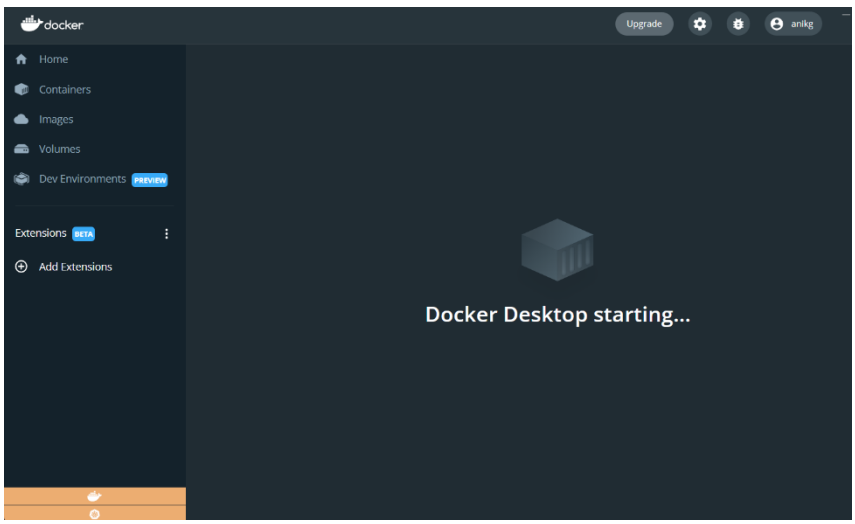
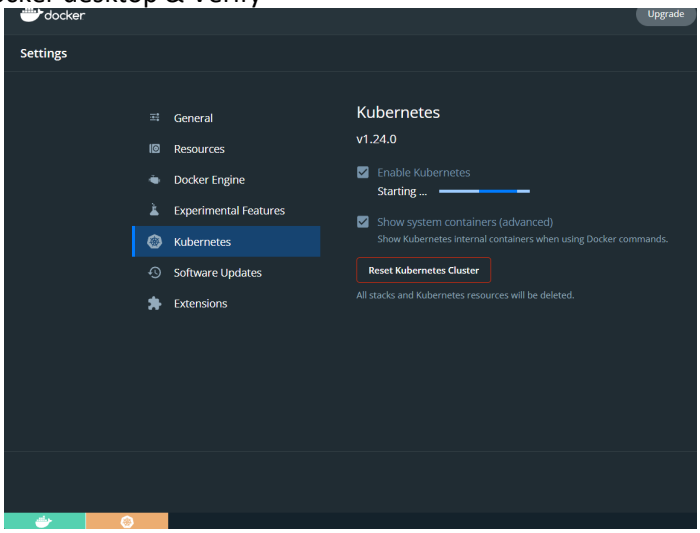
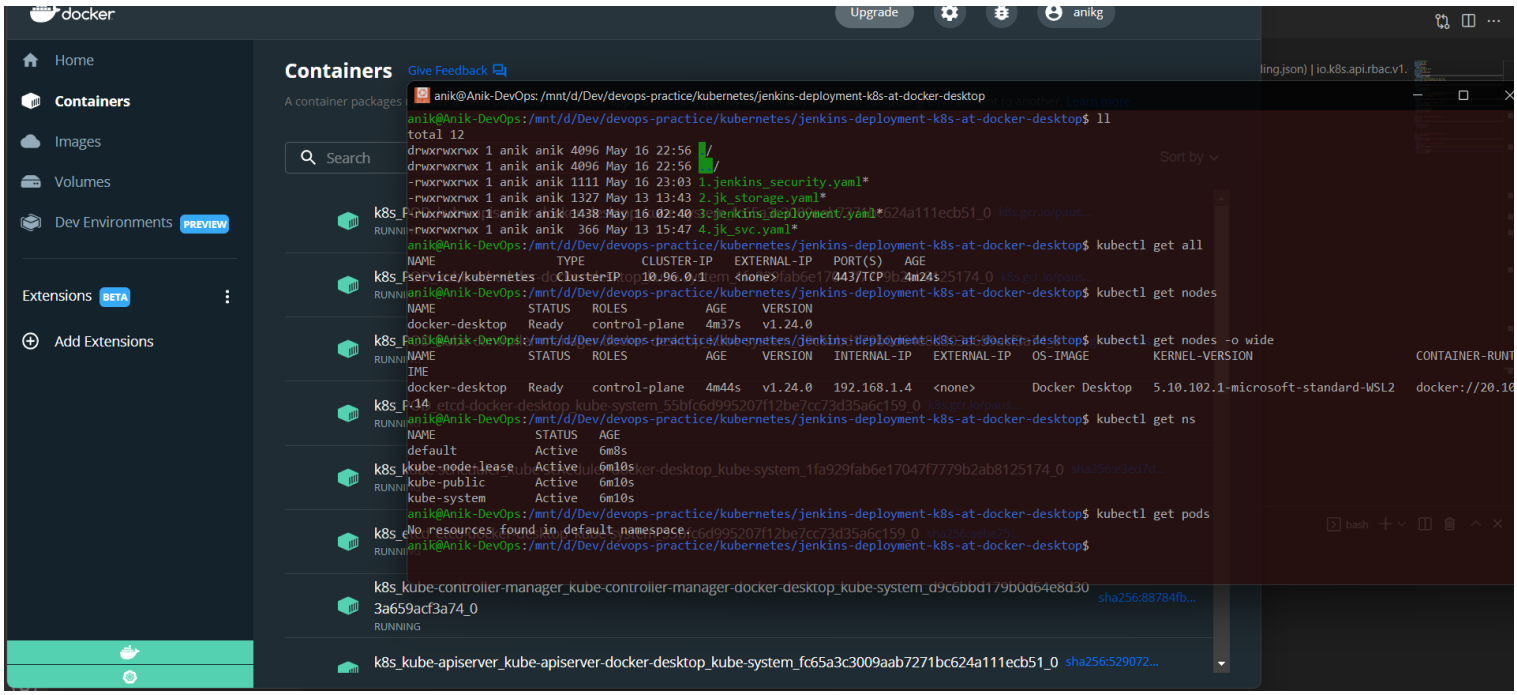
Helm Project

