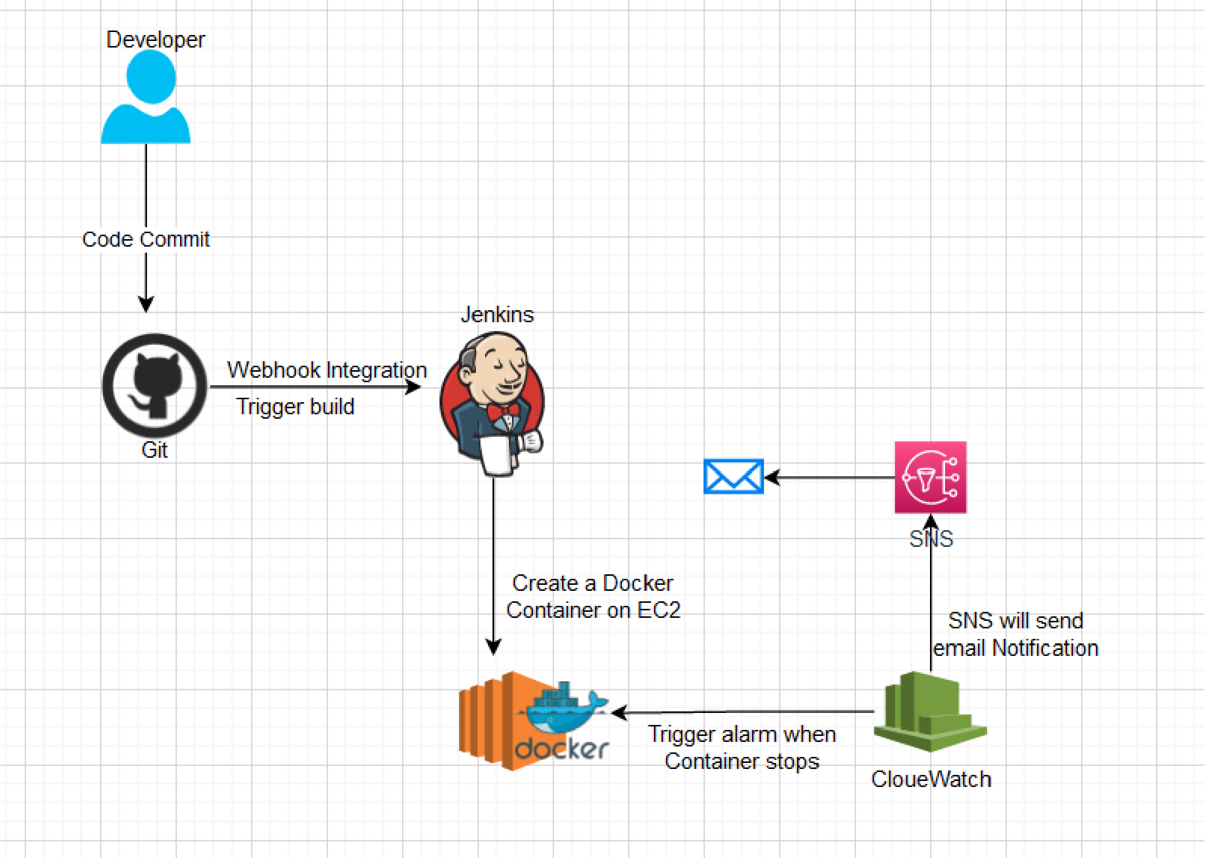
Website deployment CI/CD Pipeline Demo

https://github.com/maniaug81/checkk


Developer
Code Commit
Git
Webhook Integration
Trigger build
Jenkins
Create a Docker Container on EC2
docker
Trigger alarm when Container stops
ClouеWatch
SNS will send email Notification
SNS

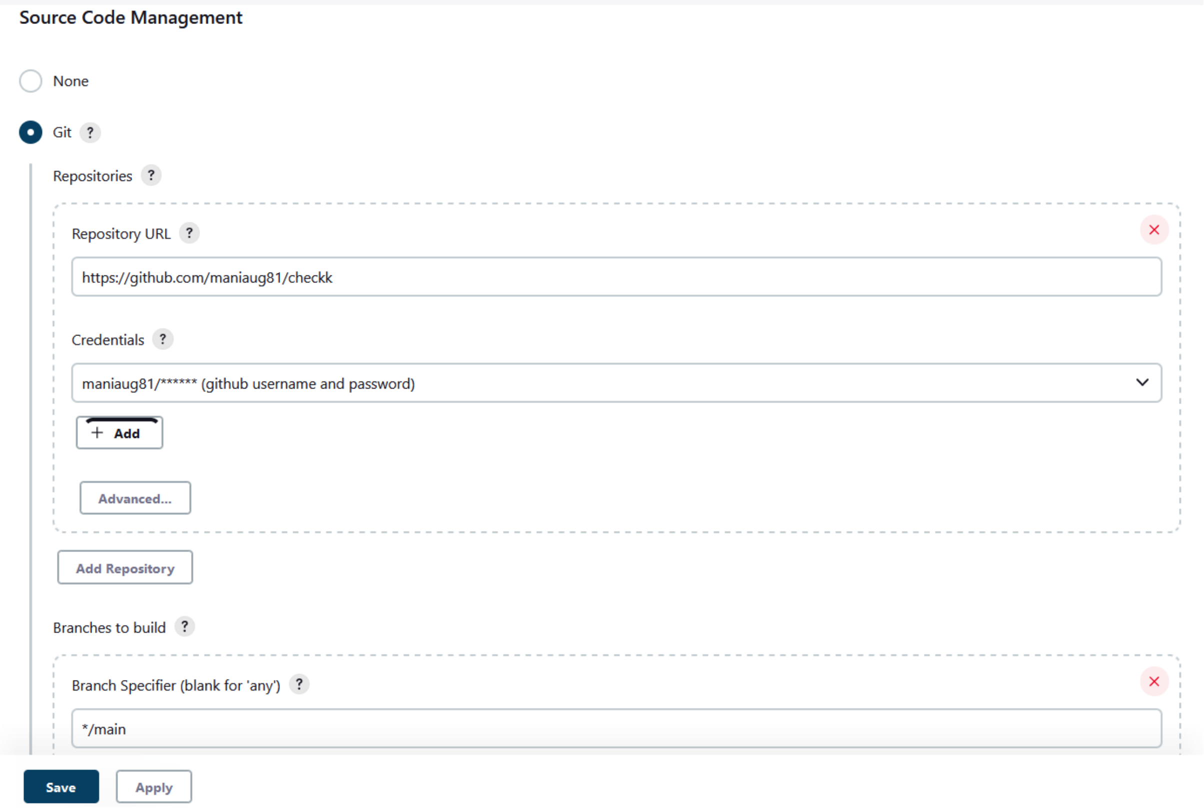
Prepared by:
Manish Kumar
22nd March 2023

Perform below mentioned steps to fulfil pre requirements:

1. Create Amazon Linux machine on your AWS account
2. Install Jenkins, Docker and Git on EC2
3. Create a repository in your Github account
4. Download a sample TODO application from GitHub
   I have used this one - https://github.com/tusharnankani/ToDoList
5. Upload the initial code to the repository

Jenkins settings:

- Provide required details in Source Code Management option in your Jenkins project
  a. Create a freestyle item in Jenkins and do required configurations
     i. Source code management - Git
     ii. Provide repo, credentials and branch details.
     iii. Select option - GitHub hook trigger for GITScm polling
     iv. In build steps mention the shell script you want to execute with command line arguments
     v. Click on Apply and Save



