Kubernetes

● Create a static index.html with your info in it

○ name, surname, index

```
PS C:\Users\Ivan\Desktop> mkdir student-info-ngnix


    Directory: C:\Users\Ivan\Desktop


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-----         5/19/2025     8:41 PM              student-info-ngnix


PS C:\Users\Ivan\Desktop> cd .\student-info-ngnix\
PS C:\Users\Ivan\Desktop\student-info-ngnix> notepad index.html
PS C:\Users\Ivan\Desktop\student-info-ngnix> cat .\index.html
<!DOCTYPE html>
<html>
<head>
    <title>My Info</title>
</head>
<body>
    <h1>My Info</h1>
    <p>Name: Ivan</p>
    <p>Surname: Pupinoski</p>
    <p>Index: 223260</p>
</body>
</html>
```

● Dockerize it with nginx

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> notepad Dockerfile
PS C:\Users\Ivan\Desktop\student-info-ngnix> cat .\Dockerfile.txt
FROM nginx:alpine
COPY index.html /usr/share/nginx/html/index.html
PS C:\Users\Ivan\Desktop\student-info-ngnix> ls


    Directory: C:\Users\Ivan\Desktop\student-info-ngnix


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----         5/19/2025     8:41 PM             67 Dockerfile.txt
-a----         5/19/2025     8:41 PM            196 index.html


PS C:\Users\Ivan\Desktop\student-info-ngnix> Rename-Item .\Dockerfile.txt Dockerfile
PS C:\Users\Ivan\Desktop\student-info-ngnix> ls


    Directory: C:\Users\Ivan\Desktop\student-info-ngnix


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----         5/19/2025     8:41 PM             67 Dockerfile
-a----         5/19/2025     8:41 PM            196 index.html
```

● Deploy it to dockerhub with tag 1.0

docker login

docker build -t ivkeex/student-info-nginx:1.0 .

docker push ivkeex/student-info-nginx:1.0

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> docker login
Authenticating with existing credentials...
Login Succeeded
PS C:\Users\Ivan\Desktop\student-info-ngnix> docker build -t ivkeex/student-info-nginx:1.0 .                                      docker:default
[+] Building 1.7s (8/8) FINISHED
 => [internal] load build definition from Dockerfile                                                                                      0.0s
 => => transferring dockerfile: 104B                                                                                                      0.0s
 => [internal] load metadata for docker.io/library/nginx:alpine                                                                          1.4s
 => [auth] library/nginx:pull token for registry-1.docker.io                                                                             0.0s
 => [internal] load .dockerignore                                                                                                        0.0s
 => => transferring context: 2B                                                                                                          0.0s
 => [internal] load build context                                                                                                        0.0s
 => => transferring context: 235B                                                                                                        0.0s
 => CACHED [1/2] FROM docker.io/library/nginx:alpine@sha256:65645c7bb6a0661892a8b03b89d0743208a18dd2f3f17a54ef4b76fb8e2f2a10             0.0s
 => [2/2] COPY index.html /usr/share/nginx/html/index.html                                                                               0.1s
 => exporting to image                                                                                                                    0.0s
 => => exporting layers                                                                                                                   0.0s
 => => writing image sha256:0e86fc565f7599104e80fa953ddbe4d6d9ac840276ea4e07353a4117c06cb4a5                                             0.0s
 => => naming to docker.io/ivkeex/student-info-nginx:1.0                                                                                 0.0s

What's Next?
  View a summary of image vulnerabilities and recommendations → docker scout quickview
PS C:\Users\Ivan\Desktop\student-info-ngnix> docker push ivkeex/student-info-nginx:1.0
The push refers to repository [docker.io/ivkeex/student-info-nginx]
f05ae41a7609: Pushed
0d853d50b128: Mounted from ivkeex/student-info
947e805a4ac7: Mounted from ivkeex/student-info
811a4dbbf4a5: Mounted from ivkeex/student-info
b8d7d1d22634: Mounted from ivkeex/student-info
e244aa659f61: Mounted from ivkeex/student-info
c56f134d3805: Mounted from ivkeex/student-info
d71eae0084c1: Mounted from ivkeex/student-info
08000c18d16d: Mounted from ivkeex/student-info
1.0: digest: sha256:439b6af5b51cdfc58c2079bfba71373c8c1664b1309864d088f38b1d354130fe size: 2196
```

● Write a deployment manifest ○ 5 replicas, 2 max surge, 1 max unavailable

notepad deployment.yml

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> notepad .\deployment.yaml
```

cat deployment.yml

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> cat .\deployment.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: student-info-nginx-deployment
spec:
  replicas: 5
  strategy:
    type: RollingUpdate
    rollingUpdate:
      maxSurge: 2
      maxUnavailable: 1
  selector:
    matchLabels:
      app: student-info-nginx
  template:
    metadata:
      labels:
        app: student-info-nginx
    spec:
      containers:
      - name: student-info-nginx-container
        image: ivkeex/student-info-nginx:1.0
        ports:
        - containerPort: 80
```