jenkins-deployment-k8s-at-docker-desktop

1. Starting docker desktop:
2. Make sure Kubernetes feature is enabled and stared at docker desktop & Verify







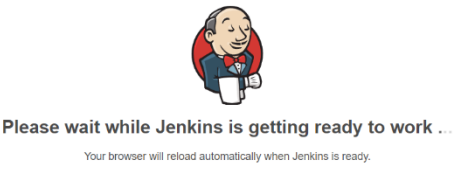
3. here deploying Jenkins as an application. Deployment must be Production standard – high available.

>>>

1. Deploying Jenkins controller at isolated **namespace**. **2**. Jenkins CICD DevOps tool: As that may need access to cluster & resources for usage, **Service account** & **RBAC** created with Clusterrole & role, role bind to Service account for Jenkins. **3**. Jenkins configuration and Jenkins data must need a storage solution for remain available outside of the pod lifecycle & backup purpose. **4**. As we are using local cluster for So here **Storage class** used local. **5**. **PersistentVolume** & **claim** maunted with Jenkins deployment volume mount. **6**. To set high availability of Jenkins application here kind used as **Deployment**. with 1 replicaset for controller node. **7**. Taking Jenkins latest **docker Image** form docker hub " jenkins/jenkins:lts". **8**. **Readiness** & **livenessProbe** enabled to control the health of an application. Failing liveness probe will restart the container, whereas failing readiness probe will stop our application from serving traffic. **9.** Jenkins containers listen ports 8080 & 50000. To access the 8080 port here used Kind: **Service NodePort** with Custom $(nodeport) from browser.

Total k8s services used:

1. Namespace
2. ServiceAccount
3. ClusterRole
4. ClusterRoleBinding
5. Role
6. RoleBinding
7. StorageClass
8. PersistentVolume
9. PersistentVolumeClaim
10. Deployment
11. Service



Here Code Link: https://github.com/AnikG-Org/devops-practice/tree/main/kubernetes/jenkins-deployment-k8s-at-docker-desktop

