

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.

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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 resources, you need to provide credentials which can be found at your user's AWS control panel provided to you for this project.

[Roma](#)
[MFA devices](#)
[Sign out](#)

AWS Account (1)

devops-education.tentech.projects

#841483048185 | devops-education.tentech.projects@mail.vok-works.com

AdministratorAccess

[Management console](#) | [Command line or programmatic access](#)

Get credentials for AdministratorAccess

AWS account 841483048185 (devops-education.tentech.projects)

Use any of the following options to access AWS resources programmatically or from the AWS CLI. You can retrieve new credentials as often as needed. [Learn more](#)

macOS and Linux

Windows

PowerShell

Option 1: Set AWS environment variables

Option 1: Set AWS environment variables [Learn more](#)

```
export AWS_ACCESS_KEY_ID="ASIA44ISOMNT43Y2MDH4P"
export AWS_SECRET_ACCESS_KEY="djb6+gLnoge4rqTGD+Ev9UnatjEetThyc/fcJlpx"
export AWS_SESSION_TOKEN="IQeJbQJpZJLax2VjEDYx8GV1LWNTLseRyYVwrtH5JG8EQCTQ2xFJCCW+P6R9W8y6ME9zxy"
```

Option 2: Add a profile to your AWS credentials file

Paste the following text in your AWS credentials file (typically found at ~/.aws/credentials). [Learn more](#)

```
[841483048185_AdministratorAccess]
aws_access_key_id = ASIA44ISOMNT43Y2MDH4P
aws_secret_access_key = djb6+gLnoge4rqTGD+Ev9UnatjEetThyc/fcJlpx
aws_session_token = IQeJbQJpZJLax2VjEDYx8GV1LWNTLseRyYVwrtH5JG8EQCTQ2xFJCCW+P6R9W8y6ME9zxy
```

Option 3: Use individual values in your AWS service client ([Learn more](#))

AWS Access Key Id

ASIA44ISOMNT43Y2MDH4P

Copy

AWS Secret access key

djb6+gLnoge4rqTGD+Ev9UnatjEetThyc/fcJlpx

Copy

AWS session token

IQeJbQJpZJLax2VjEDYx8GV1LWNTLseRyYVwrtH5JG8EQCTQ2xFJCCW+P6R9W8y6ME9zxy

Copy

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="ASIA44ISOMNT43Y2MDH4P"
> export AWS_SECRET_ACCESS_KEY="djb6+gLnoge4rqTGD+Ev9UnatjEetThyc/fcJlpx"
> export AWS_SESSION_TOKEN="IQeJbQJpZJLax2VjEDYx8GV1LWNTLseRyYVwrtH5JG8EQCTQ2xFJCCW+P6R9W8y6ME9zxy"
```

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

After that we can connect our cluster with the `kubect` 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](#)

```
@workstation ~-> aws eks --region ap-south-1 update-kubeconfig --name eks-prod --profile AdministratorAccess-841483048185
Updated context arn:aws:eks:ap-south-1:841483048185:cluster/eks-prod in /home/roman/.kube/config
@workstation ~->
```

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

```
> kubectl config view
```

```
1  apiVersion: v1
2  clusters:
3  - cluster:
4    certificate-authority-data: DATA+OMITTED
5    server: https://C4A18BE5E95FE9BFAD842B90713638BE.gr7.ap-south-1.eks.amazonaws.com
6    name: arn:aws:eks:ap-south-1:841483048185:cluster/demo-app-eks-eks-cluster
7  - cluster:
8    certificate-authority-data: DATA+OMITTED
9    server: https://10.193.2.1/k8s/clusters/c-m-lktwgdmc
10   name: dbpaas
11 contexts:
12 - context:
13   cluster: arn:aws:eks:ap-south-1:841483048185:cluster/demo-app-eks-eks-cluster
14   user: arn:aws:eks:ap-south-1:841483048185:cluster/demo-app-eks-eks-cluster
15   name: arn:aws:eks:ap-south-1:841483048185:cluster/demo-app-eks-eks-cluster
16 - context:
17   cluster: dbpaas
18   user: dbpaas
19   name: dbpaas
20 current-context: arn:aws:eks:ap-south-1:841483048185:cluster/demo-app-eks-eks-cluster
21 kind: Config
22 preferences: {}
23 users:
24 - name: arn:aws:eks:ap-south-1:841483048185:cluster/demo-app-eks-eks-cluster
25   user:
26     exec:
27       apiVersion: client.authentication.k8s.io/v1beta1
28       args:
29         - --region
30         - ap-south-1
31         - eks
32         - get-token
33         - --cluster-name
34         - demo-app-eks-eks-cluster
35       command: aws
36       env: null
37       interactiveMode: IfAvailable
38       provideClusterInfo: false
39 - name: dbpaas
40   user:
41     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	a5e9bbca4786f4c6cac18d31a3e...
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-766b8cccc-67jv4	1/1	Running	0	4h36m
actions-runner-system	actions-runner-controller-6f6b9f779-76llx	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-fbr2	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 kubectl 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

The screenshot shows the Amazon Elastic Kubernetes Service (EKS) console for the 'eks-prod' cluster. The cluster is in an 'Active' state with Kubernetes version 1.24. The 'Resources' tab is selected, showing a list of workloads (Pods). The workloads listed are:

Name	Age
ack-lambda-lambda-chart-766b8cccc-67jv4	Created 5 hours ago
actions-runner-controller-6f6b9f7779-76ltx	Created 5 hours ago
api-5fcb84f44-j5nrr	Created 5 hours ago

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.

