

Section 1: Selling CI/CD to your Team/Organization

Continuous integration, delivery and deployment (CI/CD) have enabled many organizations to release on a more frequent basis without compromising on quality. With CI/CD, code changes are shepherded through an automated pipeline that handles the repetitive build, test and deployment tasks and alerts you about any issues.

Faster time to market:

The primary goal of a CI/CD pipeline is to deliver working software to users quickly and frequently.

Understanding your users' needs, coming up with innovative features, and turning them into robust code is not necessarily enough if your competition is moving more quickly. With an automated CI/CD pipeline you can ship changes weekly, daily or even hourly

Better code quality

Automating tests ensures they are performed consistently, making the results more reliable. Because automated tests are quicker to run than their manual equivalents, it becomes feasible to test much more frequently.

Testing your code regularly and thoroughly means you'll discover bugs sooner, making it easier to fix them as less functionality has been built on top of them. Over time this results in better quality code.

Faster bug fixes

Even with improved code quality thanks to automated testing, bugs will still occasionally sneak their way through to production. If you're committing changes regularly and shipping frequently, each release to production will contain a relatively small number of code changes, making it much easier to identify the cause of an issue. As your commits are more granular, if you decide to back out the change, you're less likely to take other useful changes with it.

When it's urgent to get a fix out to production, it can be tempting to skimp on manual testing in order to save time, despite the risk of introducing a new failure to production. With a CI/CD pipeline, running automated tests is no longer a significant overhead, so there's less temptation to compromise on quality.

Reduce costs And increase revenue for businesses

CI/CD helps to accelerate the product release process leading to lower development costs

CI/CD helps to continuously integrate and continuously deliver to help products keep up with market trends, thus helping to increase revenue

CI/CD helps to quickly deploy the infrastructure, so it avoids errors when manually deploying, leading to saving production costs.

CI/CD helps the error correction process take place quickly, so it saves production costs.

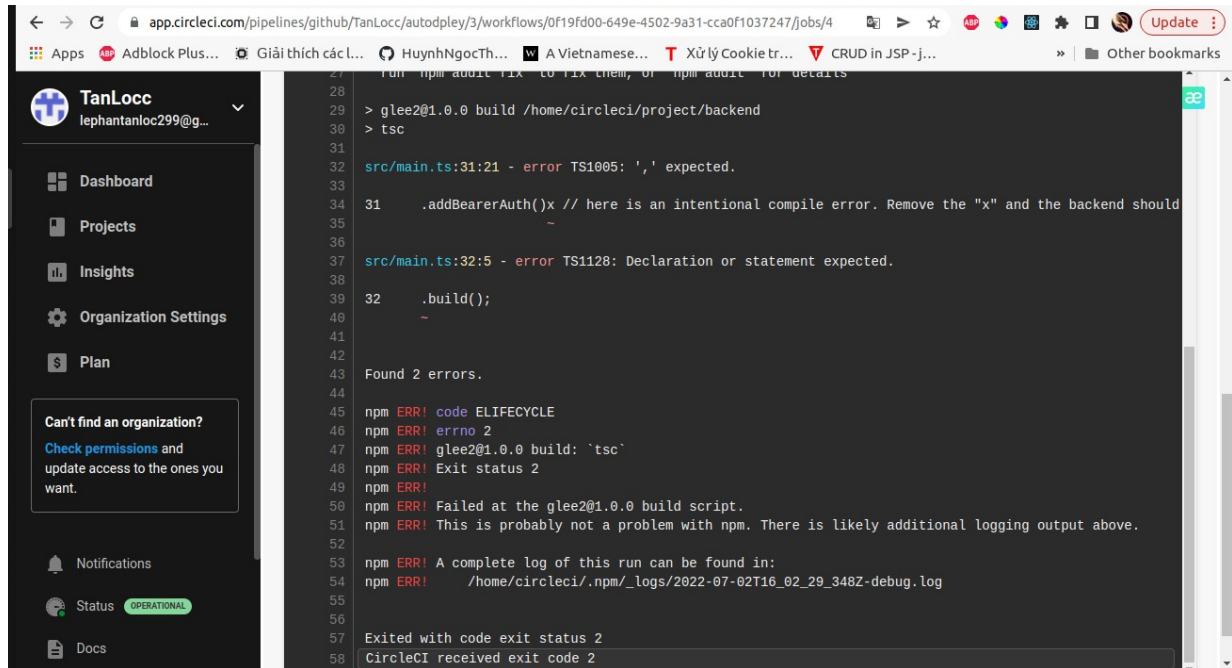
...

Section 2&3: Deploying Working, Trustworthy Software & Turn Errors into Sirens

Public Url to GitHub repository [URL01]: <https://github.com/TanLocc/autodploy>

Public URL for your S3 Bucket [URL02]: <http://udapeople-45791b9.s3-website-us-east-1.amazonaws.com>

