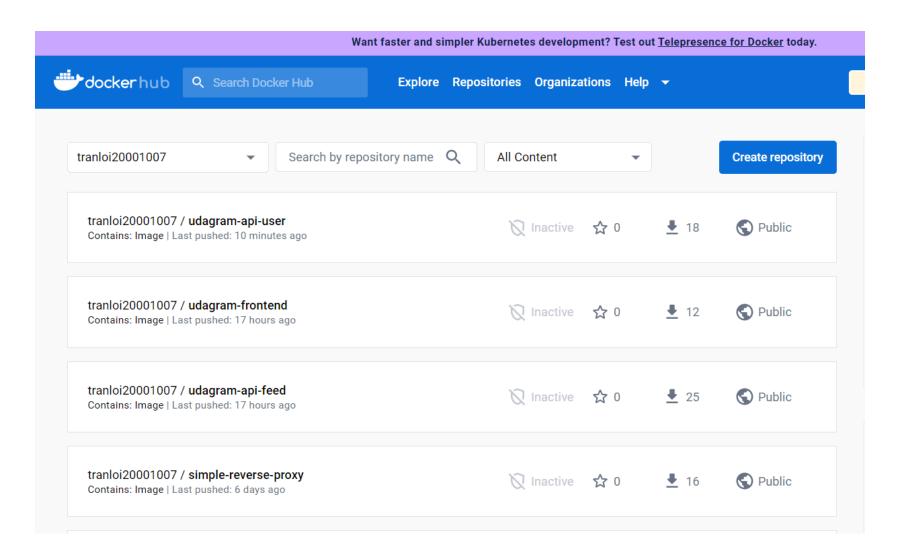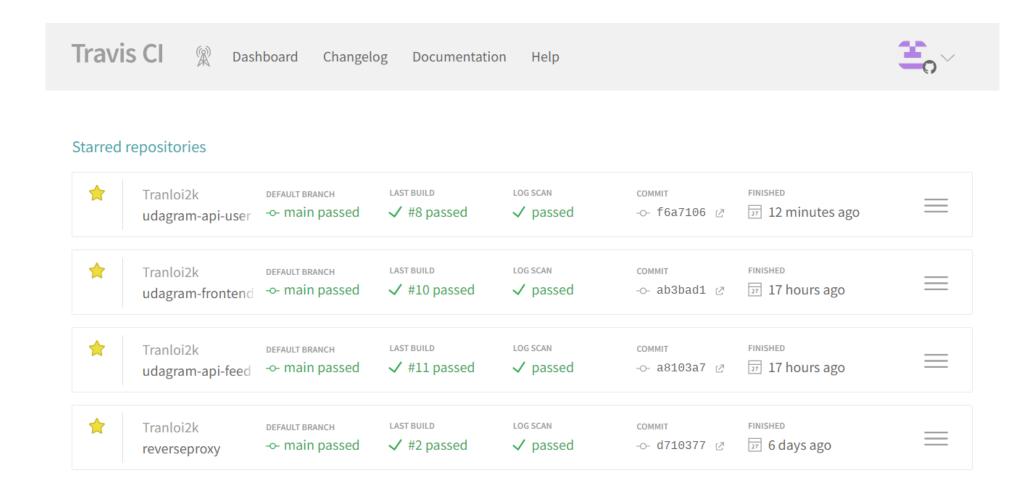Screenshot of DockerHub shows the images.

Screenshot of the Travis CI interface shows a successful build and deploy job

A screenshots of kubectl commands show the Frontend and API projects deployed in Kubernetes.

```
tranloi@MSI:/mnt/c/Users/Admin/Desktop/Project3/deployment$ kubectl get deployments
NAME           READY   UP-TO-DATE   AVAILABLE   AGE
backend-feed   2/2     2            2           22m
backend-user   2/2     2            2           22m
frontend       2/2     2            2           53m
reverseproxy   2/2     2            2           130m
tranloi@MSI:/mnt/c/Users/Admin/Desktop/Project3/deployment$ kubectl get pods
NAME                            READY   STATUS    RESTARTS       AGE
backend-feed-648654cfdf-67n49   1/1     Running   0              22m
backend-feed-648654cfdf-sn9dr   1/1     Running   0              22m
backend-user-75cd5c464d-4dx8l   1/1     Running   0              22m
backend-user-75cd5c464d-j58dg   1/1     Running   0              22m
frontend-69cf8fd859-cfm5s       1/1     Running   0              53m
frontend-69cf8fd859-gbqxt       1/1     Running   0              53m
reverseproxy-5d9c499f45-cv7zx   1/1     Running   3 (130m ago)   130m
reverseproxy-5d9c499f45-xkdkk   1/1     Running   3 (130m ago)   130m
tranloi@MSI:/mnt/c/Users/Admin/Desktop/Project3/deployment$ kubectl get svc
NAME               TYPE           CLUSTER-IP       EXTERNAL-IP                                                                      PORT(S)          AGE
backend-feed       ClusterIP      10.100.168.225   <none>                                                                           8080/TCP         130m
backend-user       ClusterIP      10.100.85.93     <none>                                                                           8080/TCP         130m
frontend           ClusterIP      10.100.86.68     <none>                                                                           8100/TCP         53m
kubernetes         ClusterIP      10.100.0.1       <none>                                                                           443/TCP          131m
publicfrontend     LoadBalancer   10.100.202.30    a1ea7b8de45fa4cda91e620a52b9a238-1320739254.us-east-1.elb.amazonaws.com          80:32185/TCP     53m
publicreverseproxy LoadBalancer   10.100.100.118   a3fddcd8dab1d419a9b5471570251efc-1032574995.us-east-1.elb.amazonaws.com          8080:32239/TCP   125m
reverseproxy       ClusterIP      10.100.119.92    <none>                                                                           8080/TCP         130m
```