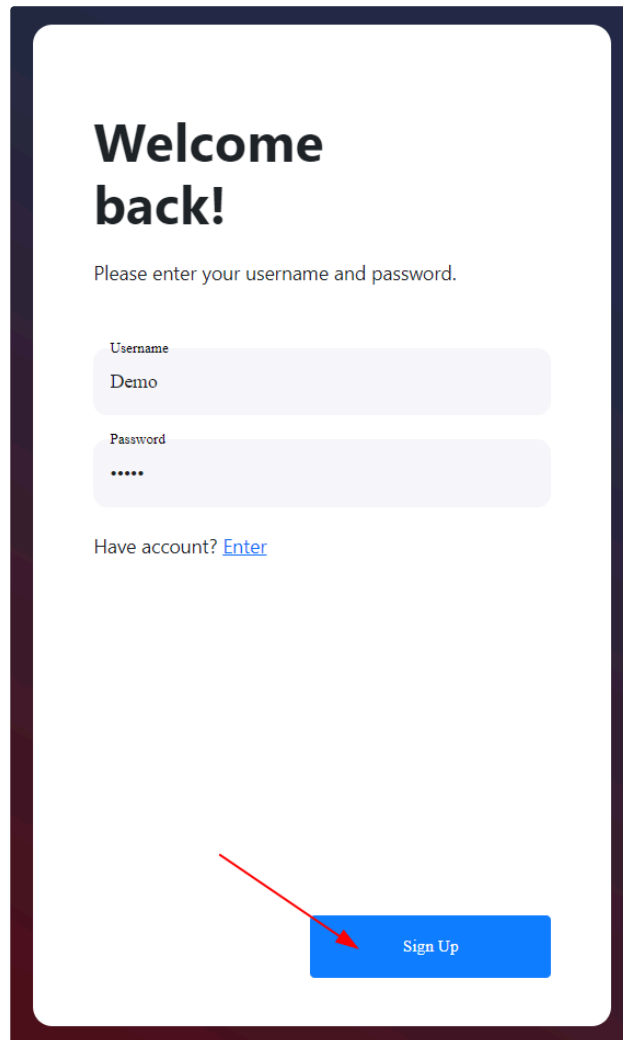
App functionality cycle.

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.

The image shows a promotional banner for TEN TEK V2. The banner includes the text 'TEN TEK V2' at the top, a 'Welcome back!' message, and a login form with 'Username' and 'Password' fields. Below the login form is a 'Sign up' link. At the bottom of the banner, it says 'JULY 11 - NEW BATCH IS COMING' and 'REGISTER AT WWW.TNTK.IO'.

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



Welcome back!

Please enter your username and password.