Source Code Management

○ None

● Git

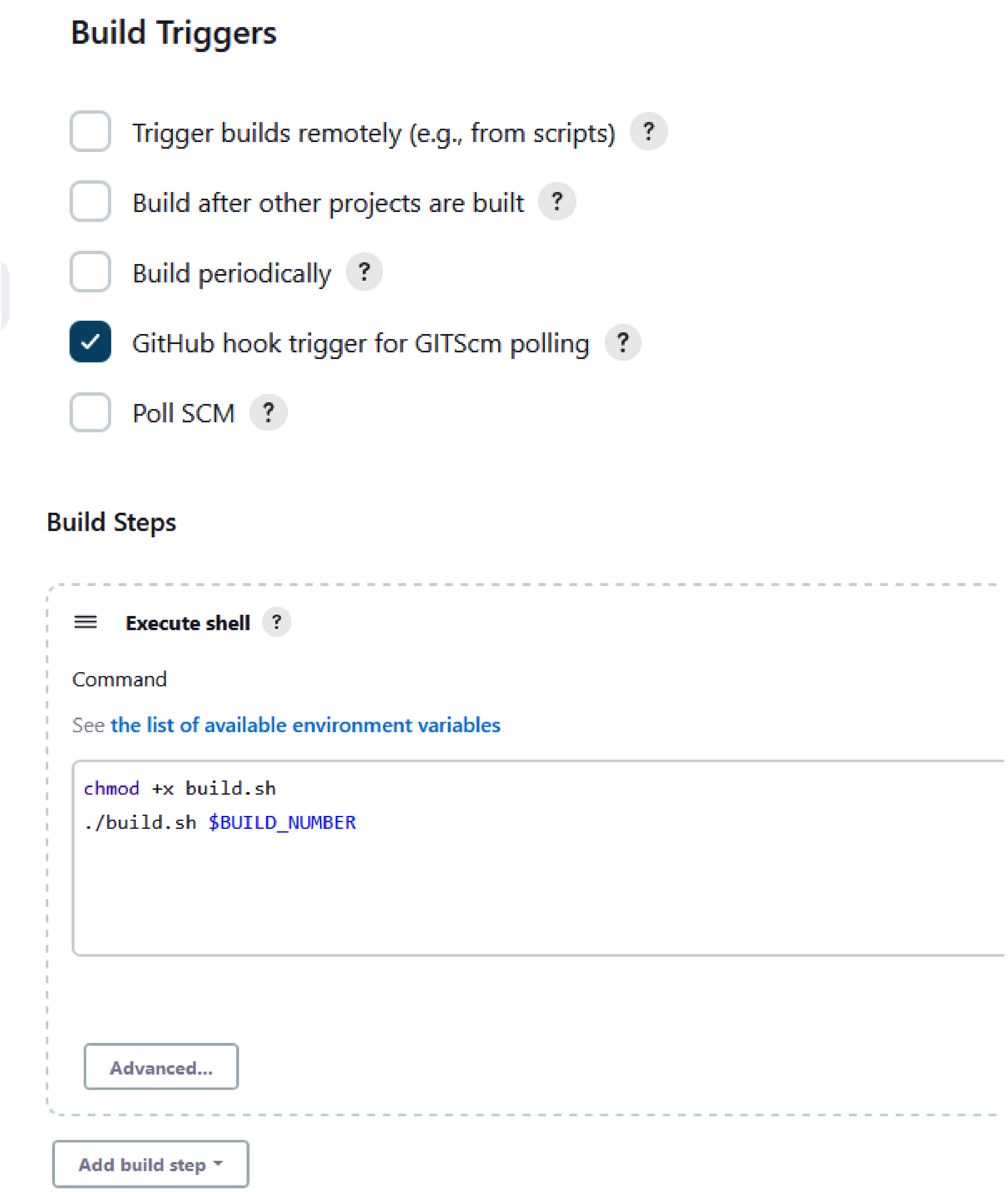
Repositories

Repository URL: https://github.com/maniaug81/checkk

Credentials: maniaug81/****** (github username and password)

Branches to build

Branch Specifier (blank for 'any'): */main



Build Triggers

- □ Trigger builds remotely (e.g., from scripts) ?
- □ Build after other projects are built ?
- □ Build periodically ?
- ☑ GitHub hook trigger for GITScm polling ?
- □ Poll SCM ?

Build Steps

Execute shell ?

Command

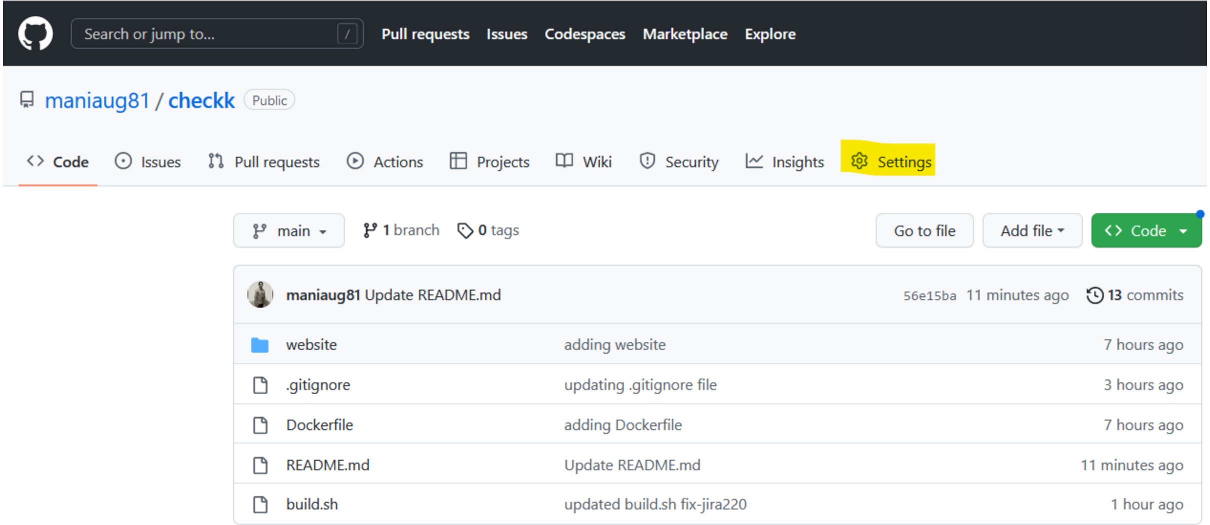
See the list of available environment variables

```
chmod +x build.sh
./build.sh $BUILD_NUMBER
```

GitHub settings:

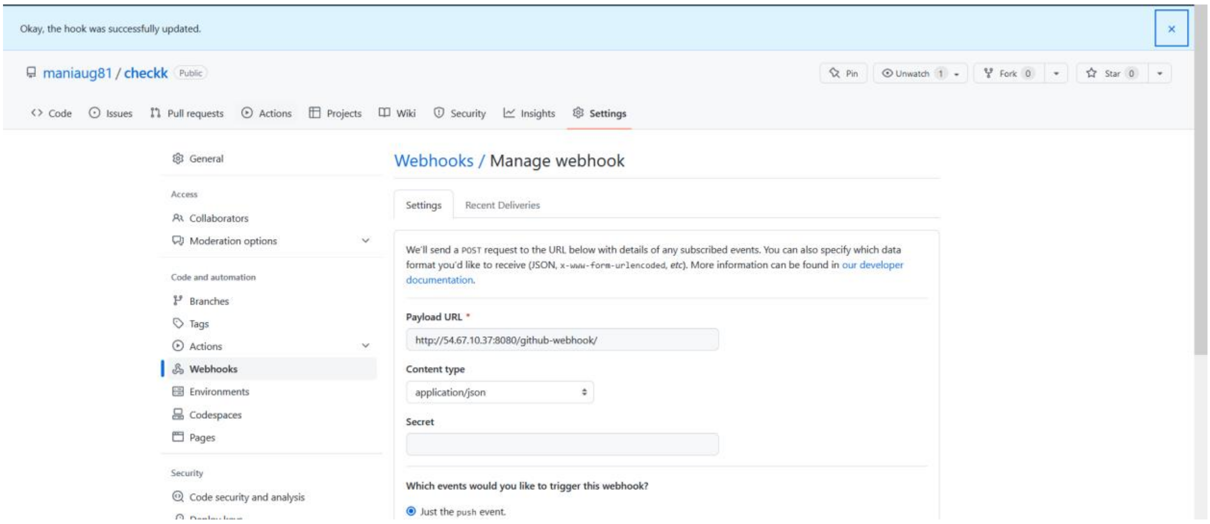
- In your Github repository click on Settings and then Webhook
  a. Payload URL will have Jenkins URL in format http://<ip address>/github-webhook/

  b. Content-type should be selected as application/json
- Select on which events you want to trigger the Jenkins Job



maniaug81 Update README.md 56e15ba 11 minutes ago 13 commits

website	adding website	7 hours ago
.gitignore	updating .gitignore file	3 hours ago
Dockerfile	adding Dockerfile	7 hours ago
README.md	Update README.md	11 minutes ago
build.sh	updated build.sh fix-jira220	1 hour ago



Okay, the hook was successfully updated.

Webhooks / Manage webhook

We'll send a POST request to the URL below with details of any subscribed events. You can also specify which data format you'd like to receive (JSON, x-www-form-urlencoded, etc). More information can be found in our developer documentation.

Payload URL * http://54.67.10.37:8080/github-webhook/

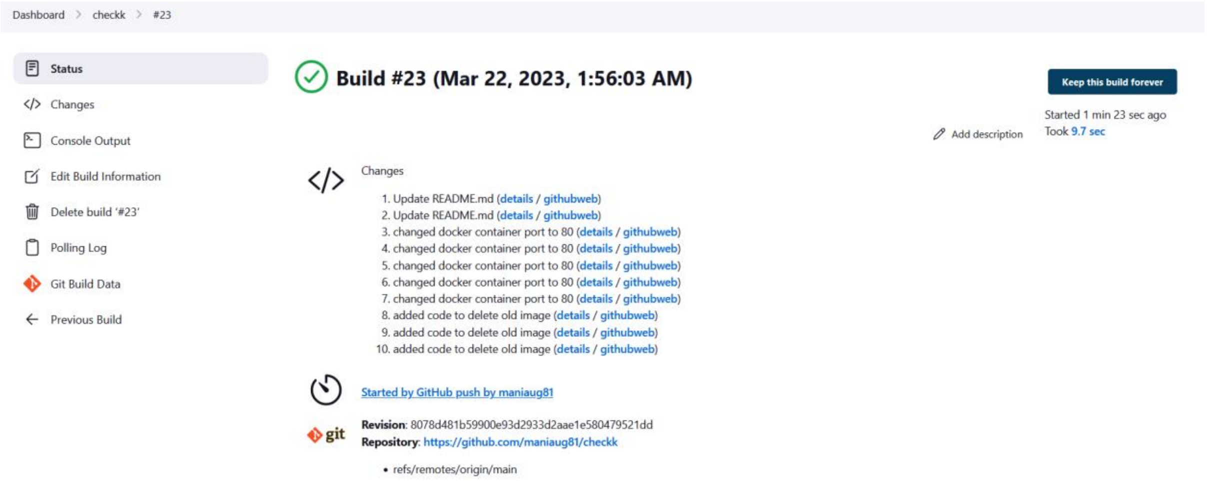
Content type application/json

Secret

Which events would you like to trigger this webhook?

● Just the push event.

- Once a code commit is done, it will trigger the Jenkins job. It can be seen in below image that it is mentioned the job is triggered by GitHub Push



Dashboard > checkk > #23

Build #23 (Mar 22, 2023, 1:56:03 AM)

Started 1 min 23 sec ago
Took 9.7 sec

Changes

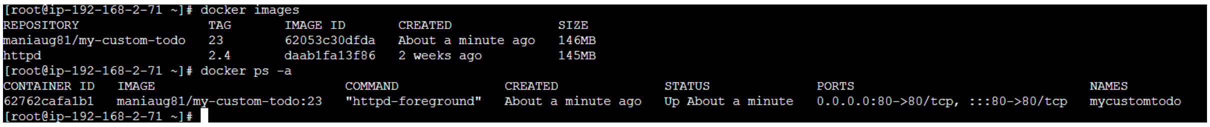
1. Update README.md (details / githubweb)
2. Update README.md (details / githubweb)
3. changed docker container port to 80 (details / githubweb)
4. changed docker container port to 80 (details / githubweb)
5. changed docker container port to 80 (details / githubweb)
6. changed docker container port to 80 (details / githubweb)
7. changed docker container port to 80 (details / githubweb)
8. added code to delete old image (details / githubweb)
9. added code to delete old image (details / githubweb)
10. added code to delete old image (details / githubweb)

Started by GitHub push by maniaug81

Revision: 8078d481b59900e93d2933d2aae1e580479521dd
Repository: https://github.com/maniaug81/checkk

