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Cloud Developer Nano Degree
Project : Refactor Udagram app to microservices

Refactor Udagram app to Micro-services

Overview of the Project Tasks : *You have to start with the "Udagram - photo sharing" Monolith application and divide the application into smaller (micro)services. Each microservice must run in a separate Docker container. These containers (and ReplicaSets) have to be managed by using the Kubernetes cluster. You have to demonstrate the ability to independently scale-up, release, and deploy the project using Kubernetes, and TravisCI.*

A. Steps to Follow

- Divide the application into smaller services
- Containerize the application, create the Kubernetes resource, and deploy it to Kubernetes cluster.
- Implement automatic continuous integration (CI) and continuous delivery (CD) using Travis CI.
- Extend the application with deployments and be able to do rolling-updates and rollbacks

B. Dependencies

Cloud Services

- Amazon Web Services - Relational Database Services - PostgreSQL
- Amazon Web Services S3 - Resource hosting and deployments
- Amazon Web Services - IAM account [applicable only if you host your project on the cloud]

The following cloud services are optional to use:

- AWS CloudFront - CDN for SPA
- AWS EKS - Backend API
- AWS DynamoDB - Persistent Datastore
- AWS Cognito - User Authentication
- AWS CloudWatch - Performance and Health checks

Please submit your project with the following:

- Screenshot of TravisCI which shows the successful build and deploy steps
- The public GitHub repo and the docker hub images
- Screenshot of kubectl `get pod` which shows all running containers
- Screenshot of the application

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1. DOCKER IMAGES for the Project. (Docker Hub Snapshot)

dockerhub			Search for great content (e.g., mysql)	Explore	Repositories	Organizations	Get Help ▾	amitgoswami1027 ▾	
amitgoswami1027 ▾			Search by repository name...	Create Repository					
amitgoswami1027 / udagram-goswami-ionicfrontendv3			Updated 24 minutes ago	☆ 0	↓ 1	PUBLIC			
amitgoswami1027 / udagram-goswami-feedapiv2			Updated a day ago	☆ 0	↓ 4	PUBLIC			
amitgoswami1027 / udagram-goswami-reverseproxy			Updated 5 days ago	☆ 0	↓ 38	PUBLIC			
amitgoswami1027 / udagram-goswami-ionicfrontend			Updated 5 days ago	☆ 0	↓ 7	PUBLIC			
amitgoswami1027 / udagram-goswami-userapi			Updated 5 days ago	☆ 0	↓ 33	PUBLIC			

2. Screenshot of all the services running

```
backend-feed_1 | server running "http://0.0.0.0:8080"
backend-feed_1 | press CTRL+C to stop server
reverseproxy_1 | 2020/04/24 19:07:06 [notice] l#1: start worker processes
reverseproxy_1 | 2020/04/24 19:07:06 [notice] l#1: start worker process 6
backend-user_1 |
backend-user_1 | > udacity-c2-restapi@1.0.0 prod /usr/src/app
backend-user_1 | > tsc && node ./www/server.js
backend-user_1 |
backend-user_1 | Executing (default): CREATE TABLE IF NOT EXISTS "User" ("email"
" VARCHAR(255) , "password_hash" VARCHAR(255), "createdAt" TIMESTAMP WITH TIME Z
ONE, "updatedAt" TIMESTAMP WITH TIME ZONE, PRIMARY KEY ("email"));
backend-user_1 | Executing (default): SELECT i.relname AS name, ix.indisprimary
AS primary, ix.indisunique AS unique, ix.indkey AS indkey, array_agg(a.attnum)
as column_indexes, array_agg(a.attname) AS column_names, pg_get_indexdef(ix.inde
xrelid) AS definition FROM pg_class t, pg_class i, pg_index ix, pg_attribute a W
HERE t.oid = ix.indrelid AND i.oid = ix.indexrelid AND a.attrelid = t.oid AND t.
relkind = 'r' and t.relname = 'User' GROUP BY i.relname, ix.indexrelid, ix.indis
primary, ix.indisunique, ix.indkey ORDER BY i.relname;
backend-user_1 | server running "http://0.0.0.0:8080"
backend-user_1 | press CTRL+C to stop server
```

