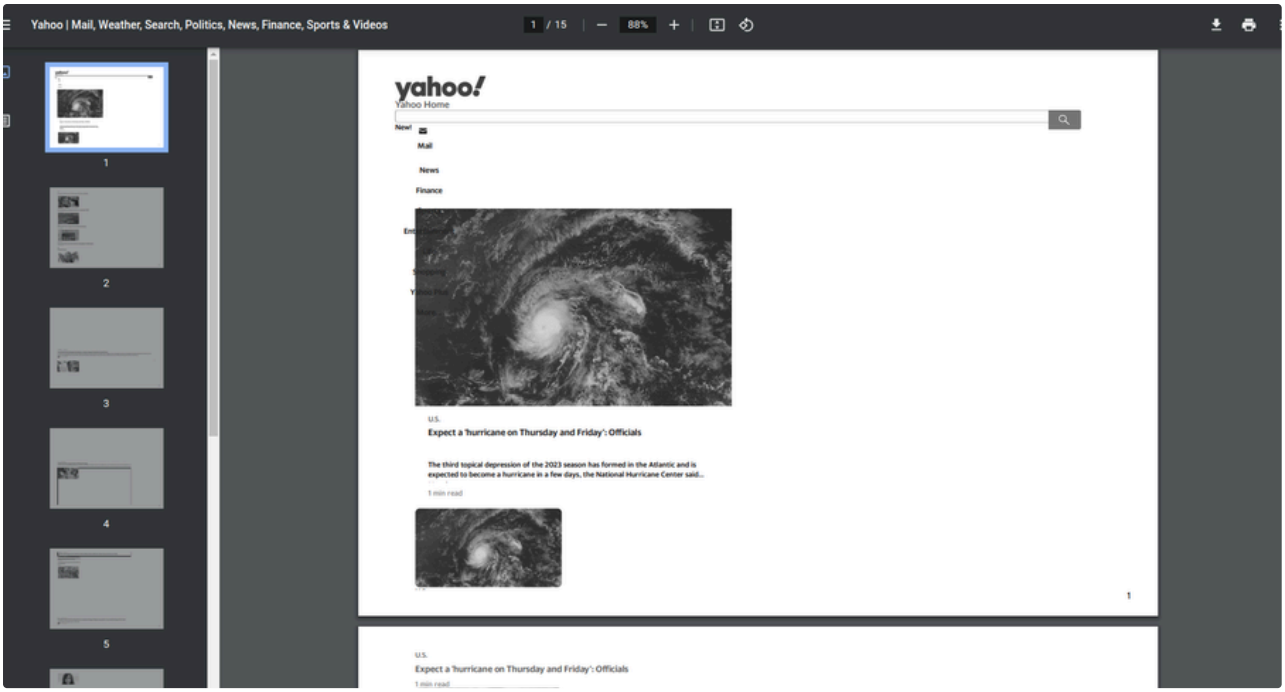


Also you can find the item with information about latest generated file by current user.





By pressing the download button the application should download it and we can how it looks.



By pressing the delete button the record will disappeared in the interface as well as S3 storage and databases.

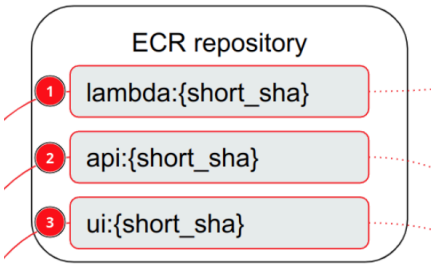
CI/CD

There are few options how you can trigger pipeline:

1. By commit

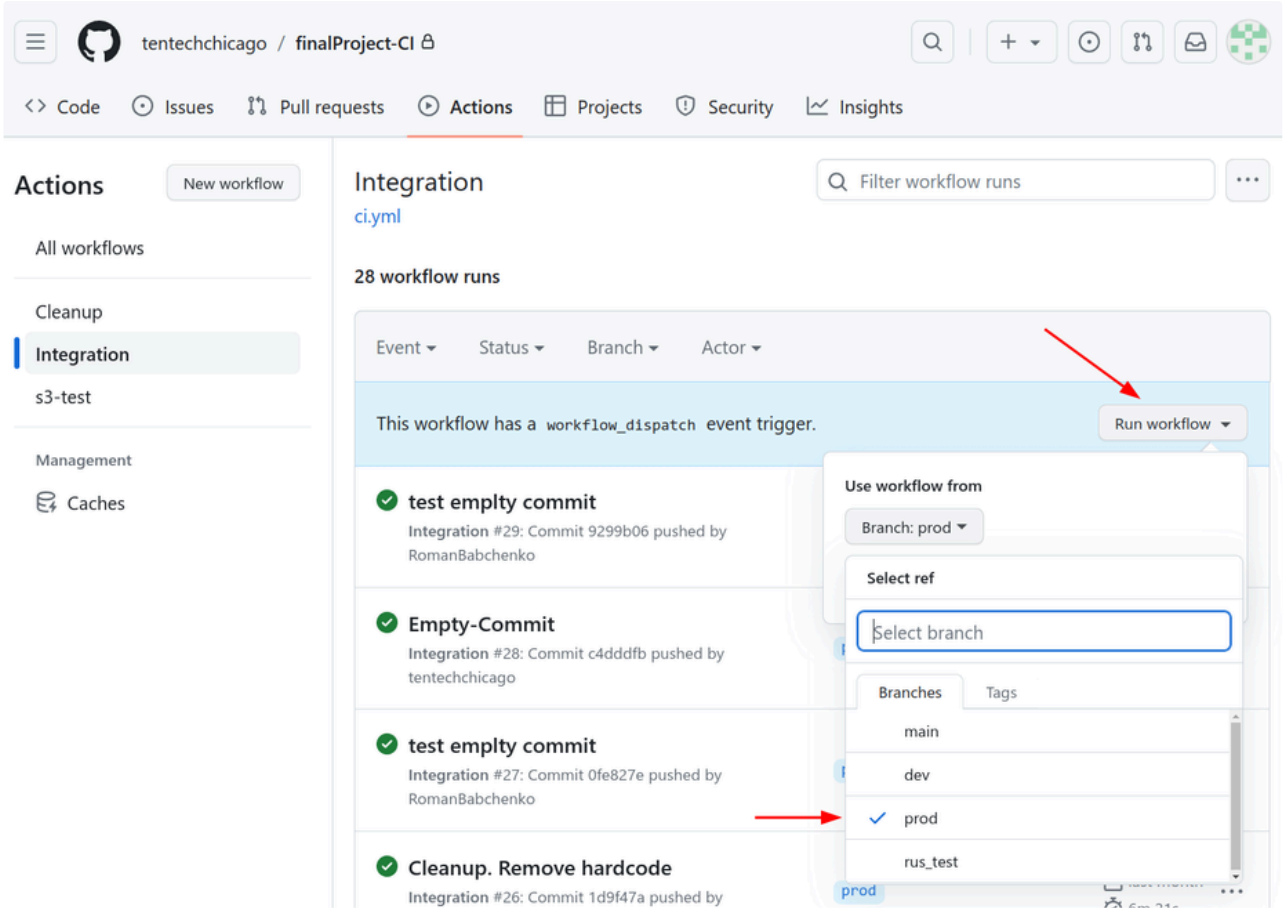
   Whenever you make changes to the code, commit and push those changes to the source repository, a workflow will be triggered. The CI pipeline within the workflow will then build new docker images for the lambda, API, and UI. These images will be tagged with the commit SHA to track their versions.

   Once the CD repository detects the new changes and tags, Argo CD will automatically initiate the continuous deployment process.