The output of kubectl describe services does not expose any sensitive strings such as database passwords.

```
tranloi@MSI:/mnt/c/Users/Admin/Desktop/Project3/deployment$ kubectl describe services backend-feed
Name:              backend-feed
Namespace:         default
Labels:            service=backend-feed
Annotations:       <none>
Selector:          service=backend-feed
Type:              ClusterIP
IP Family Policy:  SingleStack
IP Families:       IPv4
IP:                10.100.168.225
IPs:               10.100.168.225
Port:              8080  8080/TCP
TargetPort:        8080/TCP
Endpoints:         172.31.1.154:8080,172.31.25.26:8080
Session Affinity:  None
Events:            <none>
tranloi@MSI:/mnt/c/Users/Admin/Desktop/Project3/deployment$ kubectl describe services backend-user
Name:              backend-user
Namespace:         default
Labels:            service=backend-user
Annotations:       <none>
Selector:          service=backend-user
Type:              ClusterIP
IP Family Policy:  SingleStack
IP Families:       IPv4
IP:                10.100.85.93
IPs:               10.100.85.93
Port:              8080  8080/TCP
TargetPort:        8080/TCP
Endpoints:         172.31.12.38:8080,172.31.26.66:8080
Session Affinity:  None
Events:            <none>
```

Screenshot of Kubernetes cluster of command kubectl describe hpa has autoscaling configured with CPU metrics.

```
tranloi@MSI:/mnt/c/Users/Admin/Desktop/Project3/deployment$ kubectl describe hpa
Warning: autoscaling/v2beta2 HorizontalPodAutoscaler is deprecated in v1.23+, unavailable in v1.26+; use autoscaling/v2 HorizontalPodAutoscaler
Name:                                                    backend-user
Namespace:                                               default
Labels:                                                  <none>
Annotations:                                             <none>
CreationTimestamp:                                       Tue, 04 Apr 2023 13:45:17 +0700
Reference:                                               Deployment/backend-user
Metrics:                                                 ( current / target )
  resource cpu on pods  (as a percentage of request):   <unknown> / 80%
Min replicas:                                            2
Max replicas:                                            3
Deployment pods:                                         0 current / 0 desired
Events:                                                  <none>
```

Screenshot of one of the backend API pod logs indicates user activity that is logged when api api/v0/users/auth/login is made.

```
tranloi@MSI:/mnt/c/Users/Admin/Desktop/Project3/deployment$ kubectl logs backend-user-75cd5c464d-4dx8l

> udacity-c2-restapi@1.0.0 prod /usr/src/app
> tsc && node ./www/server.js

Executing (default): CREATE TABLE IF NOT EXISTS "User" ("email" VARCHAR(255) , "password_hash" VARCHAR(255), "createdAt" TIMESTAMP WITH TIME ZONE, "updatedAt" TIMESTAMP WITH
 TIME ZONE, PRIMARY KEY ("email"));
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.indexrelid) AS definition FROM pg_class t, pg_class i, pg_index ix, pg_attribute a WHERE t.oid = ix.indrelid AND i.oid = ix.inde
xrelid AND a.attrelid = t.oid AND t.relkind = 'r' and t.relname = 'User' GROUP BY i.relname, ix.indexrelid, ix.indisprimary, ix.indisunique, ix.indkey ORDER BY i.relname;
server running http://localhost:8080
press CTRL+C to stop server
Executing (default): SELECT "email", "password_hash", "createdAt", "updatedAt" FROM "User" AS "User" WHERE "User"."email" = 'loi@gmail.com';
tranloi@MSI:/mnt/c/Users/Admin/Desktop/Project3/deployment$
```