1. Build Jobs that failed because of compile errors

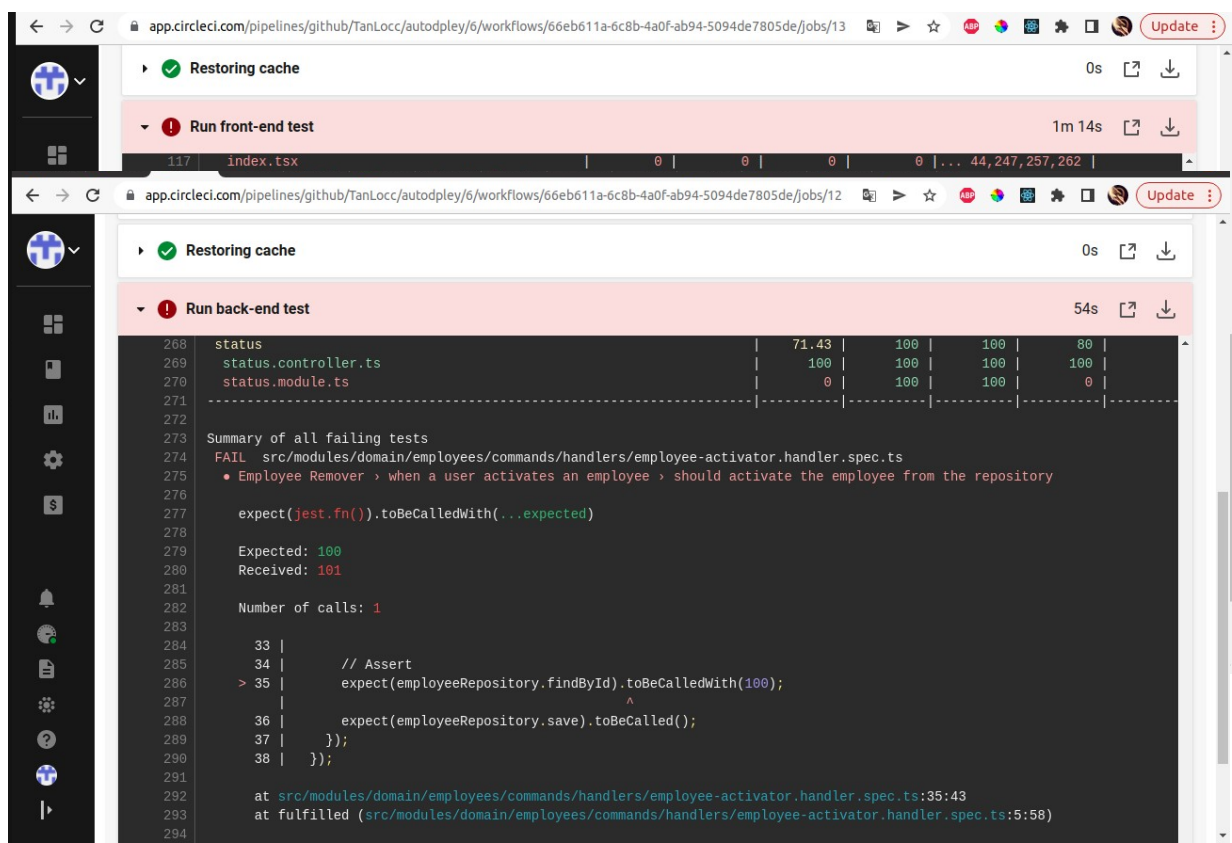


The screenshot shows a CircleCI interface for a job named 'TanLocc' with ID 'lephantanloc299@g...'. The job is in a failed state. The console output shows the following errors:

```
27 > run npm audit fix --to fix them, or npm audit --for details
28
29 > glee2@1.0.0 build /home/circleci/project/backend
30 > tsc
31
32 src/main.ts:31:21 - error TS1005: ',' expected.
33
34 31 .addBearerAuth()x // here is an intentional compile error. Remove the "x" and the backend should
35
36
37 src/main.ts:32:5 - error TS1128: Declaration or statement expected.
38
39 32 .build();
40
41
42 Found 2 errors.
43
44 npm ERR! code ELIFECYCLE
45 npm ERR! errno 2
46 npm ERR! glee2@1.0.0 build: `tsc`
47 npm ERR! Exit status 2
48 npm ERR!
49 npm ERR! Failed at the glee2@1.0.0 build script.
50 npm ERR! This is probably not a problem with npm. There is likely additional logging output above.
51
52 npm ERR! A complete log of this run can be found in:
53 npm ERR! /home/circleci/.npm/_logs/2022-07-02T16_02_29_348Z-debug.log
54
55 Exited with code exit status 2
56
57 CircleCI received exit code 2
```

SCREENSHOT01

2. Failed unit tests:



The screenshot shows a CircleCI interface for a job named 'TanLocc' with ID '66eb611a-6c8b-4a0f-ab94-5094de7805de'. The job is in a failed state. The console output shows the following tests failing:

```
268 status | 71.43 | 100 | 100 | 80 |
269 status.controller.ts | 100 | 100 | 100 | 100 |
270 status.module.ts | 0 | 100 | 100 | 0 |
271 -----|-----|-----|-----|-----|
272
273 Summary of all failing tests
274 FAIL src/modules/domain/employees/commands/handlers/employee-activator.handler.spec.ts
275   • Employee Remover > when a user activates an employee > should activate the employee from the repository
276
277   expect(jest.fn()).toBeCalledWith(...expected)
278
279   Expected: 100
280   Received: 101
281
282   Number of calls: 1
283
284   33 |
285   34 | // Assert
286   > 35 | expect(employeeRepository.findById).toBeCalledWith(100);
287     |                                     ^
288   36 | expect(employeeRepository.save).toBeCalled();
289   37 | });
290   38 | });
291
292   at src/modules/domain/employees/commands/handlers/employee-activator.handler.spec.ts:35:43
293   at fulfilled (src/modules/domain/employees/commands/handlers/employee-activator.handler.spec.ts:5:58)
294
```

SCREENSHOT02

3. Job that failed because of vulnerable packages:

app.circleci.com/pipelines/github/TanLoec/autodpley/9/workflows/2f9872c7-578a-416f-9bf0-7c9054f74ab5/jobs/27

Scan frontend 25s

Your output is too large to display in the browser.
Only the last 400000 characters are displayed.

Download the full output as a file

5581		information to an unauthorized actor
5582		
5583	Package	node-fetch
5584		
5585	Patched in	>=2.6.7
5586		
5587	Dependency of	react-foundation
5588		
5589	Path	react-foundation > fbjs > isomorphic-fetch > node-fetch
5590		
5591	More info	https://github.com/advisories/GHSA-r683-j2x4-v87g
5592		
5593		
5594	Low	The 'size' option isn't honored after following a redirect in node-fetch
5595		
5596		
5597	Package	node-fetch
5598		
5599	Patched in	>=2.6.1
5600		
5601	Dependency of	react-foundation
5602		

app.circleci.com/pipelines/github/TanLoec/autodpley/9/workflows/2f9872c7-578a-416f-9bf0-7c9054f74ab5/jobs/25

Scan backend 26s

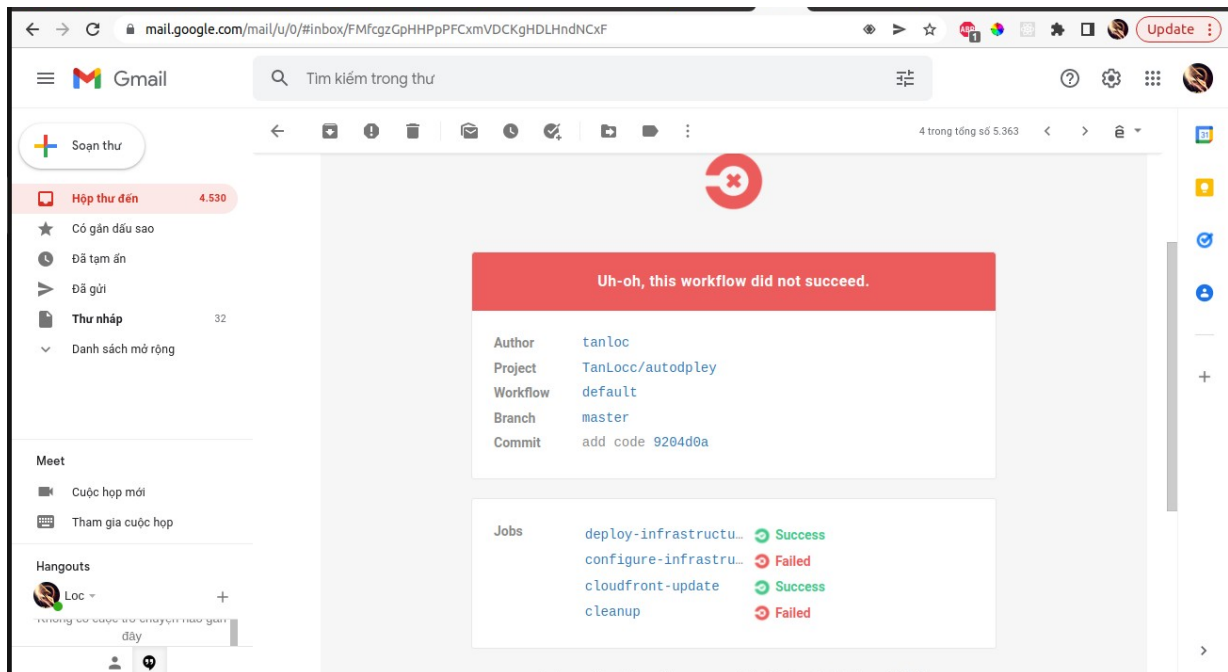
Your output is too large to display in the browser.
Only the last 400000 characters are displayed.