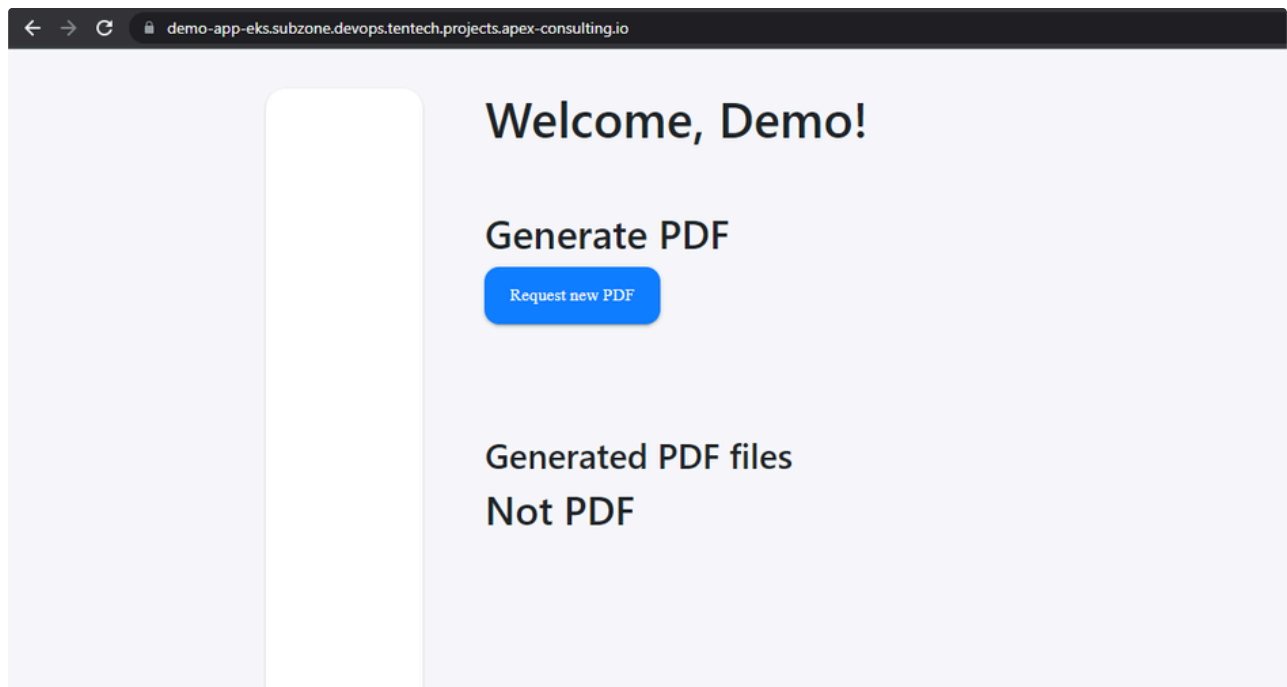
Username
Demo

Password

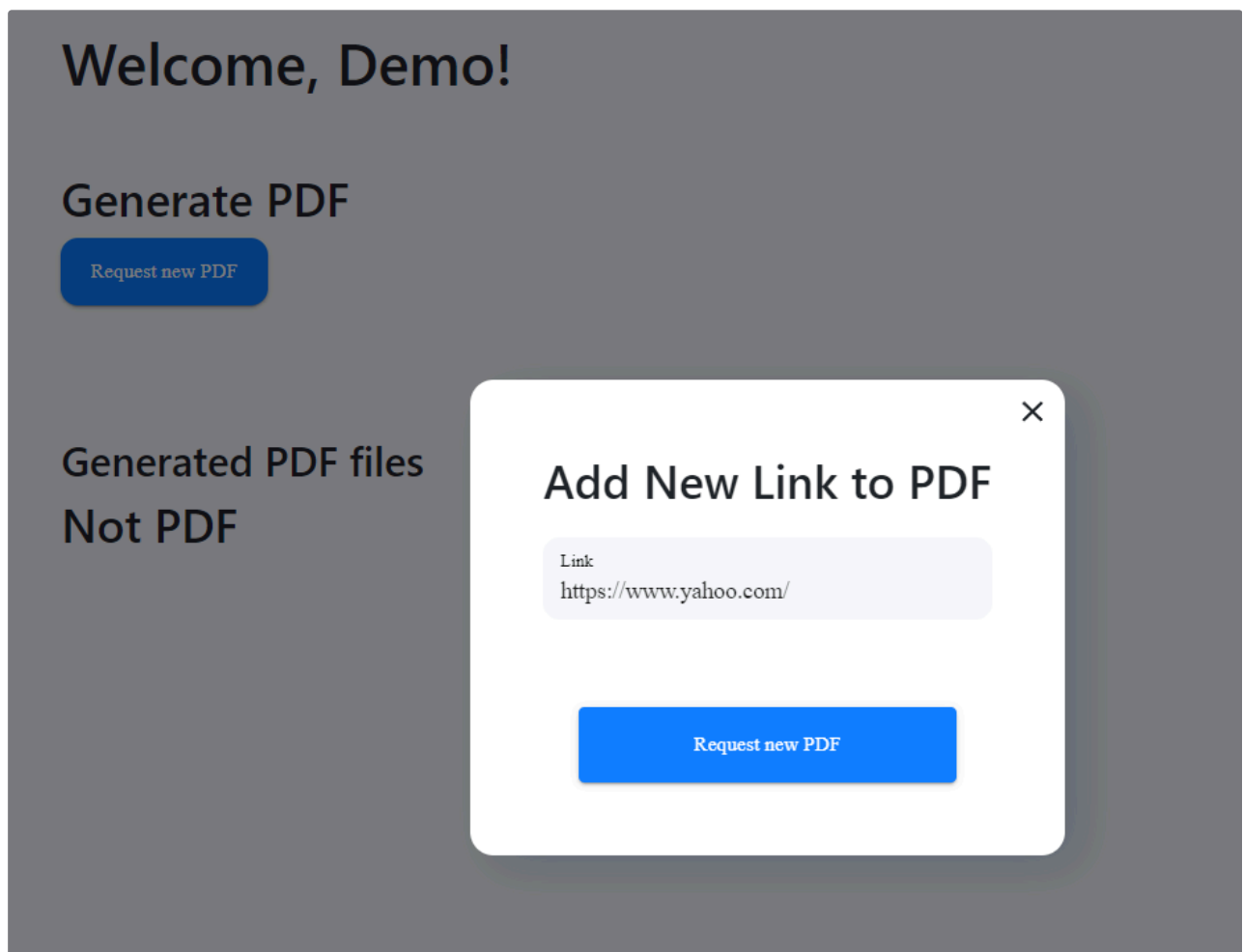
Have account? [Enter](#)

[Sign Up](#)

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.

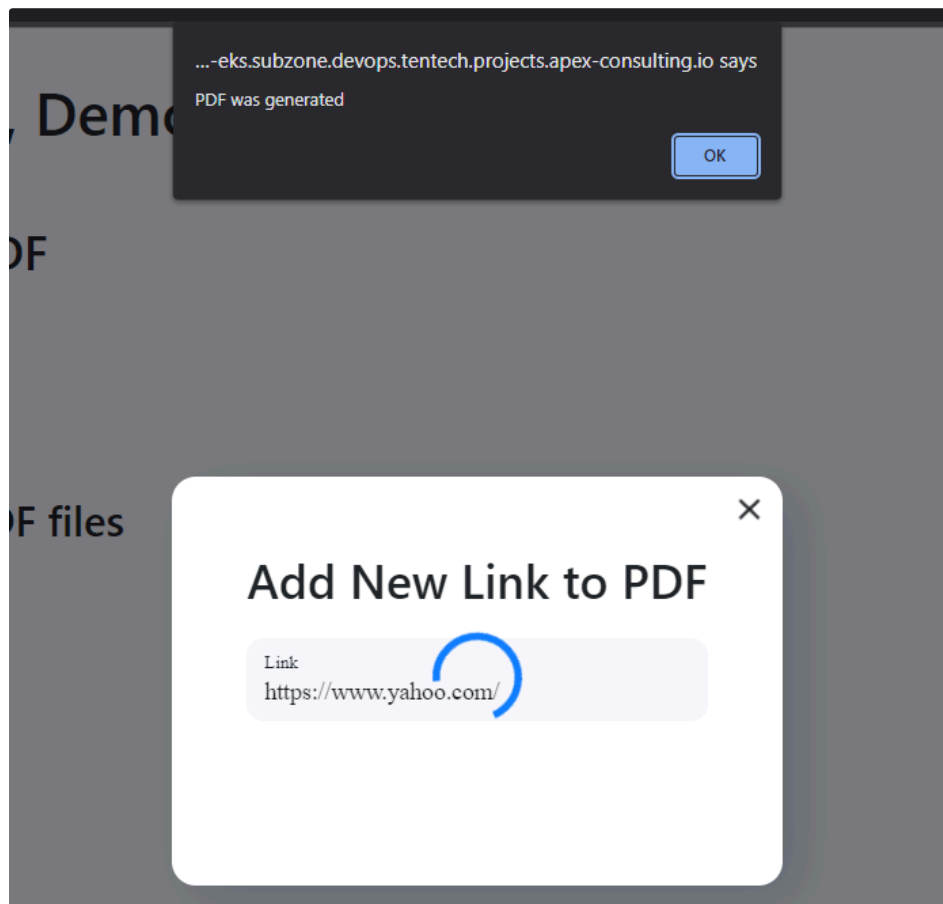


By pressing the Request button you will see the modal form where you can enter any URL for processing.