Steps:

```
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/jenkins-deployment-k8s-at-docker-desktop$ kubectl get pods
No resources found in default namespace.
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/jenkins-deployment-k8s-at-docker-desktop$ kubectl apply -f 1.jenkins_security.yaml
namespace/devops created
serviceaccount/devops-admin created
clusterrole.rbac.authorization.k8s.io/devops-admin created
clusterrolebinding.rbac.authorization.k8s.io/devops-admin created
role.rbac.authorization.k8s.io/devops-admin created
rolebinding.rbac.authorization.k8s.io/devops-admin created
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/jenkins-deployment-k8s-at-docker-desktop$ kubectl apply -f 2.jk_storage.yaml
storageclass.storage.k8s.io/local-storage created
persistentvolume/local-jenkins-pv created
persistentvolumeclaim/local-jenkins-pvc created
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/jenkins-deployment-k8s-at-docker-desktop$ kubectl apply -f 3.jenkins_deployment.yaml
deployment.apps/jenkins created
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/jenkins-deployment-k8s-at-docker-desktop$ kubectl apply -f 4.jk_svc.yaml
service/jenkins-svc created
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/jenkins-deployment-k8s-at-docker-desktop$ kubectl get all -n devops
NAME                           READY   STATUS             RESTARTS   AGE
pod/jenkins-594b94dfbc-lgtz2   0/1     ImagePullBackOff   0          2m17s

NAME                  TYPE       CLUSTER-IP      EXTERNAL-IP   PORT(S)          AGE
service/jenkins-svc   NodePort   10.98.101.116   <none>        8080:30080/TCP   2m9s

NAME                       READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/jenkins    0/1     1            0           2m17s

NAME                                 DESIRED   CURRENT   READY   AGE
replicaset.apps/jenkins-594b94dfbc   1         1         0       2m17s
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/jenkins-deployment-k8s-at-docker-desktop$ kubectl get ns
NAME              STATUS   AGE
default           Active   93m
devops            Active   2m57s
kube-node-lease   Active   93m
kube-public       Active   93m
kube-system       Active   93m
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/jenkins-deployment-k8s-at-docker-desktop$
```

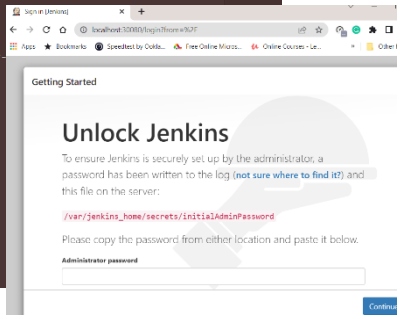
```
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/jenkins-deployment-k8s-at-docker-desktop$ kubectl logs jenkins-557987b6bc-rrbhb -n devops
Running from: /usr/share/jenkins/jenkins.war
webroot: EnvVars.masterEnvVars.get("JENKINS_HOME")
2022-05-16 20:27:04.449+0000 [id=1]     INFO    org.eclipse.jetty.util.log.Log#initialized: Logging initialized @545ms to org.eclipse.jetty.util.log.JavaUtilLog
2022-05-16 20:27:04.585+0000 [id=1]     INFO    winstone.Logger#logInternal: Beginning extraction from war file
2022-05-16 20:27:04.628+0000 [id=1]     WARNING o.e.j.s.handler.ContextHandler#setContextPath: Empty contextPath
2022-05-16 20:27:04.692+0000 [id=1]     INFO    org.eclipse.jetty.server.Server#doStart: jetty-9.4.43.v20210629; built: 2021-06-30T11:07:22.254Z; git: 526006ecfa3af7f1a2
2022-05-16 20:27:05.004+0000 [id=1]     INFO    o.e.j.w.StandardDescriptorProcessor#visitServlet: NO JSP Support for /, did not find org.eclipse.jetty.jsp.JettyJspServle
2022-05-16 20:27:05.052+0000 [id=1]     INFO    o.e.j.s.s.DefaultSessionIdManager#doStart: DefaultSessionIdManager workerName=node0
2022-05-16 20:27:05.052+0000 [id=1]     INFO    o.e.j.s.s.DefaultSessionIdManager#doStart: No SessionScavenger set, using defaults
2022-05-16 20:27:05.054+0000 [id=1]     INFO    o.e.j.server.session.HouseKeeper#startScavenging: node0 Scavenging every 600000ms
2022-05-16 20:27:05.547+0000 [id=1]     INFO    hudson.WebAppMain#contextInitialized: Jenkins home directory: /var/jenkins_home found at: EnvVars.masterEnvVars.get("JENK
2022-05-16 20:27:05.756+0000 [id=1]     INFO    o.e.j.s.handler.ContextHandler#doStart: Started w.@74cf8b28{Jenkins v2.332.3,/,file:///var/jenkins_home/war/,AVAILABLE}{/
2022-05-16 20:27:05.786+0000 [id=1]     INFO    o.e.j.server.AbstractConnector#doStart: Started ServerConnector@6c6cb480{HTTP/1.1, (http/1.1)}{0.0.0.0:8080}2022-05-16 20
ipse.jetty.server.Server#doStart: Started @1885ms
2022-05-16 20:27:05.789+0000 [id=23]    INFO    winstone.Logger#logInternal: Winstone Servlet Engine running: controlPort=disabled
2022-05-16 20:27:06.063+0000 [id=30]    INFO    jenkins.InitReactorRunner$1#onAttained: Started initialization
2022-05-16 20:27:06.129+0000 [id=30]    INFO    jenkins.InitReactorRunner$1#onAttained: Listed all plugins
2022-05-16 20:27:07.103+0000 [id=31]    INFO    jenkins.InitReactorRunner$1#onAttained: Prepared all plugins
2022-05-16 20:27:07.110+0000 [id=28]    INFO    jenkins.InitReactorRunner$1#onAttained: Started all plugins
2022-05-16 20:27:07.117+0000 [id=29]    INFO    jenkins.InitReactorRunner$1#onAttained: Augmented all extensions
2022-05-16 20:27:07.397+0000 [id=33]    INFO    jenkins.InitReactorRunner$1#onAttained: System config loaded
2022-05-16 20:27:07.398+0000 [id=28]    INFO    jenkins.InitReactorRunner$1#onAttained: System config adapted
2022-05-16 20:27:07.399+0000 [id=32]    INFO    jenkins.InitReactorRunner$1#onAttained: Loaded all jobs
2022-05-16 20:27:07.402+0000 [id=28]    INFO    jenkins.InitReactorRunner$1#onAttained: Configuration for all jobs updated
2022-05-16 20:27:07.426+0000 [id=46]    INFO    hudson.model.AsyncPeriodicWork#lambda$doRun$1: Started Download metadata
2022-05-16 20:27:07.441+0000 [id=46]    INFO    hudson.util.Retrier#start: Attempt #1 to do the action check updates server
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.codehaus.groovy.reflection.CachedClass (file:/var/jenkins_home/war/WEB-INF/lib/groovy-
WARNING: Please consider reporting this to the maintainers of org.codehaus.groovy.reflection.CachedClass
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
2022-05-16 20:27:07.557+0000 [id=31]    INFO    jenkins.install.SetupWizard#init:

*************************************************************
*************************************************************
*************************************************************

Jenkins initial setup is required. An admin user has been created and a password generated.
Please use the following password to proceed to installation:

f24e9fd9f1b94eb3a34a48b47cec6b6

This may also be found at: /var/jenkins_home/secrets/initialAdminPassword
```