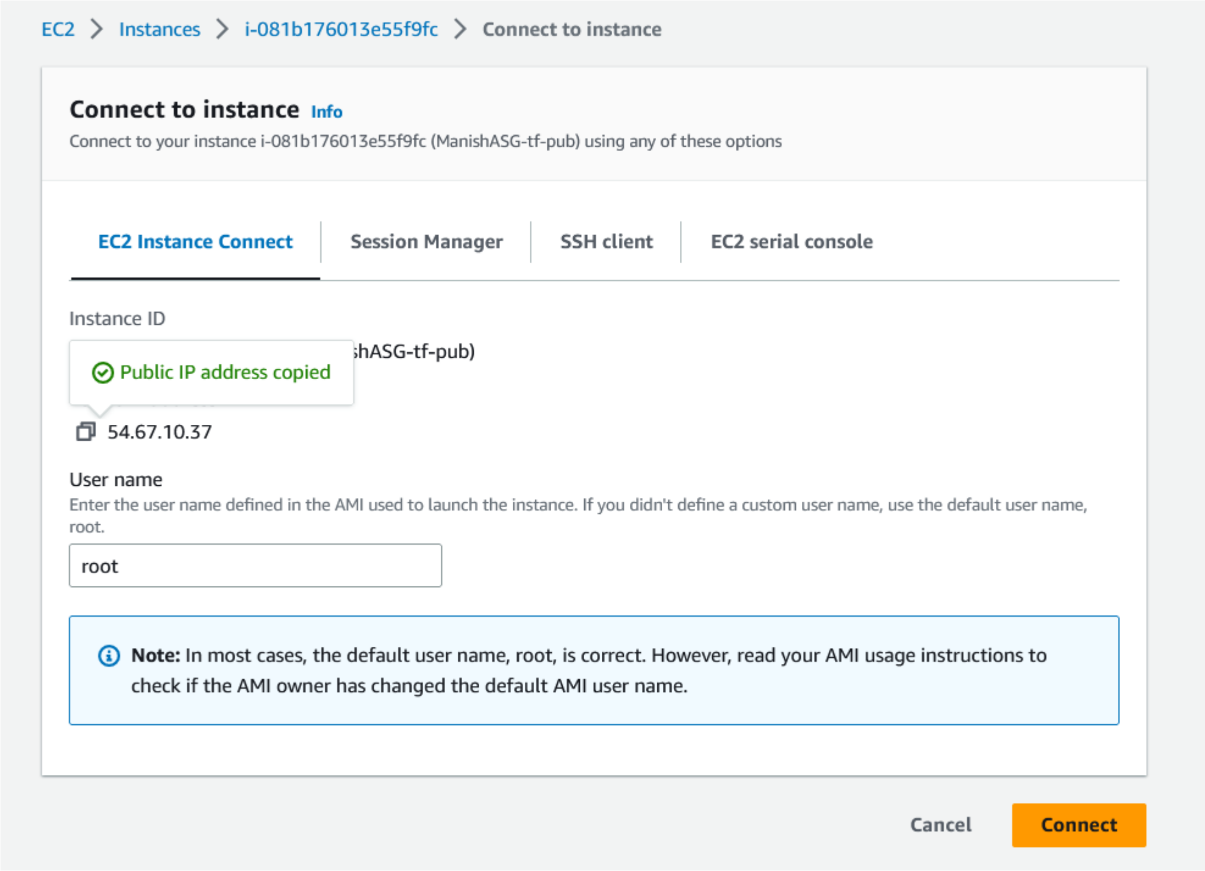
- refs/remotes/origin/main

- Once the job is executed successfully, the image and container can be verified by logging into the EC2



```
[root@ip-192-168-2-71 ~]# docker images
REPOSITORY                TAG       IMAGE ID       CREATED              SIZE
maniaug81/my-custom-todo   23        62053c30dfda   About a minute ago   146MB
httpd                     2.4       daab1fa13f86   2 weeks ago          145MB
[root@ip-192-168-2-71 ~]# docker ps -a
CONTAINER ID   IMAGE                         COMMAND              CREATED              STATUS               PORTS                                 NAMES
62762cafa1b1   maniaug81/my-custom-todo:23   "httpd-foreground"   About a minute ago   Up About a minute    0.0.0.0:80->80/tcp, :::80->80/tcp     mycustomtodo
[root@ip-192-168-2-71 ~]#
```

- Go to your EC2 and find the public IP



EC2 > Instances > i-081b176013e55f9fc > Connect to instance

Connect to instance Info

Connect to your instance i-081b176013e55f9fc (ManishASG-tf-pub) using any of these options

Instance ID

shASG-tf-pub)

Public IP address copied

54.67.10.37

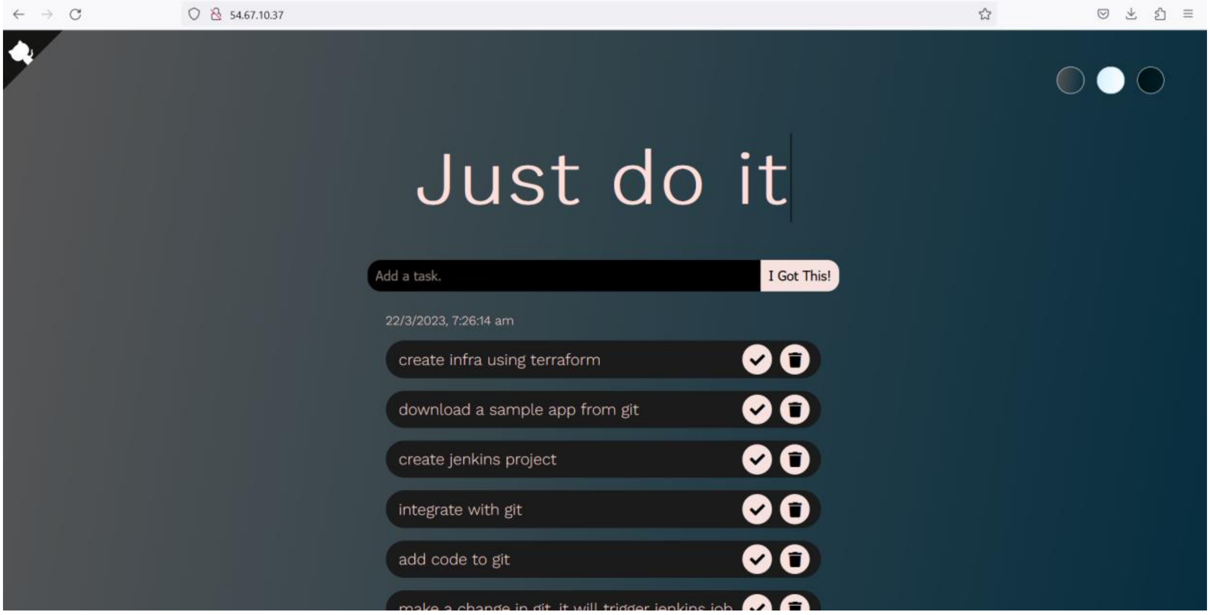
User name

Enter the user name defined in the AMI used to launch the instance. If you didn't define a custom user name, use the default user name, root.

root

Note: In most cases, the default user name, root, is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

- Enter the URL in browser to see the web app running as a docker container http://54.67.10.37/



54.67.10.37

Just do it

Add a task.