Download the full output as a file

5559	High	Crash in headerparser in dicer
5560		
5561	Package	dicer
5562		
5563	Patched in	No patch available
5564		
5565	Dependency of	@nestjs/platform-express
5566		
5567	Path	@nestjs/platform-express > multer > busboy > dicer
5568		
5569	More info	https://github.com/advisories/GHSA-wm7h-9275-46v2
5570		
5571		
5572	Moderate	Got allows a redirect to a UNIX socket
5573		
5574	Package	got
5575		
5576	Patched in	>=11.8.5
5577		
5578	Dependency of	nodemon [dev]
5579		
5580	Path	nodemon > update-notifier > latest-version > package-json > got
5581		
5582		

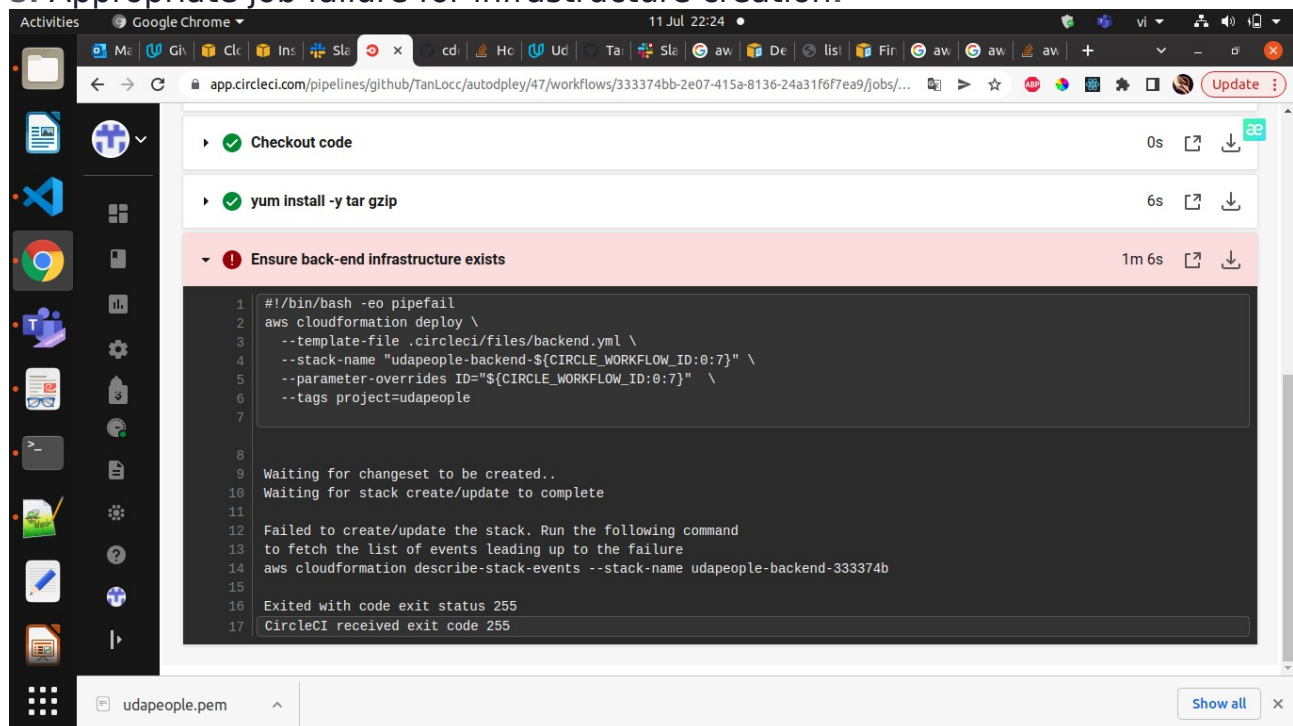
SCREENSHOT03

4. An alert from one of your failed builds



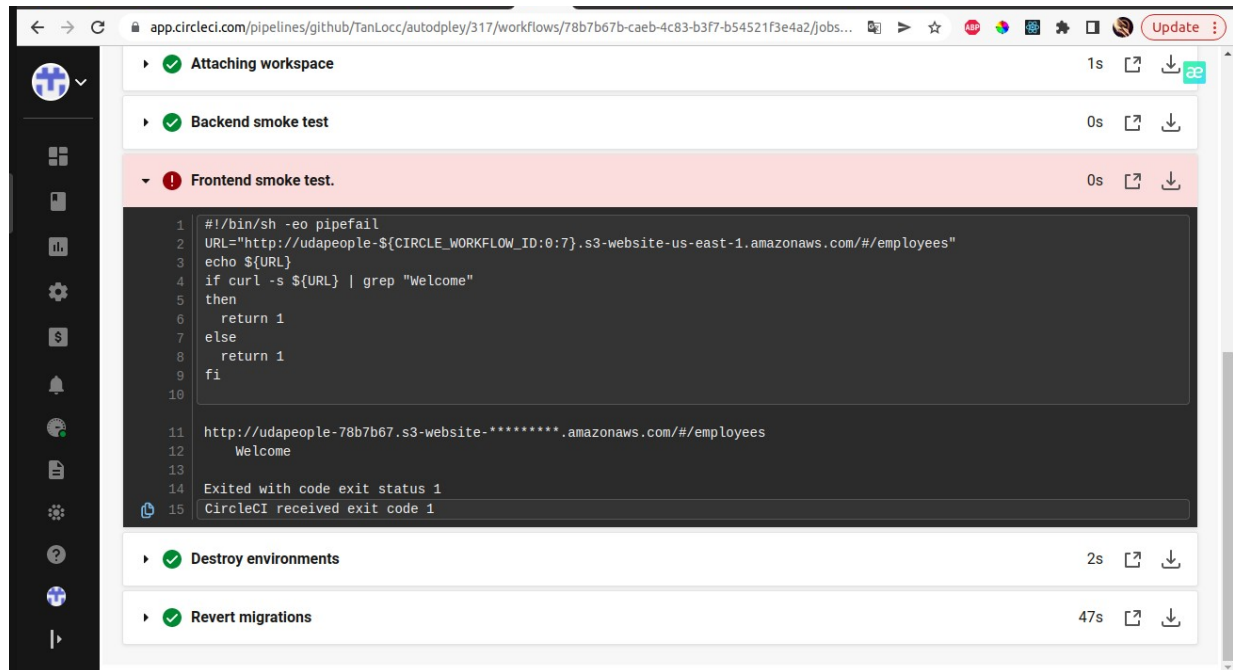
SCREENSHOT04

5. Appropriate job failure for infrastructure creation:



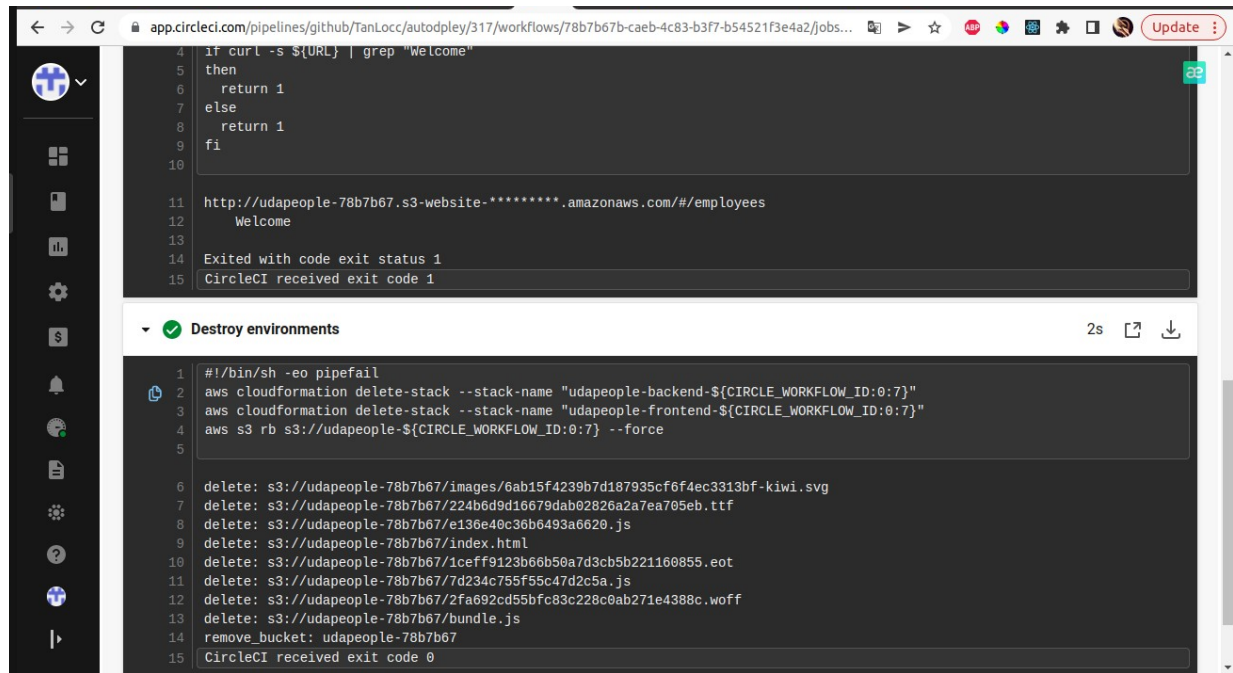
SCREENSHOT05

6. Appropriate job failure for the smoke test job:



SCREENSHOT06

7. Successful rollback after a failed smoke test:



The screenshot shows a CircleCI pipeline job in progress. The job is named "317/workflows/78b7b67b-caeb-4c83-b3f7-b54521f3e4a2/jobs...". The job is currently in the "Destroy environments" step, which is marked with a green checkmark. The step is titled "Destroy environments" and has a duration of 2s. The job is running on a Linux environment. The output of the job is as follows:

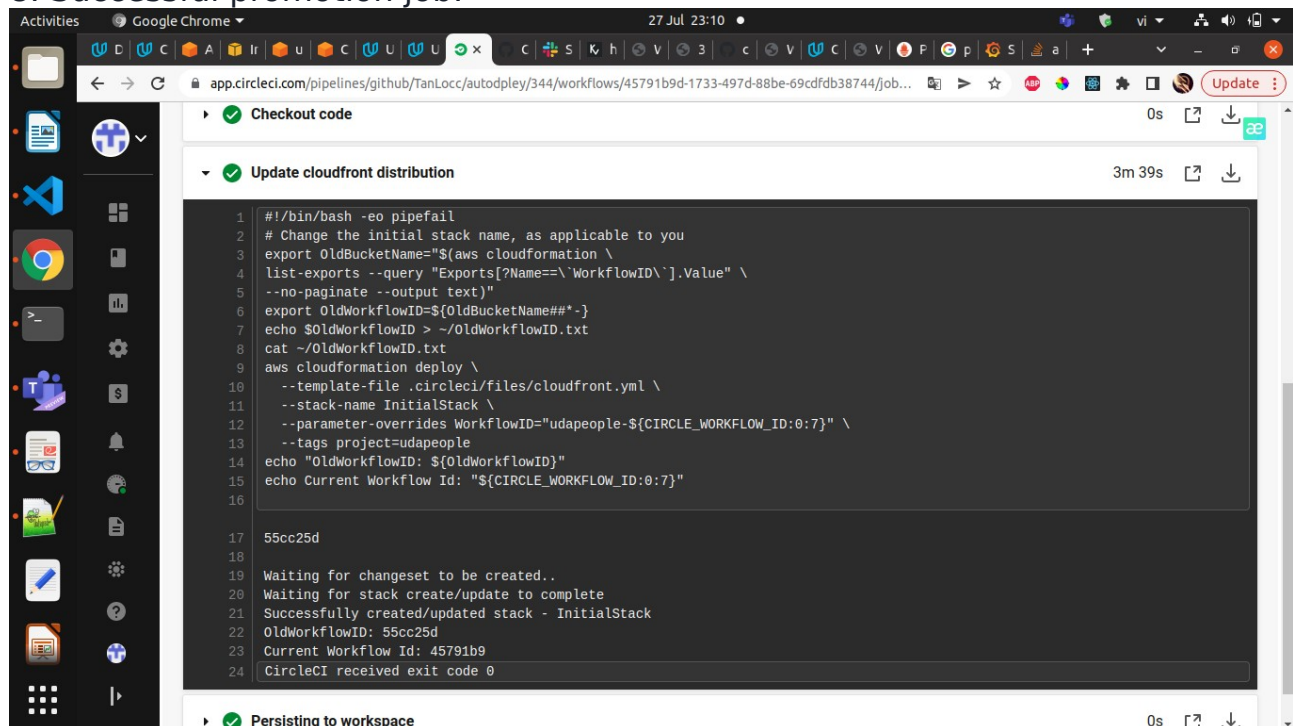
```
4 if curl -s ${URL} | grep "Welcome"
5 then
6   return 1
7 else
8   return 1
9 fi
10
11 http://udapeople-78b7b67.s3-website-*****.amazonaws.com/#/employees
12 Welcome
13
14 Exited with code exit status 1
15 CircleCI received exit code 1
```