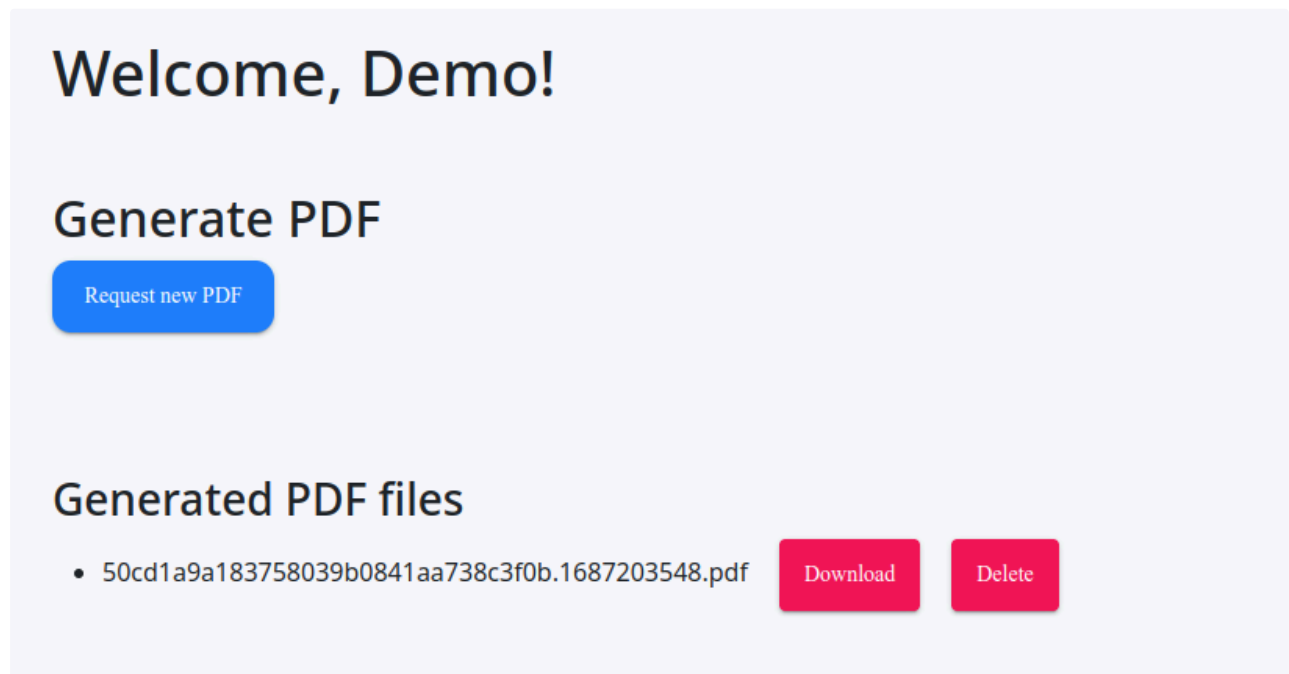


After pressing the request button of modal form the the backend will transfer this URL to SQS and then to Lambda until the PDF file will generated and stored to the S3 storage as along with name of this file which will stored to the DynamoDB database.

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

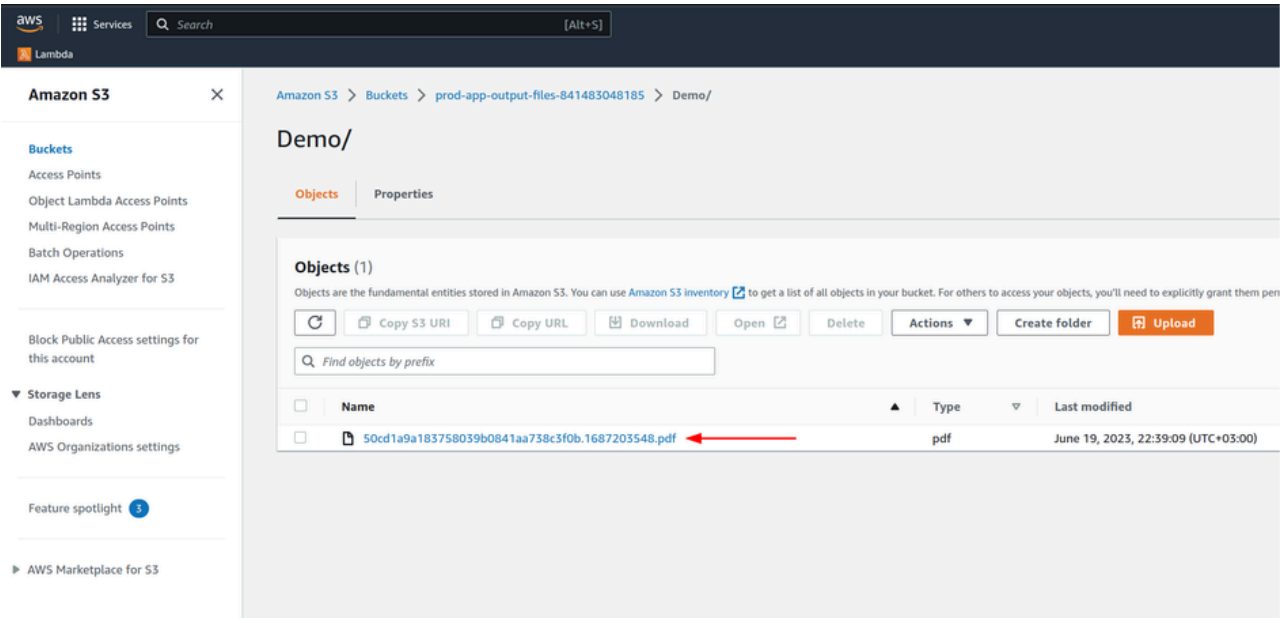
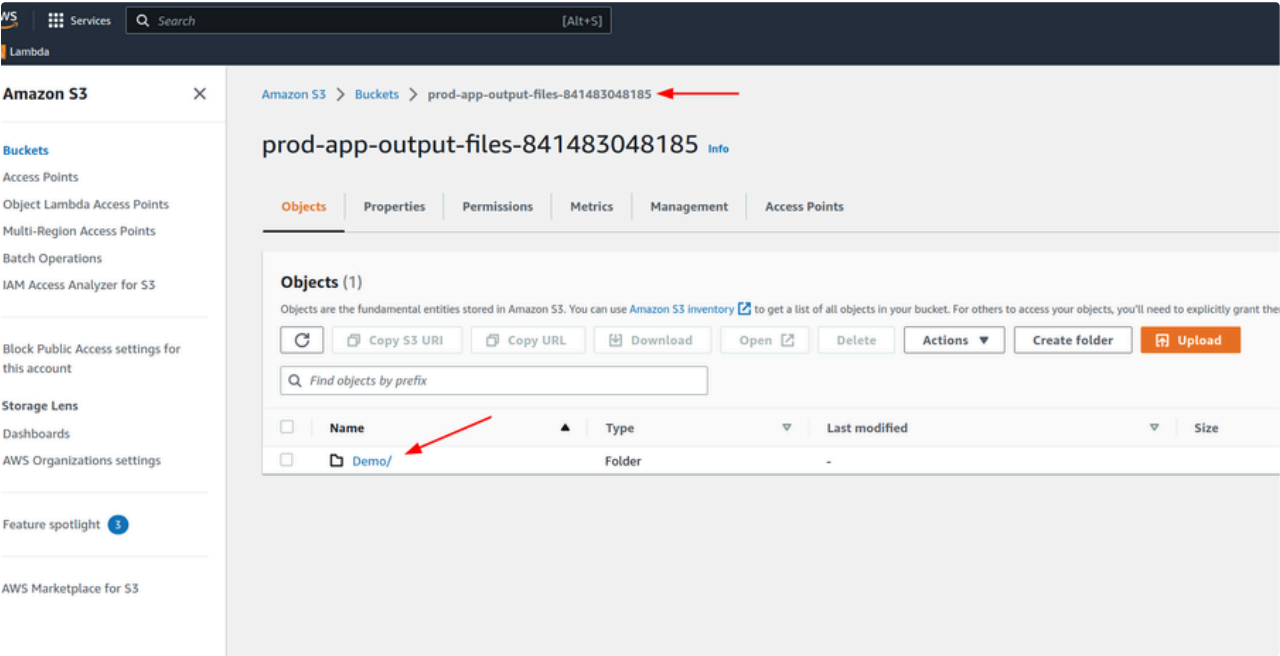