22/3/2023, 7:26:14 am

create infra using terraform

download a sample app from git

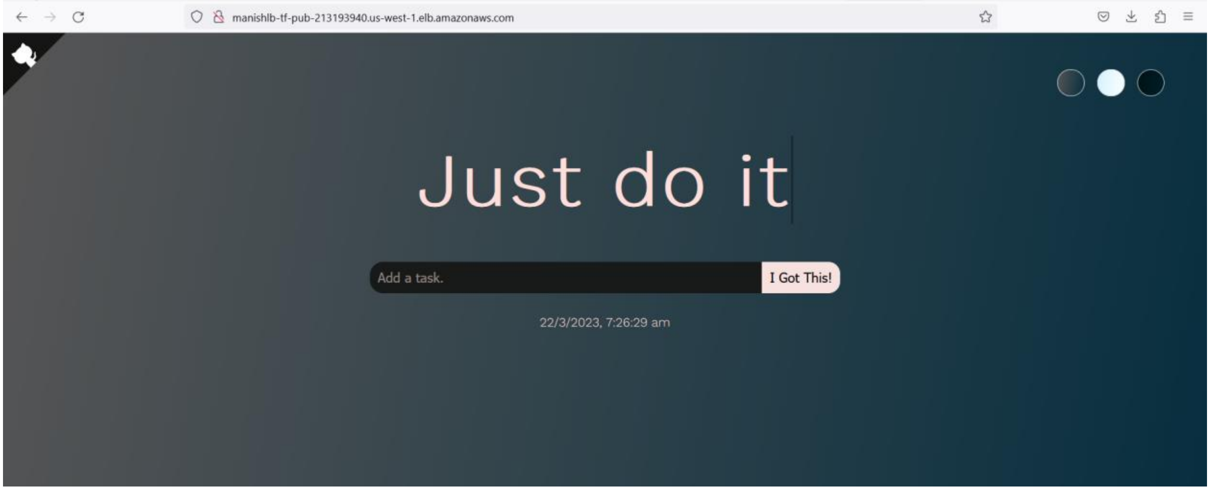
create jenkins project

integrate with git

add code to git

make a change in git, it will trigger jenkins job

- **Accessing the website from Load balancer**



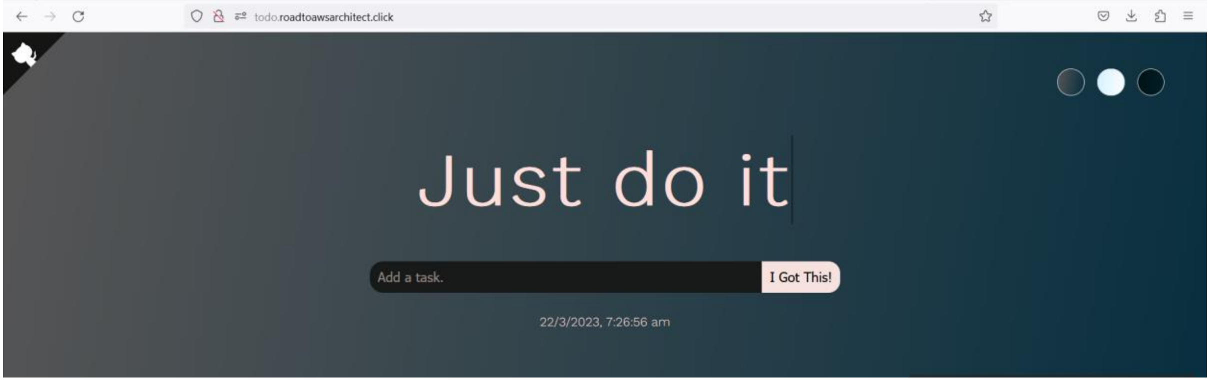
manishlb-tf-pub-213193940.us-west-1.elb.amazonaws.com

Just do it

Add a task.

22/3/2023, 7:26:29 am

- **Accessing the website using Route53 DNS name**



todo.roadtoawsarchitect.click

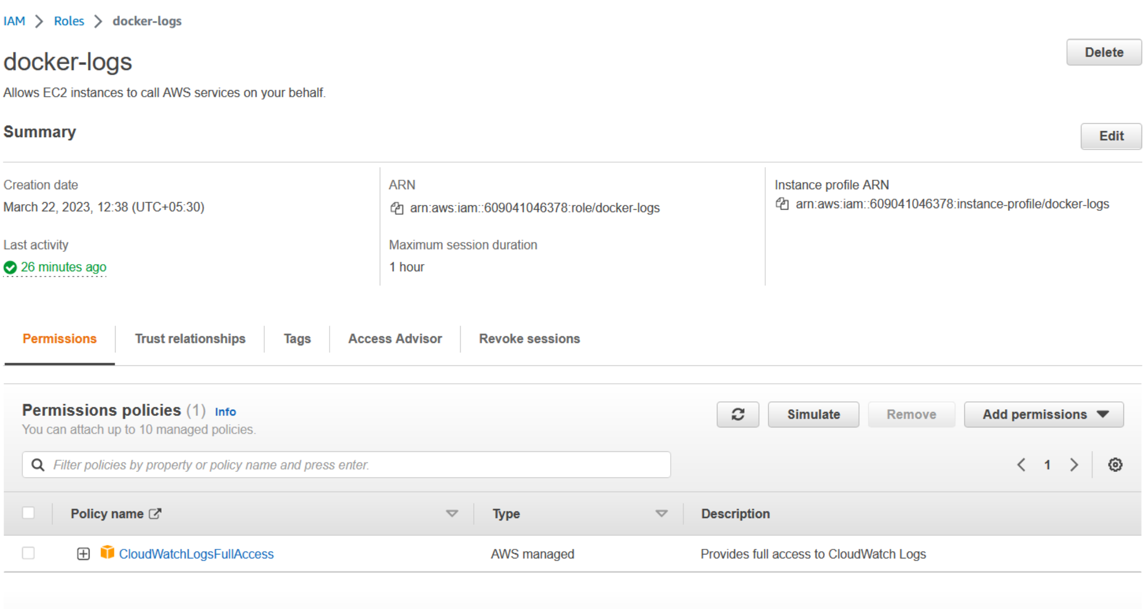
Just do it

Add a task.

22/3/2023, 7:26:56 am

Create Cloudwatch alarm when the container is stopped

- Create an IAM role as follows



docker-logs

Allows EC2 instances to call AWS services on your behalf.

Summary

Creation date: March 22, 2023, 12:38 (UTC+05:30)

Last activity: 26 minutes ago

ARN: arn:aws:iam::609041046378:role/docker-logs

Maximum session duration: 1 hour

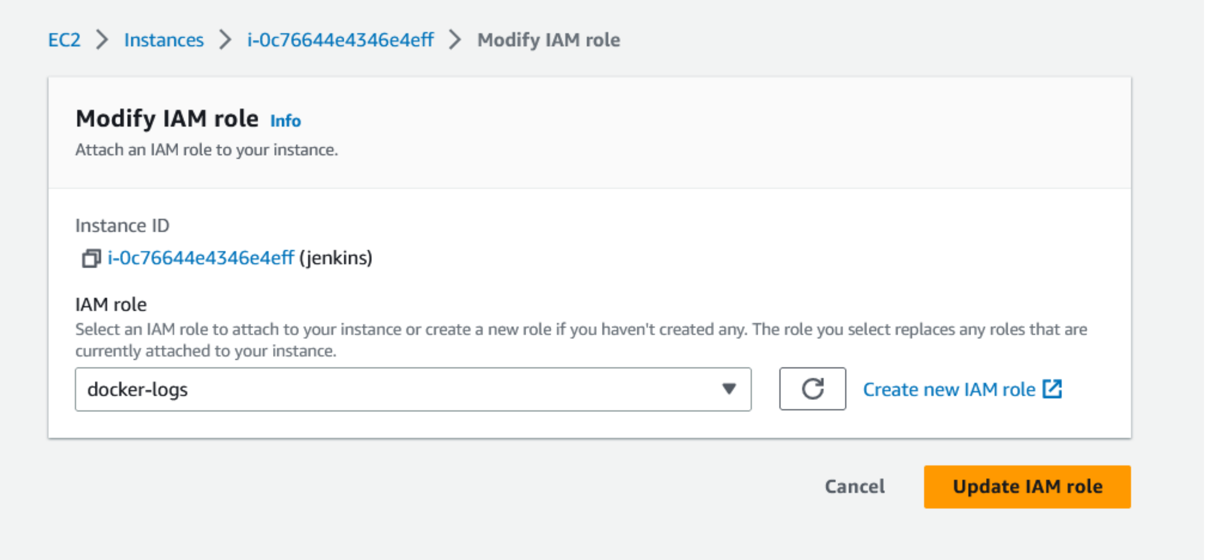
Instance profile ARN: arn:aws:iam::609041046378:instance-profile/docker-logs

Permissions policies (1)

You can attach up to 10 managed policies.

Policy name	Type	Description
CloudWatchLogsFullAccess	AWS managed	Provides full access to CloudWatch Logs

- Attach this role to your EC2 where the container is running



Modify IAM role

Attach an IAM role to your instance.