2. Manually

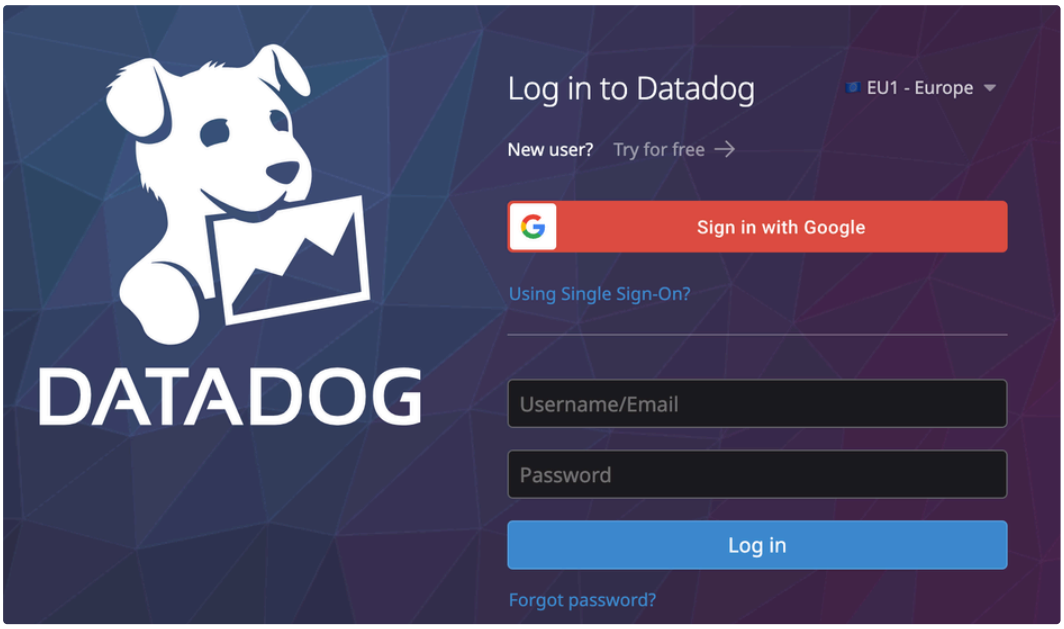
   If you manually run a workflow without any new commits, the docker image tags (short_sha) will remain the same as the previous version. Consequently, when the CI process is completed, the CD process will be skipped because there are no new short_sha values associated with the images. This method can be used for testing the CI or runner functionality or when the ECR repository is empty.