Then you will see the generated file in the list below.



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

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.

aws Services Search [Alt+S]

Lambda

DynamoDB ×

Share your feedback on Amazon DynamoDB
Your feedback is an important part of helping us provide a better customer experience. Take this short survey to let us know how we're doing.

DynamoDB > Explore items > prod-pdf-files-per-user-descriptors

Tables (1) ×

Any tag key ▾

Any tag value ▾

Find tables by table name

< 1 > ⌕

prod-pdf-files-per-user-descriptors

prod-pdf-files-per-user-descriptors

▶ Scan or query items
Expand to query or scan items.

✔ Completed. Read capacity units consumed: 2

Items returned (1)

<input type="checkbox"/>	username ▾	created ▾	files
<input type="checkbox"/>	Demo	1687203548	["50cd1a9a183758039b0841aa738c3f0b.1687203548.pdf"]

aws Services Search [Alt+S]

Lambda

Share your feedback on Amazon DynamoDB
Your feedback is an important part of helping us provide a better customer experience. Take this short survey to let us know how we're doing.

DynamoDB > Explore items: prod-pdf-files-per-user-descriptors > Edit item

Edit item

You can add, remove, or edit the attributes of an item. You can nest attributes inside other attributes up to 32 levels deep. [Learn more](#)

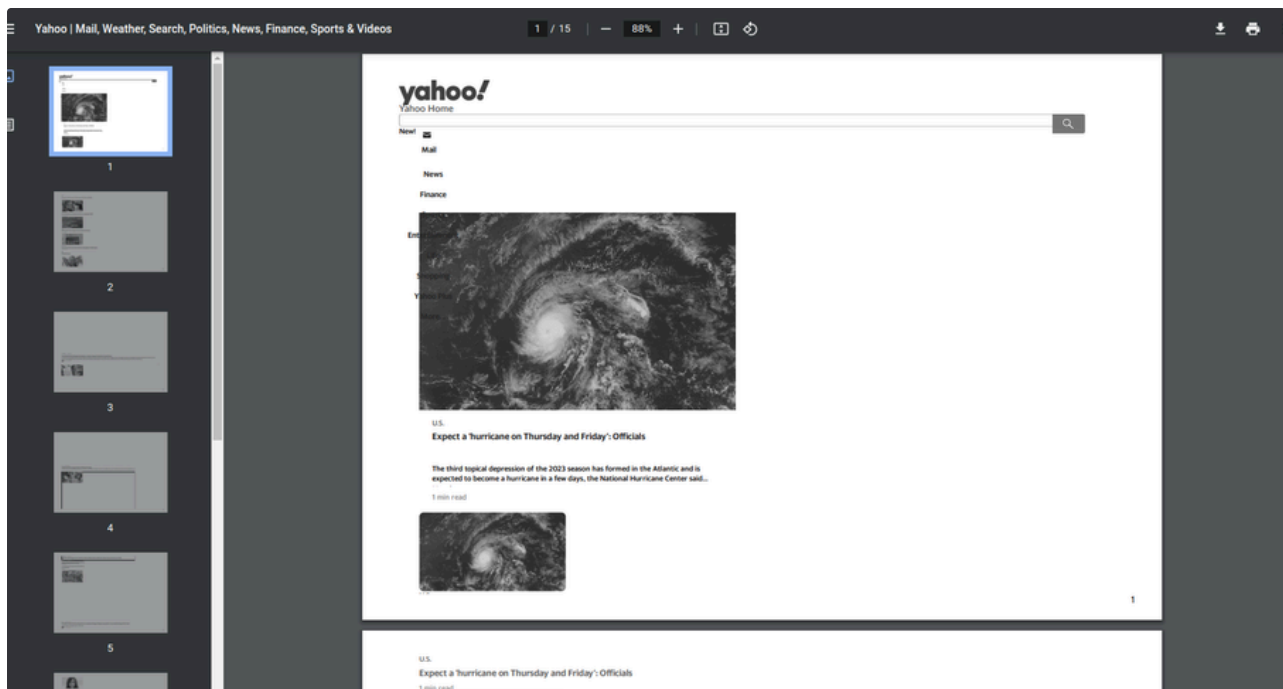
Form JSON view

Attributes Add new attribute ▾

Attribute name	Value	Type	
username - Partition key	Demo	String	
created	1687203548	Number	Remove
files	["50cd1a9a183758039b0841aa738c3f0b.1687203548.pdf"]	String	Remove

Cancel Save changes

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.