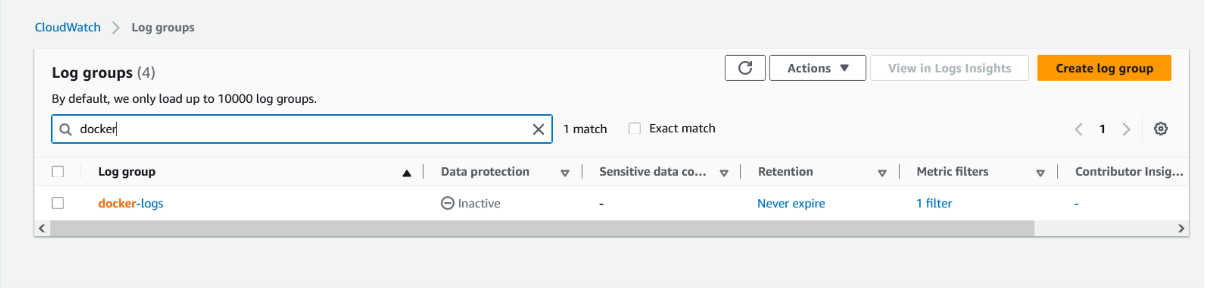
Instance ID: i-0c76644e4346e4eff (jenkins)

IAM role

Select an IAM role to attach to your instance or create a new role if you haven't created any. The role you select replaces any roles that are currently attached to your instance.

docker-logs

- Create a log group in Cloudwatch



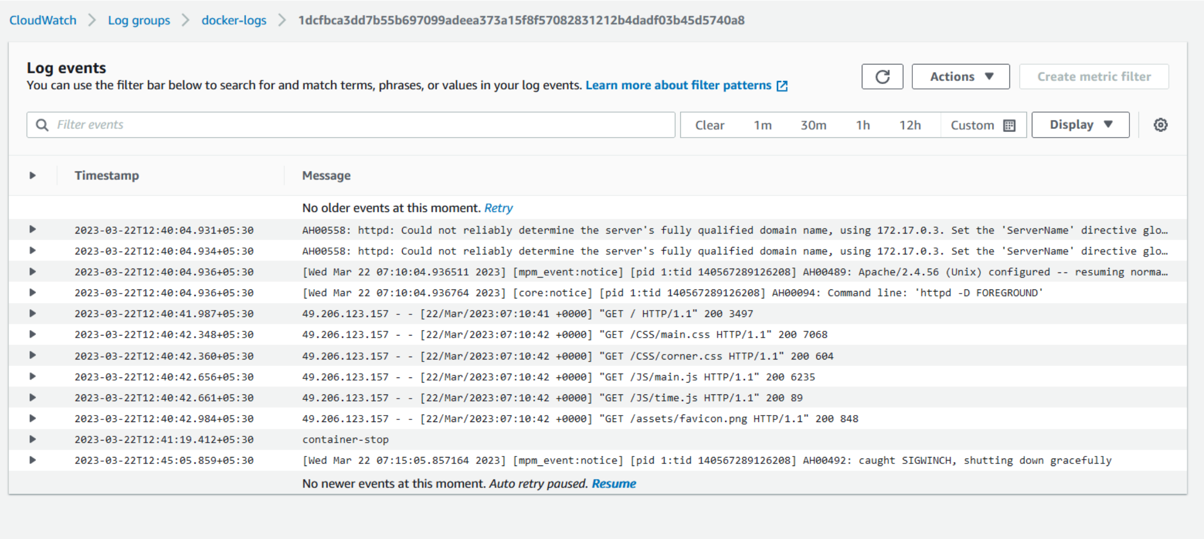
Log groups (4)

By default, we only load up to 10000 log groups.

docker — 1 match — □ Exact match

Log group	Data protection	Sensitive data co...	Retention	Metric filters	Contributor Insig...
docker-logs	Inactive	-	Never expire	1 filter	-

- Perform some operations on your container, the container logs will start going to Cloudwatch log group



CloudWatch > Log groups > docker-logs > 1dcfbca3dd7b55b697099adeea373a15f8f57082831212b4dadf03b45d5740a8

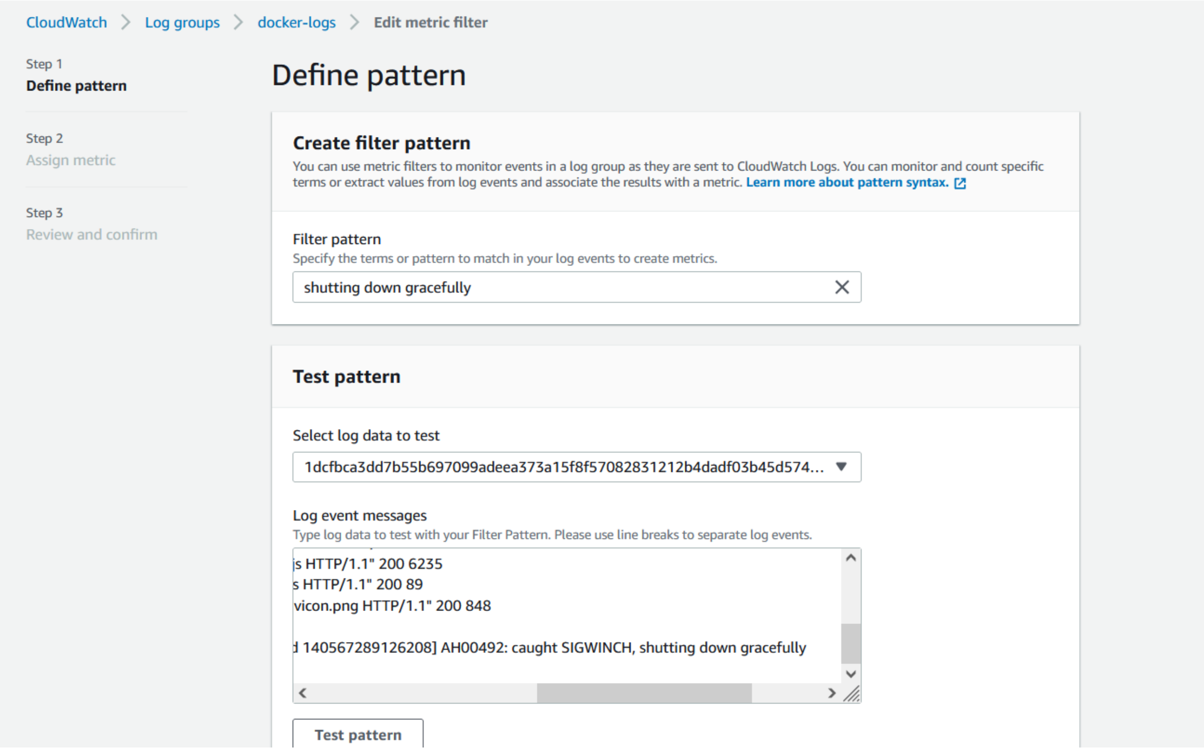
Log events

You can use the filter bar below to search for and match terms, phrases, or values in your log events. Learn more about filter patterns