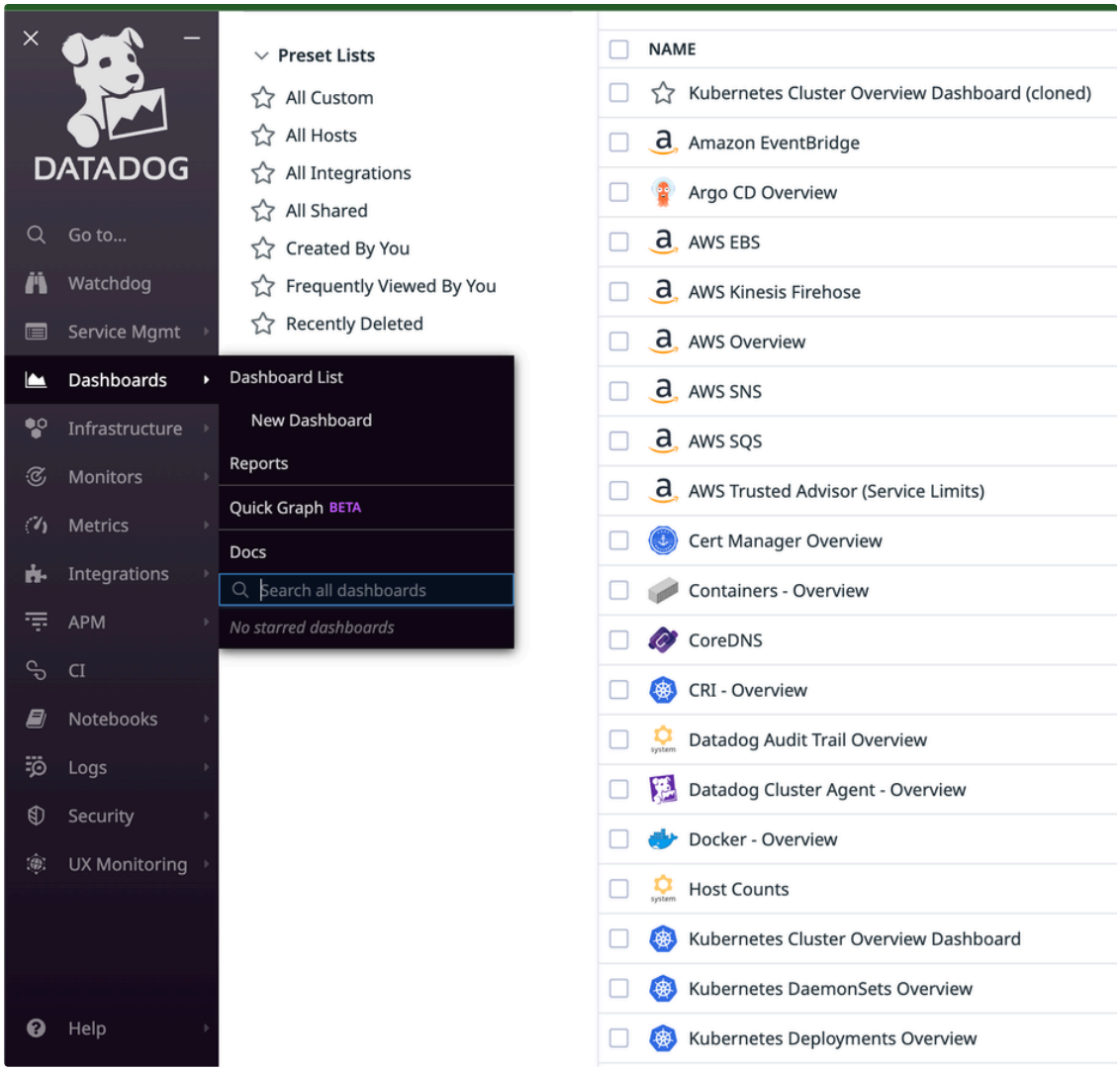
Monitoring

The valuable part of our infrastructure is monitoring.

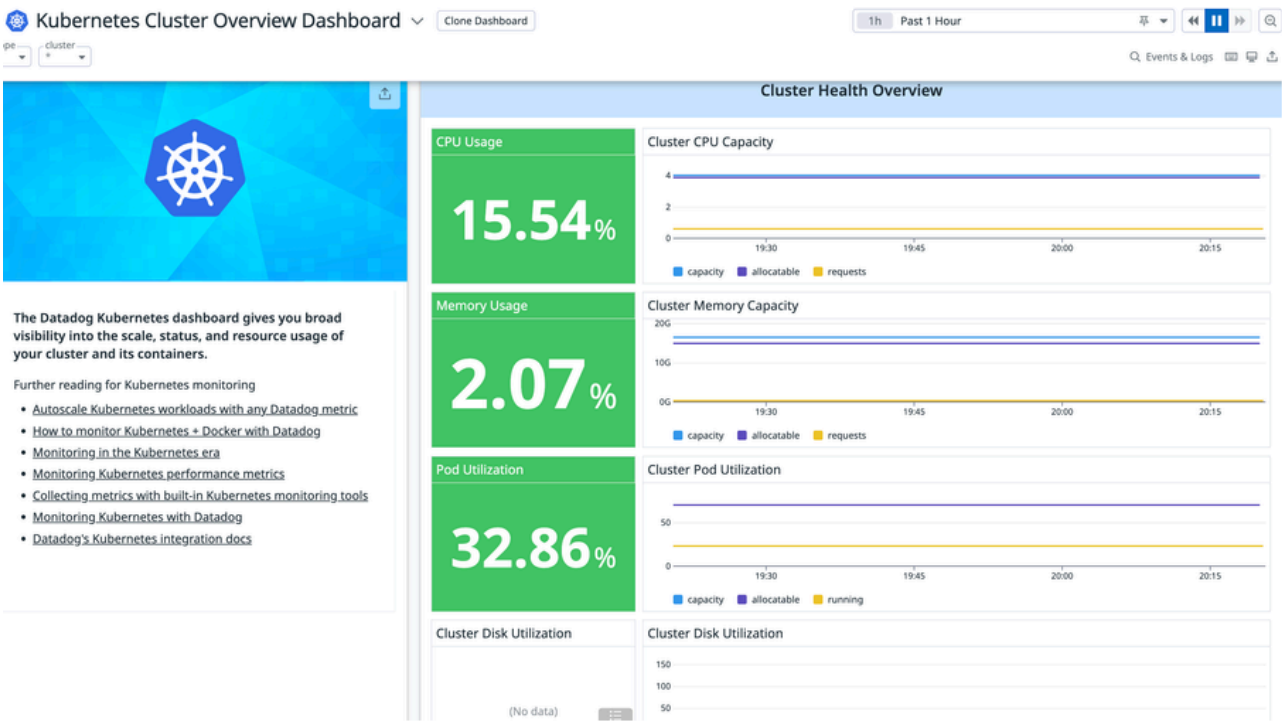
We use Datadog to collect AWS metrics and eks cluster metrics. Go to your datadog and log in