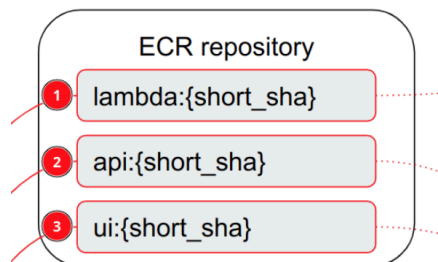
CI/CD

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

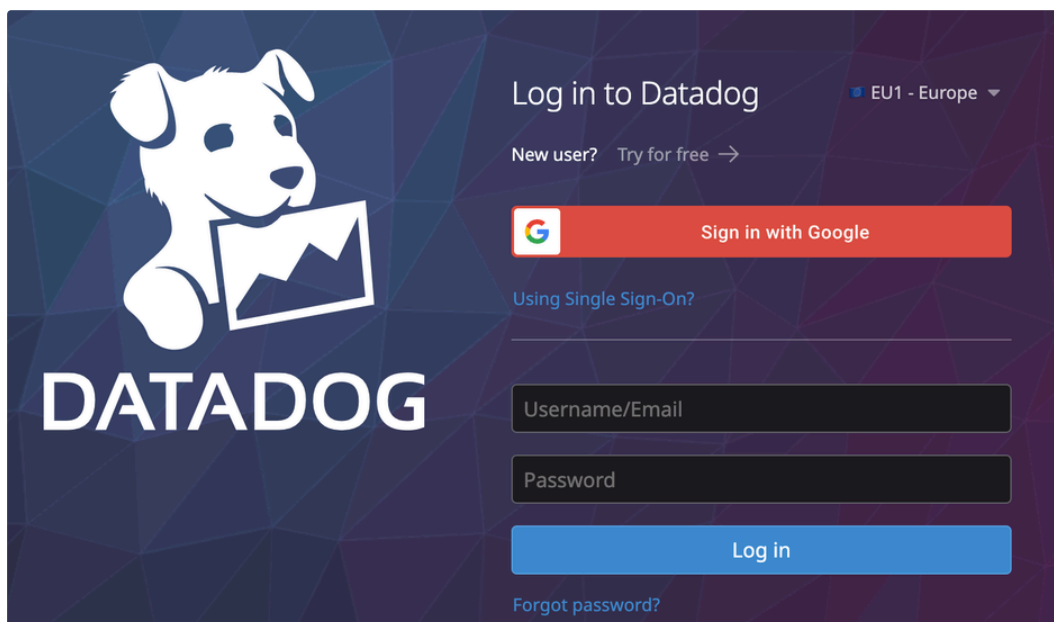
If you manually run a workflow without any new commits, the docker image tags (short_sha) will remain the same as the previous version. Consequently, when the CI process is completed, the CD process will be skipped because there are no new short_sha values associated with the images. This method can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

The screenshot shows the GitHub Actions interface for a repository named 'tentechchicago / finalProject-Cl'. The 'Actions' tab is selected, displaying a list of workflow runs under the 'Integration' workflow. The runs include 'test empty commit', 'Empty-Commit', and 'Cleanup. Remove hardcoded'. A red arrow points to the 'Run workflow' button in the top right corner. Another red arrow points to the 'prod' branch in the 'Select ref' dropdown menu.

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.

DATADOG

Go to...

Watchdog

Service Mgmt

Dashboards

Infrastructure

Monitors

Metrics

Integrations

APM

CI

Notebooks

Logs

Security

UX Monitoring

Help

▼ Preset Lists

- ☆ All Custom
- ☆ All Hosts
- ☆ All Integrations
- ☆ All Shared
- ☆ Created By You
- ☆ Frequently Viewed By You
- ☆ Recently Deleted