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3. KOPS Kubernetes cluster Details:

```
exit
[ec2-user@ip-10-0-1-208 docker]$ kops validate cluster
Validating cluster udagram-kops-goswami-store.k8s.local

INSTANCE GROUPS
NAME                                ROLE    MACHINETYPE  MIN  MAX  SUBNETS
master-us-east-1a                  Master  m3.medium    1    1    us-east-1a
nodes                               Node    t2.medium    2    2    us-east-1a

NODE STATUS
NAME                                ROLE    READY
ip-172-20-36-10.ec2.internal        node    True
ip-172-20-41-252.ec2.internal        master  True
ip-172-20-53-161.ec2.internal        node    True

Your cluster udagram-kops-goswami-store.k8s.local is ready
[ec2-user@ip-10-0-1-208 docker]$
```

4. kubectl get secrets

```
[ec2-user@ip-10-0-1-208 k8s]$ kubectl apply -f env-secret.yaml
secret/env-secret created
[ec2-user@ip-10-0-1-208 k8s]$ kubectl get secrets
NAME                                TYPE                                DATA  AGE
aws-secret                          Opaque                              2      2m49s
default-token-pnjgj                 kubernetes.io/service-account-token 3      113m
env-secret                          Opaque                              2      93s
[ec2-user@ip-10-0-1-208 k8s]$
```

5. kubectl get pods

```
[ec2-user@ip-10-0-1-208 k8s]$ kubectl get pods
NAME                                READY  STATUS   RESTARTS  AGE
backend-feed-66d8f64f66-n294x      1/1    Running  0          96s
backend-feed-66d8f64f66-ws41b      1/1    Running  0          96s
backend-user-c8687cb9d-ffzd9        1/1    Running  0          70s
backend-user-c8687cb9d-wqtng        1/1    Running  0          70s
frontend-b55df45b7-h7z48           1/1    Running  0          50s
reverseproxy-7c9d65b857-nsw27      1/1    Running  0          34s
[ec2-user@ip-10-0-1-208 k8s]$
```

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6. kubectl get services

```
[ec2-user@ip-10-0-1-208 k8s]$ kubectl get services
```

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
backend-feed	ClusterIP	100.65.108.177	<none>	8080/TCP	15m
backend-user	ClusterIP	100.64.242.143	<none>	8080/TCP	15m
frontend	ClusterIP	100.66.229.141	<none>	8100/TCP	14m
kubernetes	ClusterIP	100.64.0.1	<none>	443/TCP	131m
reverseproxy	ClusterIP	100.69.117.222	<none>	8080/TCP	14m

```
[ec2-user@ip-10-0-1-208 k8s]$
```

7. kubectl get deployments

```
[ec2-user@ip-10-0-1-208 k8s]$ kubectl get deployment
```

NAME	READY	UP-TO-DATE	AVAILABLE	AGE
backend-feed	2/2	2	2	19m
backend-user	0/2	2	0	19m
frontend	1/1	1	1	18m
reverseproxy	1/1	1	1	18m

```
[ec2-user@ip-10-0-1-208 k8s]$
```

8. Kubectl get deployments (Scaling it to three pods)

```
[ec2-user@ip-10-0-1-208 k8s]$ kubectl scale deployment/backend-user --replicas=3
```

deployment.apps/backend-user scaled

```
[ec2-user@ip-10-0-1-208 k8s]$ kubectl get deployment
```

NAME	READY	UP-TO-DATE	AVAILABLE	AGE
backend-feed	3/3	3	3	59m
backend-user	1/3	3	1	59m
frontend	1/1	1	1	58m
reverseproxy	1/1	1	1	58m

```
[ec2-user@ip-10-0-1-208 k8s]$
```