So now deployed each manifest file at a time and now destroying 1 by 1.

```
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/jenkins-deployment-k8s-at-docker-desktop$ kubectl delete -f 4.jk_svc.yaml
service "jenkins-svc" deleted
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/jenkins-deployment-k8s-at-docker-desktop$ kubectl delete -f 3.jenkins_deployment.yaml
deployment.apps "jenkins" deleted
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/jenkins-deployment-k8s-at-docker-desktop$ kubectl delete -f 2.jk_storage.yaml
storageclass.storage.k8s.io "local-storage" deleted
persistentvolume "local-jenkins-pv" deleted
persistentvolumeclaim "local-jenkins-pvc" deleted
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/jenkins-deployment-k8s-at-docker-desktop$ kubectl delete -f 1.jenkins_security.yaml
namespace "devops" deleted
serviceaccount "devops-admin" deleted
clusterrole.rbac.authorization.k8s.io "devops-admin" deleted
clusterrolebinding.rbac.authorization.k8s.io "devops-admin" deleted
role.rbac.authorization.k8s.io "devops-admin" deleted
rolebinding.rbac.authorization.k8s.io "devops-admin" deleted
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/jenkins-deployment-k8s-at-docker-desktop$
```

That's really difficult for more complicated and huge application. So here Helm chart is the ultimate solution. You can variablize, you can use functions, conditions, trim you repetitive codes etc.

Helm uses a packaging format called charts. A chart is a collection of files that describe a related set of Kubernetes resources. A single chart might be used to deploy something simple or something complex.