Dashboard List

New Dashboard

Reports

Quick Graph **BETA**

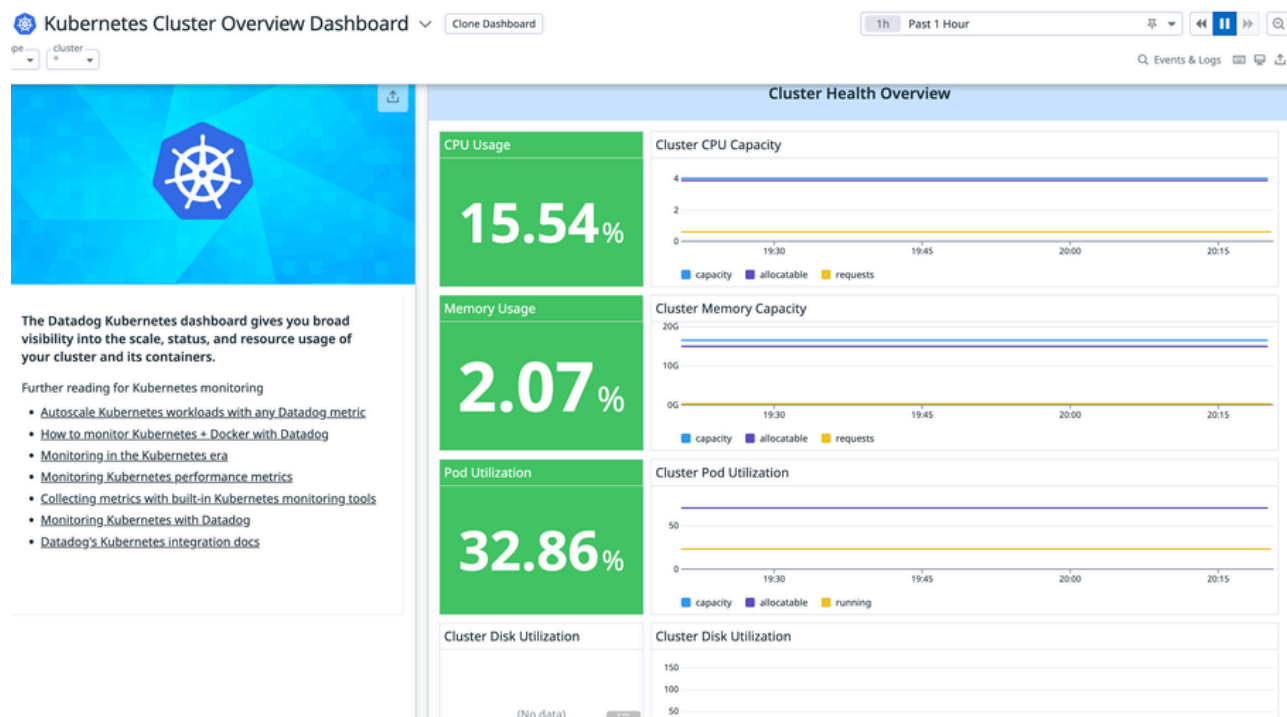
Docs

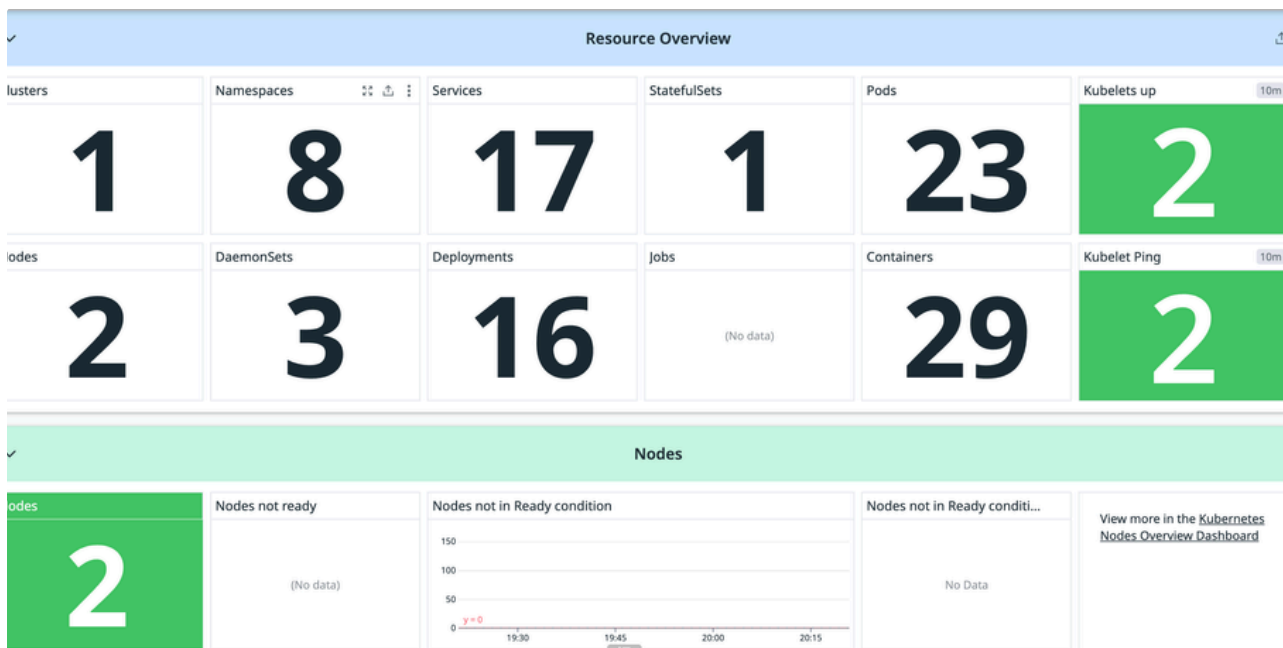
Search all dashboards

No starred dashboards

- ☐ NAME
- ☐ ☆ Kubernetes Cluster Overview Dashboard (cloned)
- ☐ Amazon EventBridge
- ☐ Argo CD Overview
- ☐ AWS EBS
- ☐ AWS Kinesis Firehose
- ☐ AWS Overview
- ☐ AWS SNS
- ☐ AWS SQS
- ☐ AWS Trusted Advisor (Service Limits)
- ☐ Cert Manager Overview
- ☐ Containers - Overview
- ☐ CoreDNS
- ☐ CRI - Overview
- ☐ Datadog Audit Trail Overview
- ☐ Datadog Cluster Agent - Overview
- ☐ Docker - Overview
- ☐ Host Counts
- ☐ Kubernetes Cluster Overview Dashboard
- ☐ Kubernetes DaemonSets Overview
- ☐ Kubernetes Deployments Overview

For example Kubernetes compute resources:





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

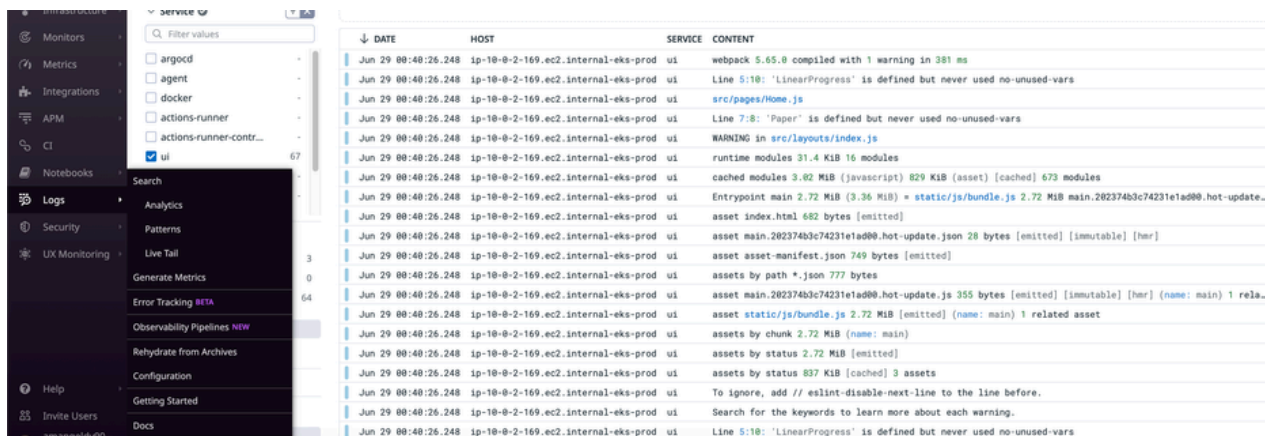
Logs

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 be able to read log information on the right panel of the current screen.