Actions ▼
Create metric filter
Filter events
Clear
1m
30m
1h
12h
Custom
Display ▼

```
Timestamp                        Message
                                 No older events at this moment. Retry
2023-03-22T12:40:04.931+05:30    AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 172.17.0.3. Set the 'ServerName' directive glo…
2023-03-22T12:40:04.934+05:30    AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 172.17.0.3. Set the 'ServerName' directive glo…
2023-03-22T12:40:04.936+05:30    [Wed Mar 22 07:10:04.936511 2023] [mpm_event:notice] [pid 1:tid 140567289126208] AH00489: Apache/2.4.56 (Unix) configured -- resuming norma…
2023-03-22T12:40:04.936+05:30    [Wed Mar 22 07:10:04.936764 2023] [core:notice] [pid 1:tid 140567289126208] AH00094: Command line: 'httpd -D FOREGROUND'
2023-03-22T12:40:41.987+05:30    49.206.123.157 - - [22/Mar/2023:07:10:41 +0000] "GET / HTTP/1.1" 200 3497
2023-03-22T12:40:42.348+05:30    49.206.123.157 - - [22/Mar/2023:07:10:42 +0000] "GET /CSS/main.css HTTP/1.1" 200 7068
2023-03-22T12:40:42.360+05:30    49.206.123.157 - - [22/Mar/2023:07:10:42 +0000] "GET /CSS/corner.css HTTP/1.1" 200 604
2023-03-22T12:40:42.656+05:30    49.206.123.157 - - [22/Mar/2023:07:10:42 +0000] "GET /JS/main.js HTTP/1.1" 200 6235
2023-03-22T12:40:42.661+05:30    49.206.123.157 - - [22/Mar/2023:07:10:42 +0000] "GET /JS/time.js HTTP/1.1" 200 89
2023-03-22T12:40:42.984+05:30    49.206.123.157 - - [22/Mar/2023:07:10:42 +0000] "GET /assets/favicon.png HTTP/1.1" 200 848
2023-03-22T12:41:19.412+05:30    container-stop
2023-03-22T12:45:05.859+05:30    [Wed Mar 22 07:15:05.857164 2023] [mpm_event:notice] [pid 1:tid 140567289126208] AH00492: caught SIGWINCH, shutting down gracefully
                                 No newer events at this moment. Auto retry paused. Resume
```

- Create a “Metric Filter” in your Cloudwatch log group



Define pattern

Create filter pattern

You can use metric filters to monitor events in a log group as they are sent to CloudWatch Logs. You can monitor and count specific terms or extract values from log events and associate the results with a metric. Learn more about pattern syntax.

Filter pattern

Specify the terms or pattern to match in your log events to create metrics.

shutting down gracefully

Test pattern

Select log data to test

1dcfbca3dd7b55b697099adeea373a15f8f57082831212b4dadf03b45d574…

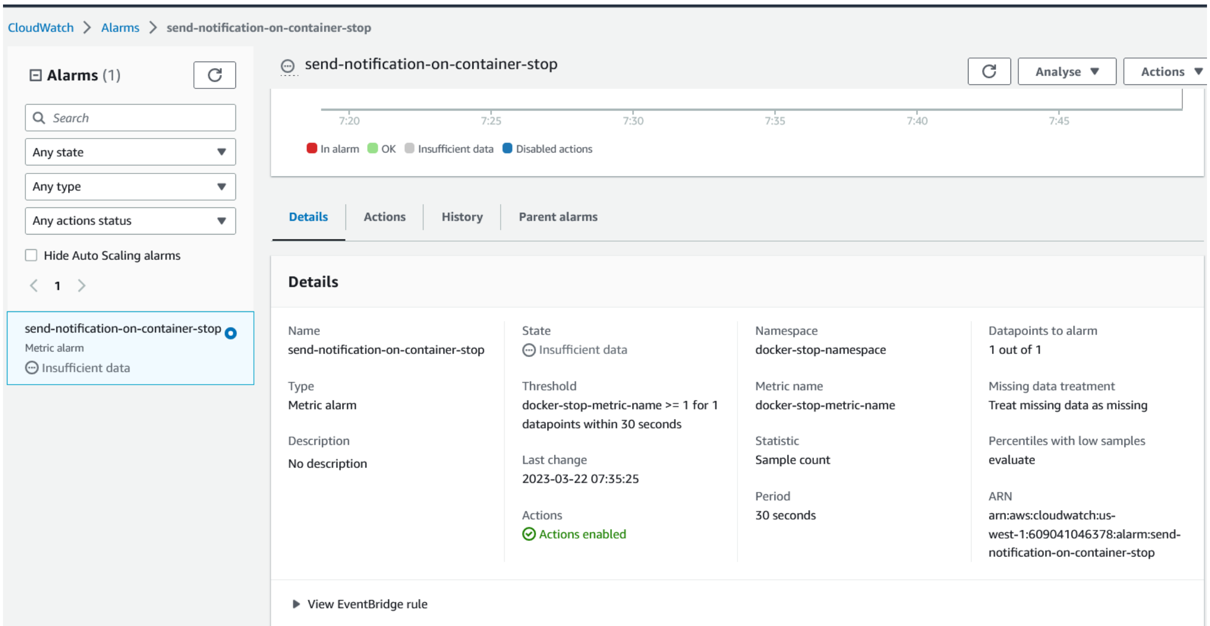
Log event messages

Type log data to test with your Filter Pattern. Please use line breaks to separate log events.

```
js HTTP/1.1" 200 6235
s HTTP/1.1" 200 89
vicon.png HTTP/1.1" 200 848

d 140567289126208] AH00492: caught SIGWINCH, shutting down gracefully
```

- Create a new CloudWatch alarm based on this Metric and select SNS notification where you want to send the notification


CloudWatch > Alarms > send-notification-on-container-stop

⊟ **Alarms** (1)

Search

Any state ▼

Any type ▼

Any actions status ▼

□ Hide Auto Scaling alarms

< 1 >

send-notification-on-container-stop
Metric alarm
Insufficient data

send-notification-on-container-stop

Analyse ▼ Actions ▼

Details | Actions | History | Parent alarms

Details

Name
send-notification-on-container-stop

Type
Metric alarm

Description
No description

State
Insufficient data

Threshold
docker-stop-metric-name >= 1 for 1 datapoints within 30 seconds

Last change
2023-03-22 07:35:25

Actions
✓ Actions enabled

Namespace
docker-stop-namespace

Metric name
docker-stop-metric-name

Statistic
Sample count

Period
30 seconds

Datapoints to alarm
1 out of 1

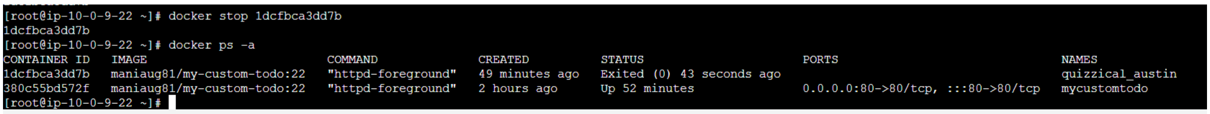
Missing data treatment
Treat missing data as missing