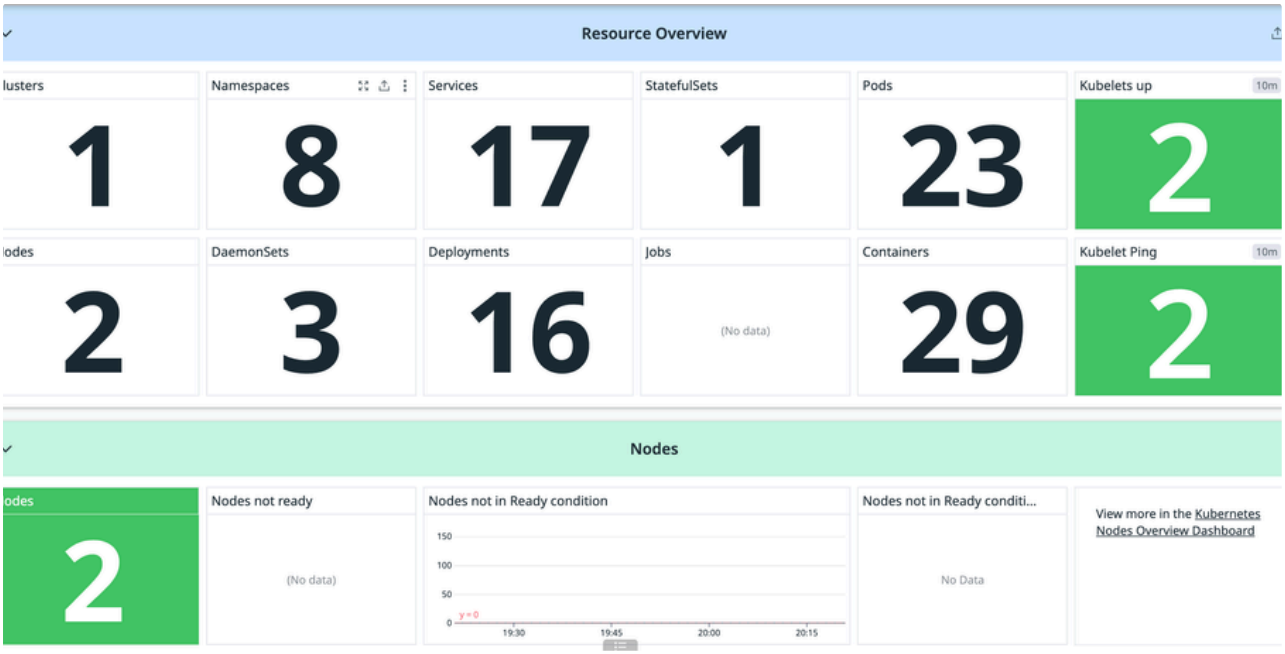


You can explore the AWS service or eks cluster metrics by choosing proper dashboard.



For example Kubernetes compute resouses:





There are many options that we recommend to explore for yourself.