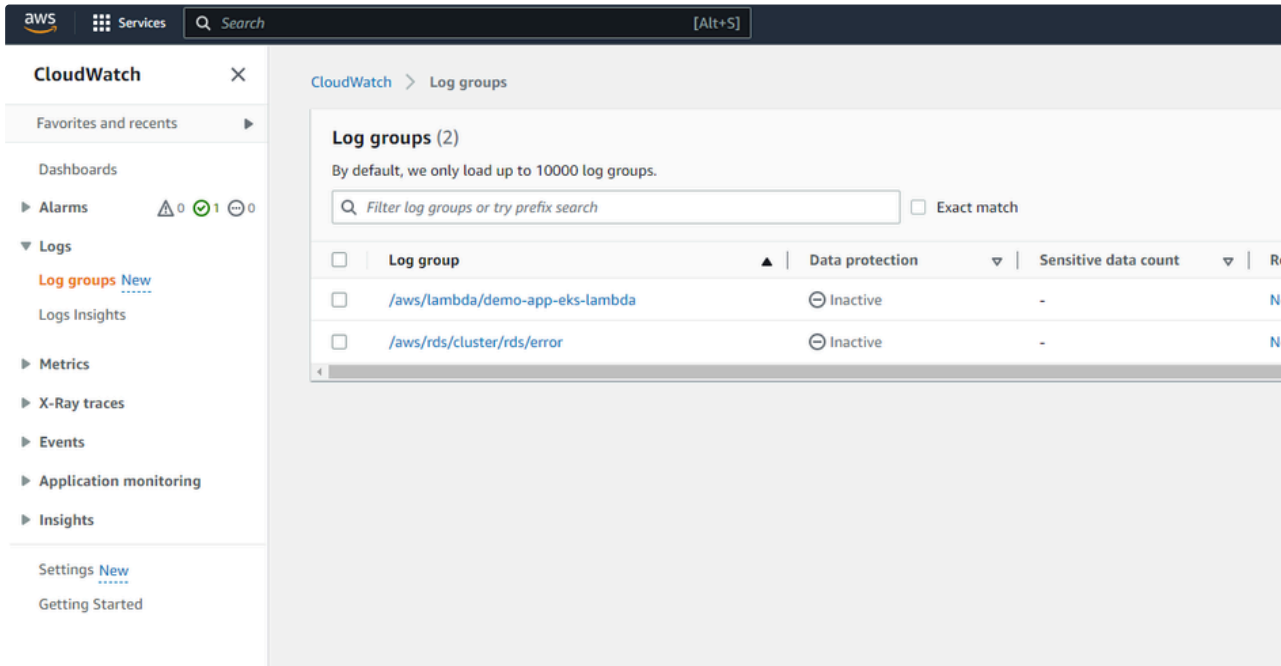
You can also view logs by using kubectl:

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

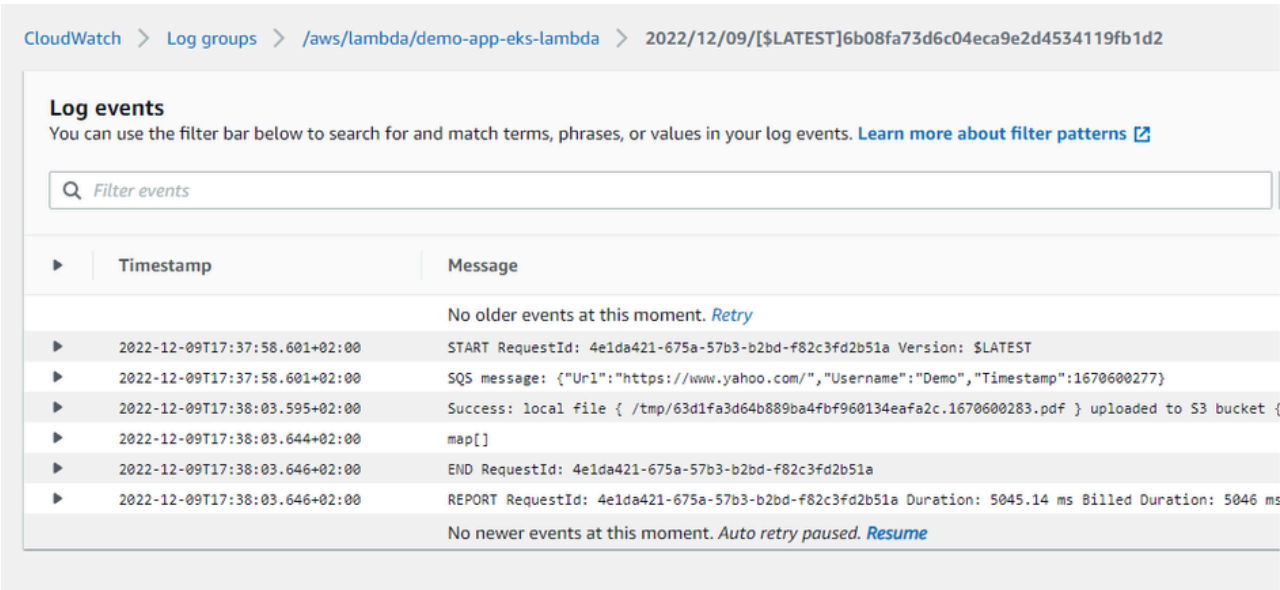
Service logs

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

CloudWatch → Log groups



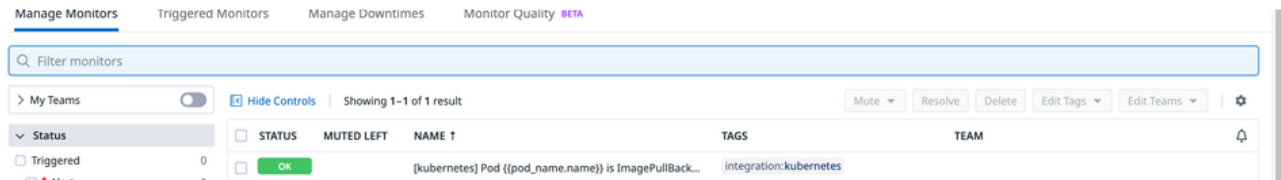
For example latest Lambda execution log:



Accident management (PagerDuty)

After successfully Datadog and PagerDuty integration in previous step.

Here how it looks after creation and everything is ok



But if something goes wrong it will be like this

My Teams

Hide Controls

Showing 1-1 of 1 result

Mute

Resolve

Delete

Edit Tags

Edit Teams

Status					
Triggered	1				
Alert	1				

STATUS	MUTED LEFT	NAME 1	TAGS	TEAM
ALERT		[kubernetes] Pod {{pod_name.name}} is ImagePullBack...	integration:kubernetes	

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

datadog	[#37] [kubernetes] Pod api-57598bb9-k8d5l is ImagePullBackOff on namespace application on kube_clust...	at 7:50 PM	Triggered through the API. Description: [kubernetes] Pod api-57598bb9-k8d5l is ImagePullBackOff on namespace application on kube_cluster_name:eks-prod,kube_namespace:application,pod_name:api-57598bb9-k8d5l (View Message)
datadog	[#36] [kubernetes] Pod ui-6c64d4fb99-7wxn7 is ImagePullBackOff on namespace application on kube_clus...	at 7:50 PM	Triggered through the API. Description: [kubernetes] Pod ui-6c64d4fb99-7wxn7 is ImagePullBackOff on namespace application on kube_cluster_name:eks-prod,kube_namespace:application,pod_name:ui-6c64d4fb99-7wxn7 (View Message)