● Deploy it to your cluster

k3d cluster create mycluster –api-port 6443

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> k3d cluster create mycluster --api-port 6443
INFO[0000] Prep: Network
INFO[0000] Created network 'k3d-mycluster'
INFO[0000] Created image volume k3d-mycluster-images
INFO[0000] Starting new tools node...
INFO[0000] Starting node 'k3d-mycluster-tools'
INFO[0001] Creating node 'k3d-mycluster-server-0'
INFO[0001] Creating LoadBalancer 'k3d-mycluster-serverlb'
INFO[0001] Using the k3d-tools node to gather environment information
INFO[0001] Starting new tools node...
INFO[0001] Starting node 'k3d-mycluster-tools'
INFO[0003] Starting cluster 'mycluster'
INFO[0003] Starting servers...
INFO[0003] Starting node 'k3d-mycluster-server-0'
INFO[0006] All agents already running.
INFO[0006] Starting helpers...
INFO[0007] Starting node 'k3d-mycluster-serverlb'
INFO[0013] Injecting records for hostAliases (incl. host.k3d.internal) and for 3 network members into CoreDNS configmap...   INFO[0015] Cluster 'mycluster' created successfully!          INFO[0015] You can now use it li
ke this:
                kubectl cluster-info
```

k3d cluster list

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> k3d cluster list
NAME          SERVERS    AGENTS    LOADBALANCER
mycluster     1/1        0/0       true
```

kubectl config set-cluster k3d-myclyster –server=https://localhost:6443

–insecure-skip-tls-verify=true

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> kubectl config set-cluster k3d-mycluster --server=https://localhost:6443 --insecure-skip-tls-verify=true
>>
Cluster "k3d-mycluster" set.
```

kubectl apply -f deployment.yaml

kubectl get deployments

kubectl get pods

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> kubectl apply -f deployment.yaml
deployment.apps/student-info-nginx-deployment created
PS C:\Users\Ivan\Desktop\student-info-ngnix> kubectl get deployments
NAME                            READY   UP-TO-DATE   AVAILABLE   AGE
student-info-nginx-deployment   5/5     5            5           24s
PS C:\Users\Ivan\Desktop\student-info-ngnix> kubectl get pods
NAME                                            READY   STATUS    RESTARTS   AGE
student-info-nginx-deployment-5948df96c7-5d84n  1/1     Running   0          29s
student-info-nginx-deployment-5948df96c7-9jjbk  1/1     Running   0          29s
student-info-nginx-deployment-5948df96c7-j754v  1/1     Running   0          29s
student-info-nginx-deployment-5948df96c7-lxgtj  1/1     Running   0          29s
student-info-nginx-deployment-5948df96c7-rc75l  1/1     Running   0          29s
```

● Refactor index.html with current year in it - tag 2.0

notepad index.html

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> notepad .\index.html
```

cat index.html

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> cat .\index.html
<!DOCTYPE html>
<html>
<head>
    <title>My Info</title>
</head>
<body>
    <h1>My Info</h1>
    <p>Name: Ivan</p>
    <p>Surname: Pupinoski</p>
    <p>Index: 223260</p>
    <p>Year: 2025</p>
</body>
</html>
```

docker build -t ivkeex/student-info-nginx:2.0 .

docker push ivkeex/student-info-nginx:2.0

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> docker build -t ivkeex/student-info-nginx:2.0 .
[+] Building 0.0s (0/0)  docker:default
[+] Building 1.7s (8/8) FINISHED
 => [internal] load build definition from Dockerfile
 => => transferring dockerfile: 104B
 => [internal] load metadata for docker.io/library/nginx:alpine
 => [auth] library/nginx:pull token for registry-1.docker.io
 => [internal] load .dockerignore
 => => transferring context: 2B
 => [internal] load build context
 => => transferring context: 258B
 => CACHED [1/2] FROM docker.io/library/nginx:alpine@sha256:65645c7bb6a0661892a8b03b89d0743208a18dd2f3f17a54ef4b76fb8e2f2a10
 => [2/2] COPY index.html /usr/share/nginx/html/index.html
 => exporting to image
 => => exporting layers
 => => writing image sha256:87d3482703ca8392929d2b45f7b2d2d50d21fde0050bd7152ddee82f5dd89612
 => => naming to docker.io/ivkeex/student-info-nginx:2.0