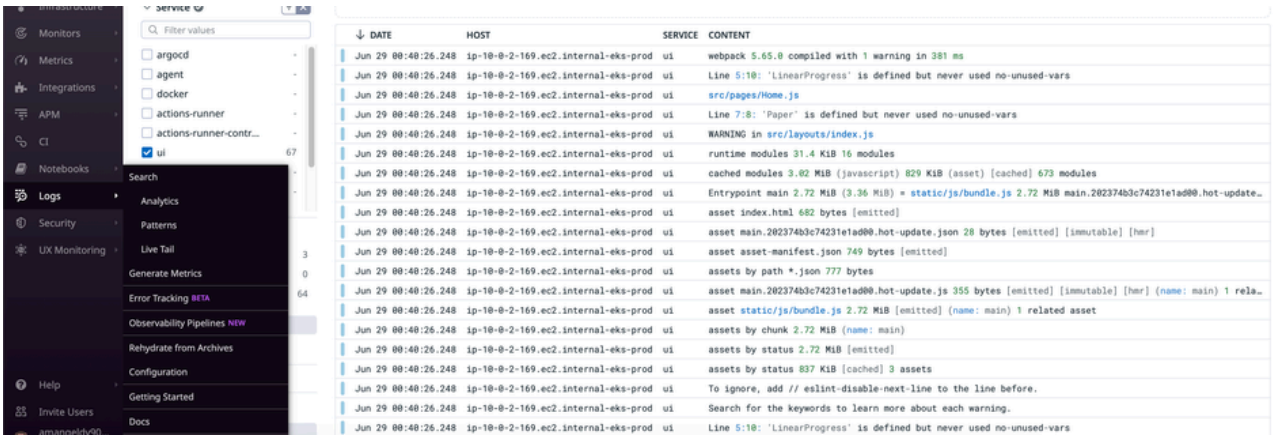
Logs

There are two main logs types in this project:

1. Application logs
2. Service logs

Application logs

You need to select the pod which you are interested in and select the appropriate item in the service menu. Then you will able to read log information on the right panel of the current screen.



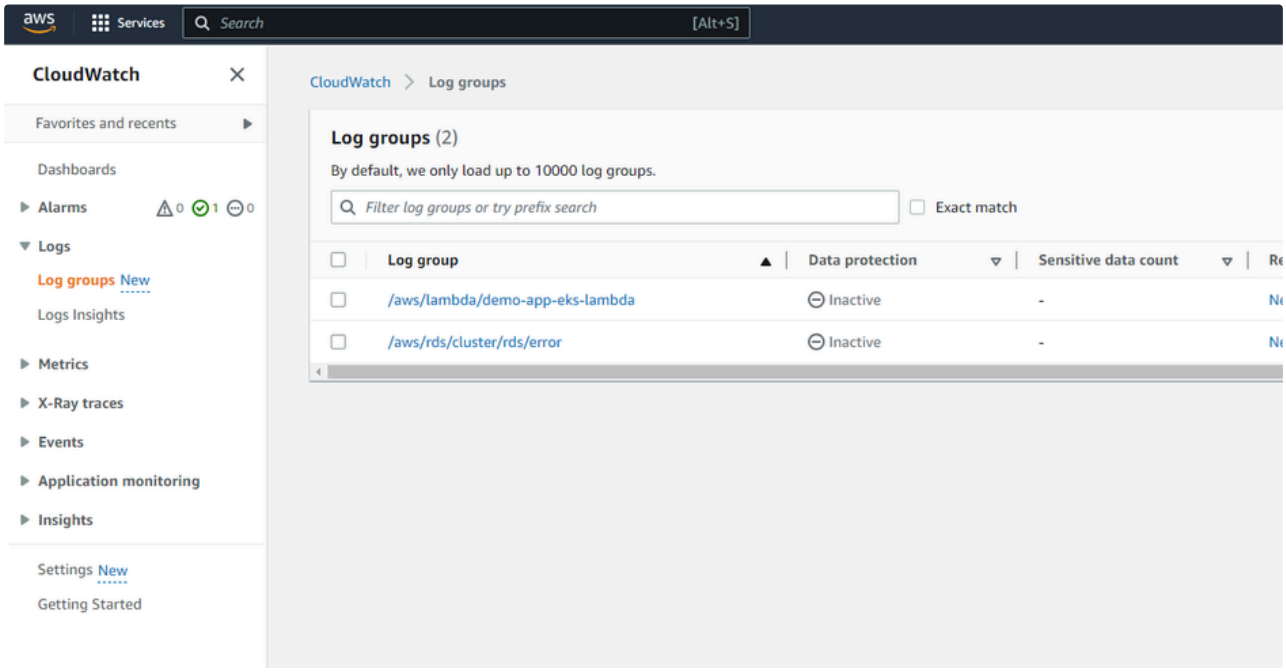
You can also view logs by using kubectl:

```
kubectl logs -n application api-5d9f7b7fc4-q846r
```