The job is currently in the "Destroy environments" step, which is marked with a green checkmark. The step is titled "Destroy environments" and has a duration of 2s. The job is running on a Linux environment. The output of the job is as follows:

```
1 #!/bin/sh -eo pipefail
2 aws cloudformation delete-stack --stack-name "udapeople-backend-${CIRCLE_WORKFLOW_ID:0:7}"
3 aws cloudformation delete-stack --stack-name "udapeople-frontend-${CIRCLE_WORKFLOW_ID:0:7}"
4 aws s3 rb s3://udapeople-${CIRCLE_WORKFLOW_ID:0:7} --force
5
6 delete: s3://udapeople-78b7b67/images/6ab15f4239b7d187935cf6f4ec3313bf-kiwi.svg
7 delete: s3://udapeople-78b7b67/224b6d9d16679dab02826a2a7ea705eb.ttf
8 delete: s3://udapeople-78b7b67/e136e40c36b6493a6620.js
9 delete: s3://udapeople-78b7b67/index.html
10 delete: s3://udapeople-78b7b67/1ceff9123b66b50a7d3cb5b221160855.eot
11 delete: s3://udapeople-78b7b67/7d234c755f55c47d2c5a.js
12 delete: s3://udapeople-78b7b67/2fa692cd55bfc83c228c0ab271e4388c.woff
13 delete: s3://udapeople-78b7b67/bundle.js
14 remove_bucket: udapeople-78b7b67
15 CircleCI received exit code 0
```

SCREENSHOT07

8. Successful promotion job:



The screenshot shows a CircleCI pipeline job in progress. The job is named "344/workflows/45791b9d-1733-497d-88be-69cdfb38744/jobs...". The job is currently in the "Update cloudfront distribution" step, which is marked with a green checkmark. The step is titled "Update cloudfront distribution" and has a duration of 3m 39s. The job is running on a Linux environment. The output of the job is as follows:

```
1 #!/bin/bash -eo pipefail
2 # Change the initial stack name, as applicable to you
3 export OldBucketName=$(aws cloudformation \
4   list-exports --query "Exports[?Name=='WorkflowID'].Value" \
5   --no-paginate --output text)"
6 export OldWorkflowID=${OldBucketName##*-}
7 echo $OldWorkflowID > ~/OldWorkflowID.txt
8 cat ~/OldWorkflowID.txt
9 aws cloudformation deploy \
10   --template-file .circleci/files/cloudfront.yml \
11   --stack-name InitialStack \
12   --parameter-overrides WorkflowID="udapeople-${CIRCLE_WORKFLOW_ID:0:7}" \
13   --tags project=udapeople
14 echo "OldWorkflowID: ${OldWorkflowID}"
15 echo Current Workflow Id: "${CIRCLE_WORKFLOW_ID:0:7}"
16
17 55cc25d
18
19 Waiting for changeset to be created..
20 Waiting for stack create/update to complete
21 Successfully created/updated stack - InitialStack
22 OldWorkflowID: 55cc25d
23 Current Workflow Id: 45791b9
24 CircleCI received exit code 0
```

The job is currently in the "Update cloudfront distribution" step, which is marked with a green checkmark. The step is titled "Update cloudfront distribution" and has a duration of 3m 39s. The job is running on a Linux environment. The output of the job is as follows:

```
1 #!/bin/bash -eo pipefail
2 # Change the initial stack name, as applicable to you
3 export OldBucketName=$(aws cloudformation \
4   list-exports --query "Exports[?Name=='WorkflowID'].Value" \
5   --no-paginate --output text)"
6 export OldWorkflowID=${OldBucketName##*-}
7 echo $OldWorkflowID > ~/OldWorkflowID.txt
8 cat ~/OldWorkflowID.txt
9 aws cloudformation deploy \
10   --template-file .circleci/files/cloudfront.yml \
11   --stack-name InitialStack \
12   --parameter-overrides WorkflowID="udapeople-${CIRCLE_WORKFLOW_ID:0:7}" \
13   --tags project=udapeople
14 echo "OldWorkflowID: ${OldWorkflowID}"
15 echo Current Workflow Id: "${CIRCLE_WORKFLOW_ID:0:7}"
16
17 55cc25d
18
19 Waiting for changeset to be created..
20 Waiting for stack create/update to complete
21 Successfully created/updated stack - InitialStack
22 OldWorkflowID: 55cc25d
23 Current Workflow Id: 45791b9
24 CircleCI received exit code 0
```

SCREENSHOT08

9. Successful cleanup job:

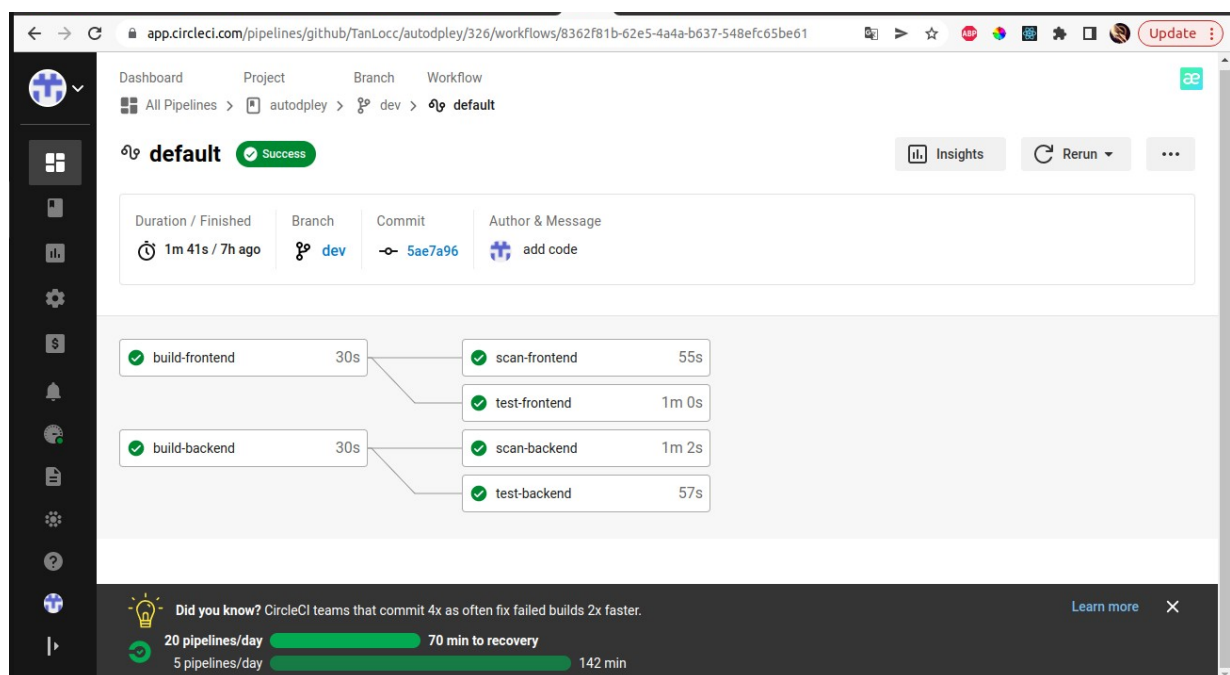
```

1  #!/bin/bash -eo pipefail
2  export OldWorkflowID="$(cat ~/OldWorkflowID.txt)"
3  echo OldWorkflowID: "${OldWorkflowID}"
4  echo CIRCLE_WORKFLOW_ID "${CIRCLE_WORKFLOW_ID:0:7}"
5  # Fetch the stack names
6  export STACKS=$(aws cloudformation list-stacks --query "StackSummaries[*].StackName" \
7    --stack-status-filter CREATE_COMPLETE --no-paginate --output text))
8  echo Stack names: "${STACKS[@]}"
9  if [[ "udapeople-${CIRCLE_WORKFLOW_ID:0:7}" != "${OldWorkflowID}" ]]
10 then
11   aws s3 rm "s3://${OldWorkflowID}" --recursive
12   aws cloudformation delete-stack --stack-name "udapeople-frontend-${OldWorkflowID}"
13   aws cloudformation delete-stack --stack-name "udapeople-backend-${OldWorkflowID}"
14 fi
15
16 OldWorkflowID: udapeople-24207ab
17 CIRCLE_WORKFLOW_ID 02eab93
18 Stack names: udapeople-frontend-02eab93 udapeople-backend-02eab93 udapeople-frontend-24207ab udapeople-backend-24207ab udapeople-frontend-24207ab udapeople-backend-24207ab
19 delete: s3://udapeople-24207ab/bundle.js
20 delete: s3://udapeople-24207ab/2e19cd014873528fa327.js
21 delete: s3://udapeople-24207ab/1ceff9123b66b50a7d3cb5b221160855.eot
22 delete: s3://udapeople-24207ab/224b6d9d16679dab02826a2a7ea705eb.ttf
23 delete: s3://udapeople-24207ab/images/6ab15f4239b7d187935cf6f4ec3313bf-kivi.svg
24 delete: s3://udapeople-24207ab/7d234c755f55c47d2c5a.js
25 delete: s3://udapeople-24207ab/index.html
26 delete: s3://udapeople-24207ab/2fa692cd55bfc83c228c0ab271e4388c.woff
27 CircleCI received exit code 0