What's Next?
  View a summary of image vulnerabilities and recommendations → docker scout quickview
PS C:\Users\Ivan\Desktop\student-info-ngnix> docker push ivkeex/student-info-nginx:2.0
The push refers to repository [docker.io/ivkeex/student-info-nginx]
3de971ab5340: Pushed
0d853d50b128: Layer already exists
947e805a4ac7: Layer already exists
811a4dbbf4a5: Layer already exists
b8d7d1d22634: Layer already exists
e244aa659f61: Layer already exists
c56f134d3805: Layer already exists
d71eae0084c1: Layer already exists
08000c18d16d: Layer already exists
2.0: digest: sha256:b2686013629cd841feb64d64aeca6fe0a8911c78b4b66244a641e788fcf2c752 size: 2196
```

● Make a rollout with 2.0 image tag

kubectl set image deployment/student/info-nginx-deployment

student-info-nginx-container=ivkeex/student-info-nginx:2.0

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> kubectl set image deployment/student-info-nginx-deployment student-info-nginx-container=ivkeex/student-info-nginx:2.0
>>
deployment.apps/student-info-nginx-deployment image updated
```

kubectl rollout status deployment/student-info-nginx-deployment

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> kubectl rollout status deployment/student-info-nginx-deployment
>>
deployment "student-info-nginx-deployment" successfully rolled out
```

● Revert to 1.0 version

kubectl rollout undo deployment/student-info-nginx-deployment

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> kubectl rollout undo deployment/student-info-nginx-deployment
deployment.apps/student-info-nginx-deployment rolled back
```

kubectl describe deployment student-info-nginx-deployment

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> kubectl describe deployment student-info-nginx-deployment
Name:                   student-info-nginx-deployment
Namespace:              default
CreationTimestamp:      Mon, 19 May 2025 21:14:35 +0200
Labels:                 <none>
Annotations:            deployment.kubernetes.io/revision: 3
Selector:               app=student-info-nginx
Replicas:               5 desired | 5 updated | 5 total | 5 available | 0 unavailable
StrategyType:           RollingUpdate
MinReadySeconds:        0
RollingUpdateStrategy:  1 max unavailable, 2 max surge
Pod Template:
  Labels:  app=student-info-nginx
  Containers:
   student-info-nginx-container:
    Image:        ivkeex/student-info-nginx:1.0
    Port:         80/TCP
    Host Port:    0/TCP
    Environment:  <none>
    Mounts:       <none>
  Volumes:        <none>
Conditions:
  Type           Status  Reason
  ----           ------  ------
  Available      True    MinimumReplicasAvailable
  Progressing    True    NewReplicaSetAvailable
OldReplicaSets:  student-info-nginx-deployment-c6fc56c6b (0/0 replicas created)
NewReplicaSet:   student-info-nginx-deployment-5948df96c7 (5/5 replicas created)
Events:
  Type    Reason            Age   From                   Message
  ----    ------            ----  ----                   -------
  Normal  ScalingReplicaSet 15m   deployment-controller  Scaled up replica set student-info-nginx-deployment-5948df96c7 to 5
  Normal  ScalingReplicaSet 119s  deployment-controller  Scaled up replica set student-info-nginx-deployment-c6fc56c6b to 2
  Normal  ScalingReplicaSet 119s  deployment-controller  Scaled down replica set student-info-nginx-deployment-5948df96c7 to 4 from 5
  Normal  ScalingReplicaSet 119s  deployment-controller  Scaled up replica set student-info-nginx-deployment-c6fc56c6b to 3 from 2
  Normal  ScalingReplicaSet 113s  deployment-controller  Scaled down replica set student-info-nginx-deployment-5948df96c7 to 3 from 4
  Normal  ScalingReplicaSet 113s  deployment-controller  Scaled up replica set student-info-nginx-deployment-c6fc56c6b to 4 from 3
  Normal  ScalingReplicaSet 113s  deployment-controller  Scaled down replica set student-info-nginx-deployment-5948df96c7 to 1 from 3
  Normal  ScalingReplicaSet 113s  deployment-controller  Scaled up replica set student-info-nginx-deployment-c6fc56c6b to 5 from 4
  Normal  ScalingReplicaSet 112s  deployment-controller  Scaled down replica set student-info-nginx-deployment-5948df96c7 to 0 from 1
  Normal  ScalingReplicaSet 25s   deployment-controller  Scaled up replica set student-info-nginx-deployment-5948df96c7 to 2 from 0
  Normal  ScalingReplicaSet 22s (x7 over 25s) deployment-controller  (combined from similar events): Scaled down replica set student-info-nginx-deployment-c6fc56c6b to 0 from 1
```

k3d cluster delete mycluster

```
PS C:\Users\Ivan\Desktop\student-info-ngnix> k3d cluster delete mycluster
INFO[0000] Deleting cluster 'mycluster'
INFO[0002] Deleting cluster network 'k3d-mycluster'
INFO[0003] Deleting 1 attached volumes...
INFO[0003] Removing cluster details from default kubeconfig...
INFO[0003] Removing standalone kubeconfig file (if there is one)...
INFO[0003] Successfully deleted cluster mycluster!
```