Code Link: https://github.com/AnikG-Org/devops-practice/tree/main/kubernetes/helm/HelmProject/jenkins-chart

Steps: Try dry run your code to see the deployent expected outputs, : **helm install <name >--dry-run --debug ./path**

```
ANIK@Anik-DevOps MINGW64 /d/Dev/devops-practice/kubernetes/helm/HelmProject (main)
$ helm install jenkins-controler --dry-run --debug ./jenkins-chart/
install.go:178: [debug] Original chart version: ""
install.go:195: [debug] CHART PATH: D:\Dev\devops-practice\kubernetes\helm\HelmProject\jenkins-chart

NAME: jenkins-controler
LAST DEPLOYED: Tue May 17 02:13:01 2022
NAMESPACE: default
STATUS: pending-install
REVISION: 1
TEST SUITE: None
USER-SUPPLIED VALUES:
{}

COMPUTED VALUES:
Env: General
Storage:
  StorageClass_reclaimPolicy: Retain
  accessModes: ReadWriteOnce
  nodeSelectorkey: kubernetes.io/hostname
  nodeSelectoroperator: In
  nodeSelectorvalues: docker-desktop
  pv_reclaimPolicy: Retain
  pvName: local-jenkins
  pvlocalPath: /mnt
  storage: 1Gi
  storageClassName: local-storage
  volumeMountName: localhost-data-volume-for-jenkins
deployment:
  app: jenkins-controler
  name: jenkins
  namespace:
    create: true
    name: devops
fullnameOverride: ""
image:
  pullPolicy: IfNotPresent
  repository: jenkins/jenkins
  tag: lts-jdk11
imagePullSecrets: []
```

```
anik@Anik-DevOps: /mnt/d/Dev/devops-practice/kubernetes/helm/HelmProject
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/helm/HelmProject$ tree
.
└── jenkins-chart
    ├── Chart.yaml
    ├── templates
    │   ├── 1.jenkins_security.yaml
    │   ├── 2.jk_storage.yaml
    │   ├── 3.jenkins_deployment.yaml
    │   ├── 4.jk_svc.yaml
    │   ├── NOTES.txt
    │   └── _helpers.tpl
    └── values.yaml

2 directories, 8 files
anik@Anik-DevOps:/mnt/d/Dev/devops-practice/kubernetes/helm/HelmProject$
```

Then just a command **helm install jenkins-controler ./jenkins-chart** to deploy the entire application. & **helm uninstall jenkins-controler** to destroy entire application.

```
ANIK@Anik-DevOps MINGW64 /d/Dev/devops-practice/kubernetes/helm/HelmProject (main)
$ helm install jenkins-controler ./jenkins-chart
NAME: jenkins-controler
LAST DEPLOYED: Tue May 17 02:18:29 2022
NAMESPACE: default
STATUS: deployed
REVISION: 1
TEST SUITE: None
NOTES:
1. Get the application URL by running these commands:
  export NODE_PORT=$(kubectl get --namespace default -o jsonpath="{.spec.ports[0].nodePort}" services jenkins-svc)
  export NODE_IP=$(kubectl get nodes --namespace default -o jsonpath="{.items[0].status.addresses[0].address}")
  echo http://$NODE_IP:$NODE_PORT

ANIK@Anik-DevOps MINGW64 /d/Dev/devops-practice/kubernetes/helm/HelmProject (main)
$ kubectl get all -n devops
NAME                           READY   STATUS    RESTARTS   AGE
pod/jenkins-6c57cf8ccc-8w9v2   1/1     Running   0          109s

NAME                  TYPE       CLUSTER-IP      EXTERNAL-IP   PORT(S)          AGE
service/jenkins-svc   NodePort   10.108.58.236   <none>        8080:30080/TCP   109s

NAME                       READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/jenkins    1/1     1            1           109s

NAME                                  DESIRED   CURRENT   READY   AGE
replicaset.apps/jenkins-6c57cf8ccc    1         1         1       109s

ANIK@Anik-DevOps MINGW64 /d/Dev/devops-practice/kubernetes/helm/HelmProject (main)
$ helm list
NAME                    NAMESPACE       REVISION        UPDATED                                 STATUS          CHART                   APP VERSION
jenkins-controler       default         1               2022-05-17 02:18:29.6434619 +0530 IST   deployed        jenkins-chart-1.1.0     1.16.0

ANIK@Anik-DevOps MINGW64 /d/Dev/devops-practice/kubernetes/helm/HelmProject (main)
$ helm uninstall jenkins-controler
release "jenkins-controler" uninstalled

ANIK@Anik-DevOps MINGW64 /d/Dev/devops-practice/kubernetes/helm/HelmProject (main)
$ kubectl get ns
NAME              STATUS   AGE
default           Active   129m
kube-node-lease   Active   129m
kube-public       Active   129m
kube-system       Active   129m
```