```

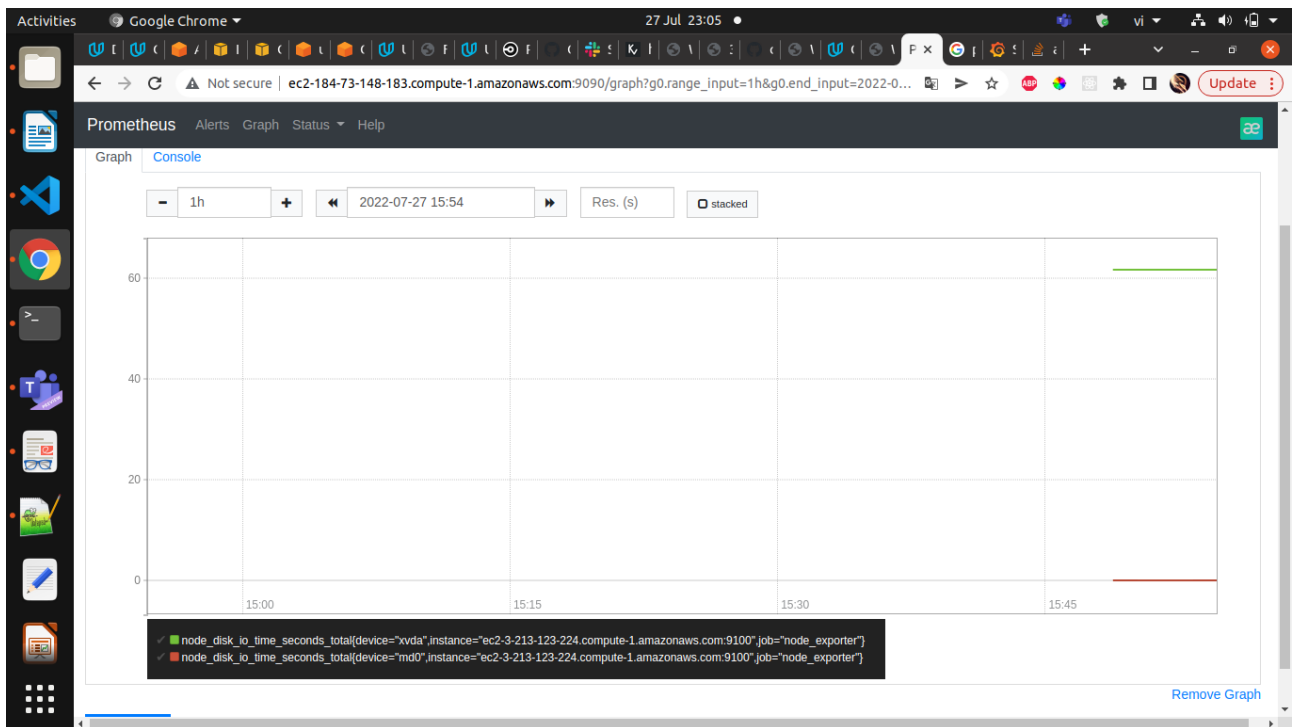
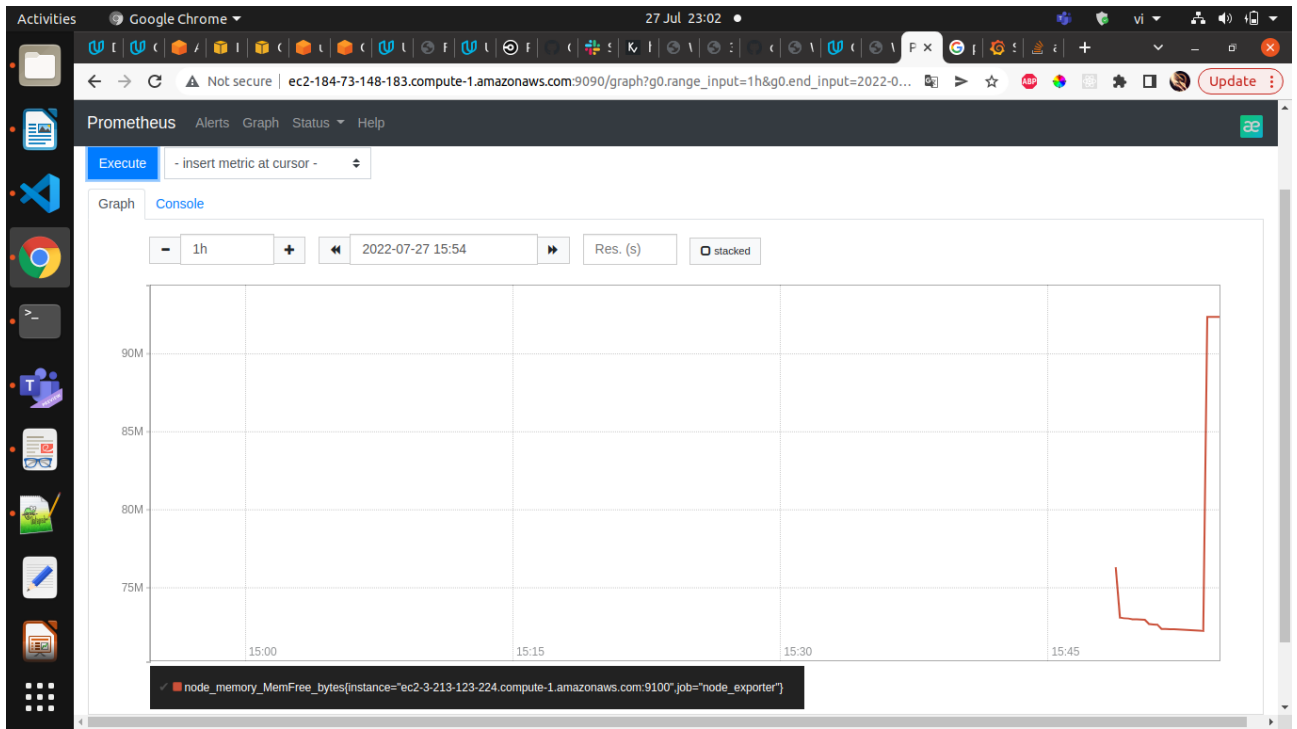
SCREENSHOT09