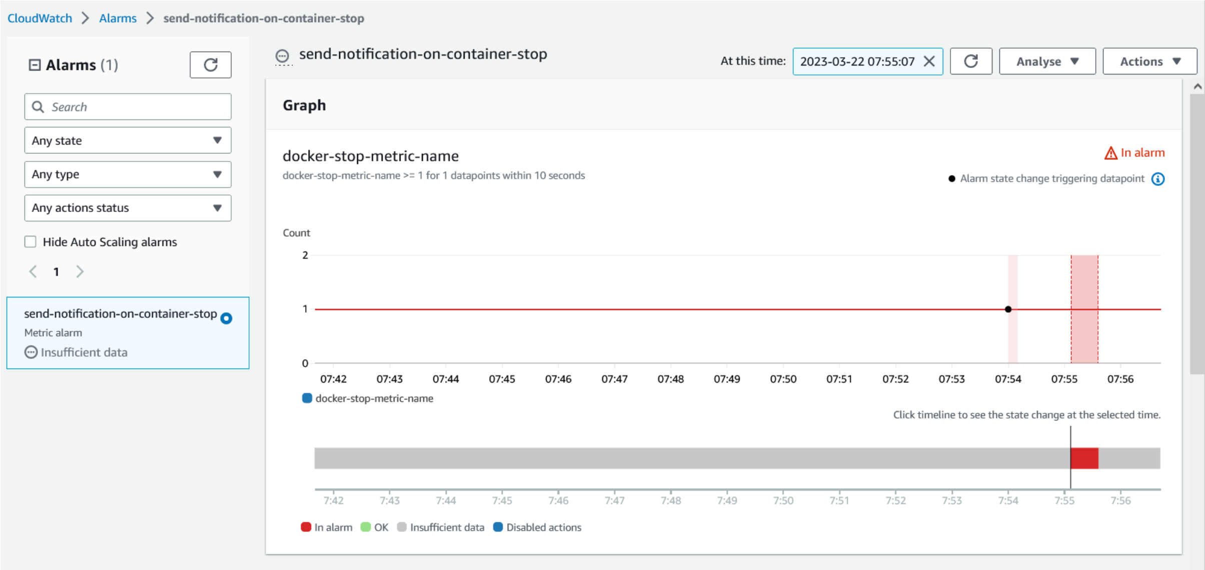
Percentiles with low samples
evaluate

ARN
arn:aws:cloudwatch:us-west-1:609041046378:alarm:send-notification-on-container-stop

▶ View EventBridge rule

- When the container is stopped, it triggered the alarm


```
[root@ip-10-0-9-22 ~]# docker stop 1dcfbca3dd7b
1dcfbca3dd7b
[root@ip-10-0-9-22 ~]# docker ps -a
CONTAINER ID   IMAGE                      COMMAND              CREATED          STATUS                     PORTS                              NAMES
1dcfbca3dd7b   maniaug81/my-custom-todo:22   "httpd-foreground"   49 minutes ago   Exited (0) 43 seconds ago                                     quizzical_austin
380c55bd572f   maniaug81/my-custom-todo:22   "httpd-foreground"   2 hours ago      Up 52 minutes              0.0.0.0:80->80/tcp, :::80->80/tcp   mycustomtodo
[root@ip-10-0-9-22 ~]#
```


CloudWatch > Alarms > send-notification-on-container-stop

⊟ **Alarms** (1)

Search

Any state ▼

Any type ▼

Any actions status ▼

□ Hide Auto Scaling alarms

< 1 >

send-notification-on-container-stop
Metric alarm
Insufficient data

send-notification-on-container-stop

At this time: 2023-03-22 07:55:07 ✕

Analyse ▼ Actions ▼

Graph

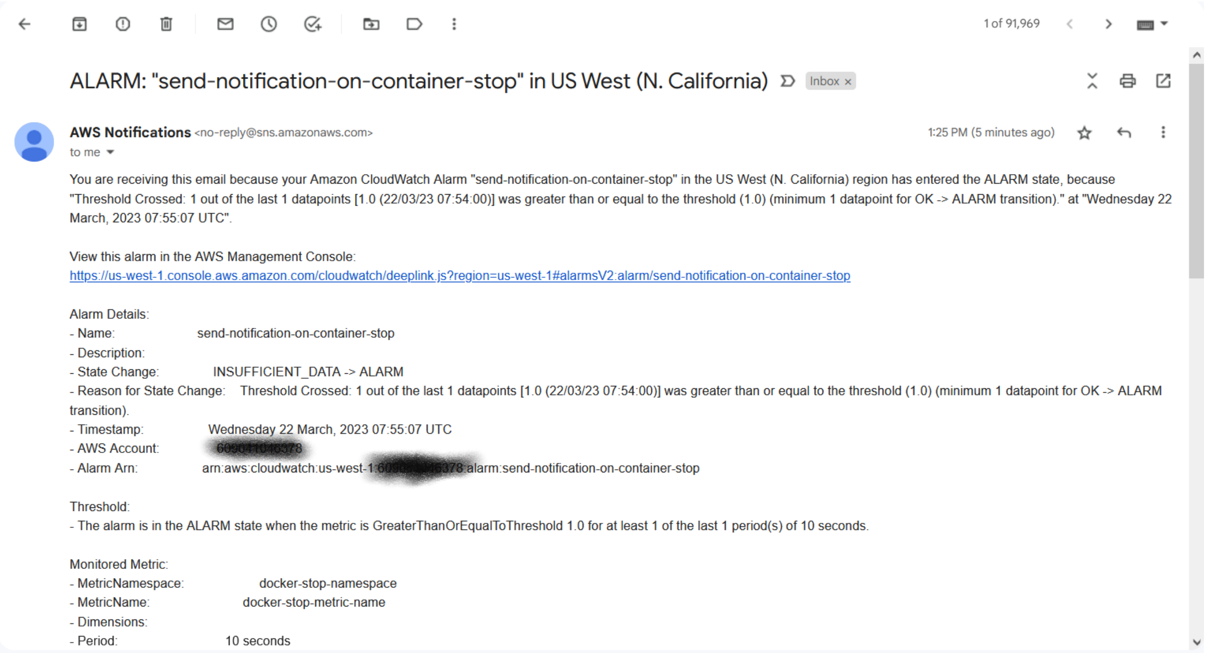
docker-stop-metric-name
docker-stop-metric-name >= 1 for 1 datapoints within 10 seconds

⚠ In alarm

● Alarm state change triggering datapoint ⓘ

Click timeline to see the state change at the selected time.

- Email notification received on the email ID specified while creating Topic



ALARM: "send-notification-on-container-stop" in US West (N. California)

AWS Notifications <no-reply@sns.amazonaws.com>
to me

1:25 PM (5 minutes ago)

You are receiving this email because your Amazon CloudWatch Alarm "send-notification-on-container-stop" in the US West (N. California) region has entered the ALARM state, because "Threshold Crossed: 1 out of the last 1 datapoints [1.0 (22/03/23 07:54:00)] was greater than or equal to the threshold (1.0) (minimum 1 datapoint for OK -> ALARM transition)." at "Wednesday 22 March, 2023 07:55:07 UTC".

View this alarm in the AWS Management Console:
https://us-west-1.console.aws.amazon.com/cloudwatch/deeplink.js?region=us-west-1#alarmsV2:alarm/send-notification-on-container-stop

Alarm Details:
- Name: send-notification-on-container-stop
- Description:
- State Change: INSUFFICIENT_DATA -> ALARM
- Reason for State Change: Threshold Crossed: 1 out of the last 1 datapoints [1.0 (22/03/23 07:54:00)] was greater than or equal to the threshold (1.0) (minimum 1 datapoint for OK -> ALARM transition).
- Timestamp: Wednesday 22 March, 2023 07:55:07 UTC
- AWS Account: [redacted]
- Alarm Arn: arn:aws:cloudwatch:us-west-1:[redacted]:alarm:send-notification-on-container-stop

Threshold:
- The alarm is in the ALARM state when the metric is GreaterThanOrEqualToThreshold 1.0 for at least 1 of the last 1 period(s) of 10 seconds.

Monitored Metric:
- MetricNamespace: docker-stop-namespace
- MetricName: docker-stop-metric-name
- Dimensions:
- Period: 10 seconds