9. Kubectl get pods

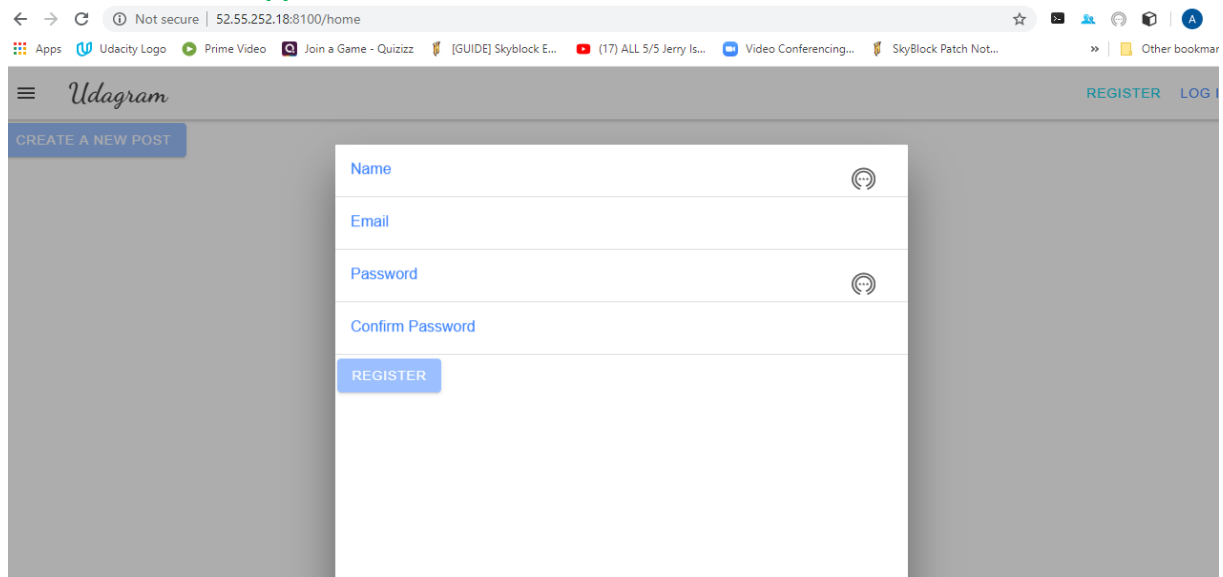
```
[ec2-user@ip-10-0-1-208 k8s]$ kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
backend-feed-66d8f64f66-dkvrg	1/1	Running	2	3m48s
backend-feed-66d8f64f66-j51fv	1/1	Running	2	3m48s
backend-feed-66d8f64f66-sgl4x	1/1	Running	2	3m48s
backend-user-c8687cb9d-ffzd9	0/1	Terminating	13	61m
backend-user-c8687cb9d-g27s2	0/1	Error	1	2m41s
frontend-b55df45b7-h7z48	1/1	Running	0	61m
reverseproxy-7c9d65b857-nsw27	1/1	Running	0	61m

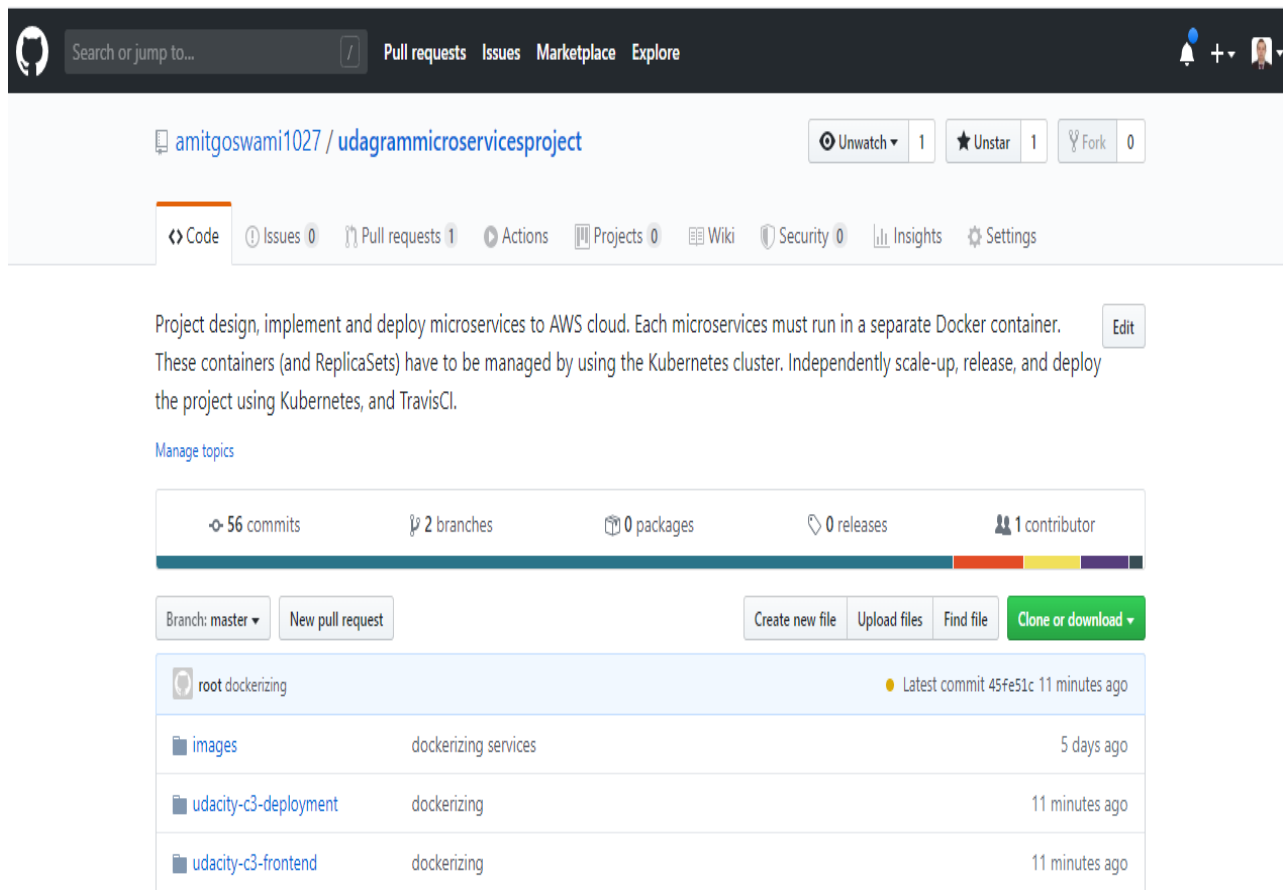
```
[ec2-user@ip-10-0-1-208 k8s]$
```

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Screenshot of the application



Screenshot of github



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Screenshot of the travis UI

The screenshot displays the Travis CI web interface. At the top, the Travis CI logo is on the left, and navigation links for Dashboard, Change, and Help are in the center. A user profile picture is on the right. A small tooltip above the navigation links says "Join a Game - Quizizz" with the URL "https://quizizz.com/join".

On the left sidebar, there is a search bar labeled "Search all repositories". Below it, the "My Repositories" section shows a list of repositories. The first entry is "amitgoswami1027/udagrammic # 3", which is marked with a green checkmark. Below this entry, it shows "Duration: 9 min 50 sec" and "Finished: less than a minute ago".

The main content area shows the repository "amitgoswami1027 / udagrammicroservicesproject". Below the repository name, there is a GitHub icon and a green badge that says "build passing". There are tabs for "Current", "Branches", "Build History", and "Pull Requests". The "Current" tab is selected.

Under the "Current" tab, the build status is "✓ master dockerizing" with a green checkmark. To the right, it says "#3 passed" and "Restart build". Below this, it shows "Commit 45fe51c", "Compare 1991cb3...45fe51c", and "Branch master". The author is "Amit Goswami".

At the bottom, it shows the environment: "Shell", "AMD64", and "DOCKER_COMPOSE_VERSION=1.23.2".