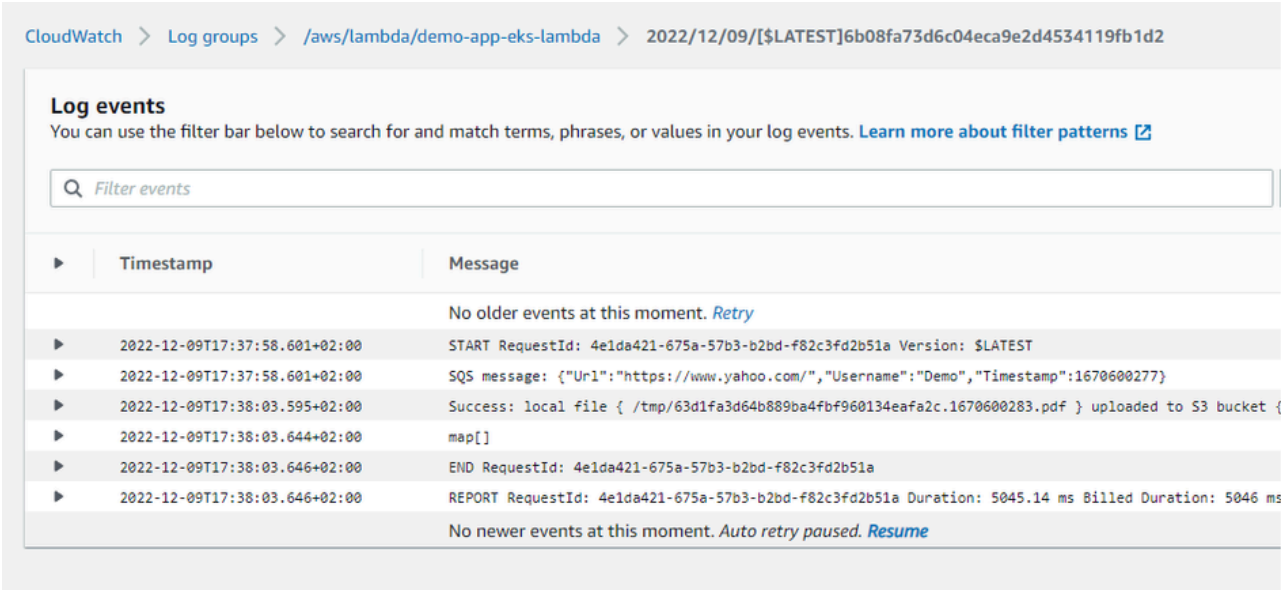
Service logs

These are Lambda and RDS logs which you can find here:

CloudWatch → Log groups



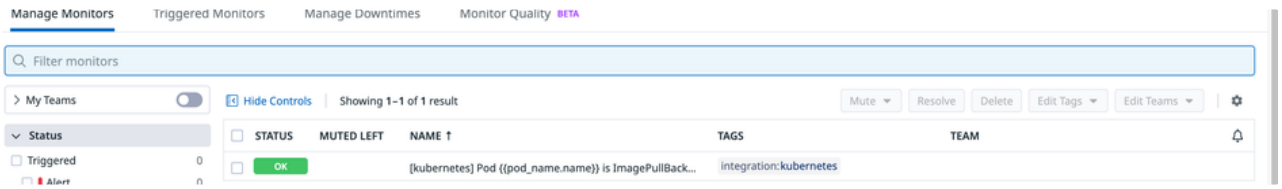
For example latest Lambda execution log:



Accident management (PagerDuty)

After successfully Datadog and PagerDuty integration in previous step.

Here how it looks after creation and everything is ok



But ic something goes wrong it will be like this

it will trigger pagerduty and you will receive alerts in pagerduty and sms/phone call