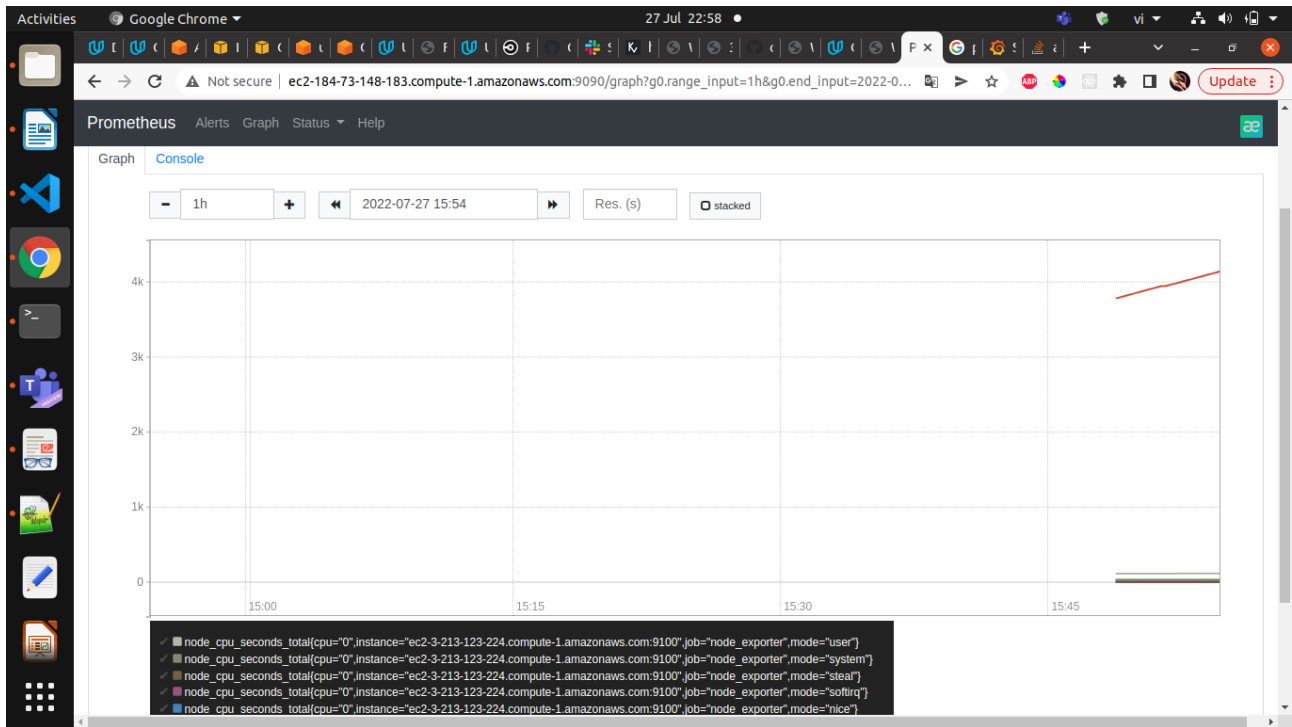
10. Only deploy on pushed to master branch



SCREENSHOT10

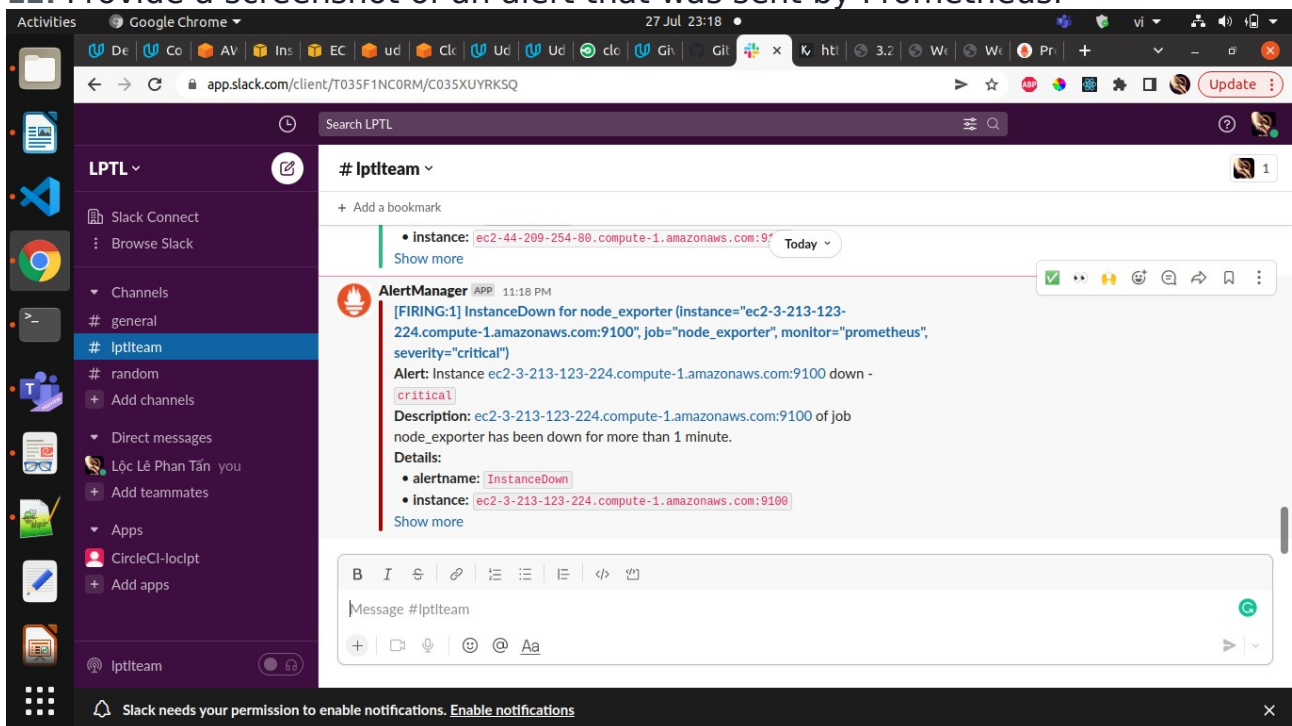
11. Provide a screenshot of a graph of your EC2 instance including available memory, available disk space, and CPU usage:





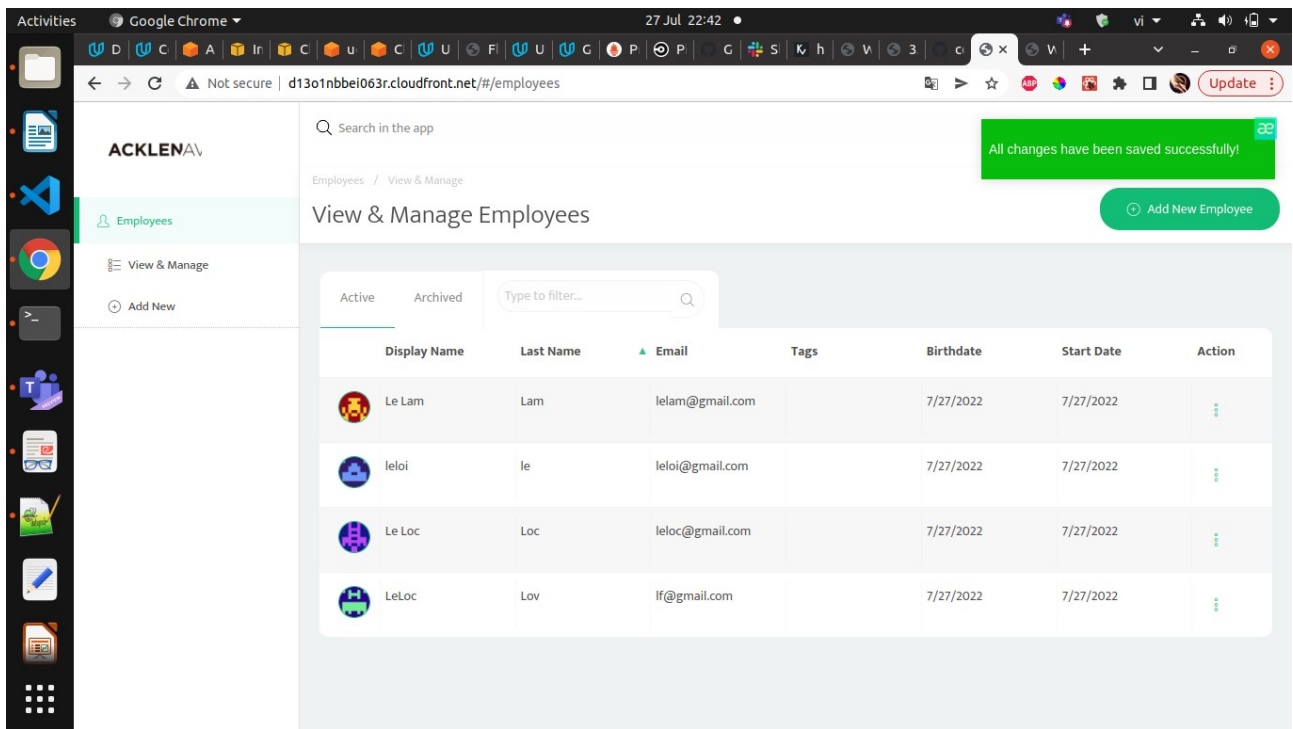
SCREENSHOT11

12. Provide a screenshot of an alert that was sent by Prometheus.



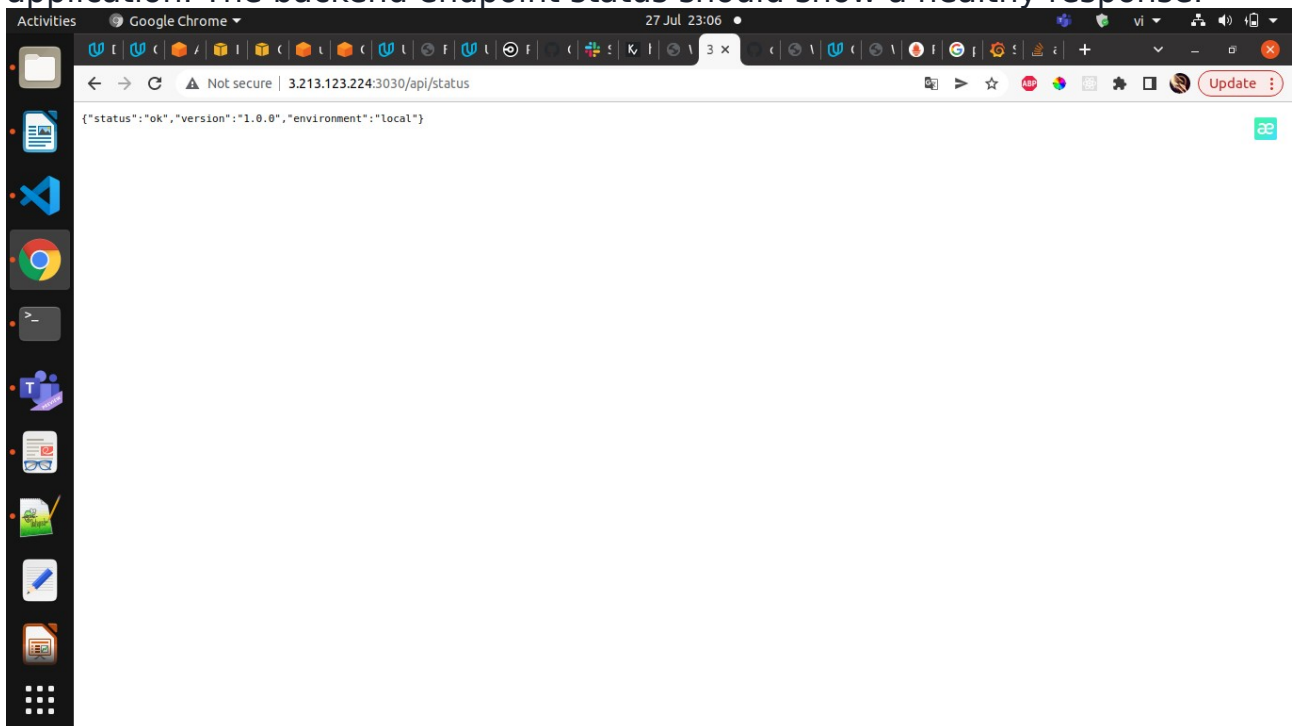
SCREENSHOT12

13. Provide a screenshot showing the evidence of deployed and functioning front-end application in CloudFront (aka, your production front-end)



URL03_SCREENSHOT

14. Provide a screenshot showing the evidence of a healthy backend application. The backend endpoint status should show a healthy response.



URL04_SCREENSHOT

15. Provide a screenshot of your Prometheus server showing UP state

Activities Google Chrome 27 Jul 22:48

Not secure | ec2-184-73-148-183.compute-1.amazonaws.com:9090/targets

Prometheus Alerts Graph Status Help

Targets

All Unhealthy

node_exporter (1/1 up) show less

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://ec2-3-213-123-224.compute-1.amazonaws.com:9100/metrics	UP	instance="ec2-3-213-123-224.compute-1.amazonaws.com:9100" job="node_exporter"	6.135s ago	20.86ms	

prometheus (1/1 up) show less

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:9090/metrics	UP	instance="localhost:9090" job="prometheus"	8.1s ago	8.839ms	

URL05_SCREENSHOT