

Problem Statement

A retail company Abstergo Corp. has recently setup an online shopping portal(website) to sell their products. Due to fierce competition, the company wants a solution that can reduce the time and effort it needs to enhance the functionality of their website on a regular basis. They are looking for an automated way to deploy the new code (for new features) to production website whenever they want.

Business Requirements

- The team of developers working on new features will merge their code to a GitHub repo.
- As soon as the code reaches GitHub, using a CI (Continuous Integration) pipeline, setup in Jenkins, automated builds will be triggered.
- The automated builds will frequently deploy new features to the production website.
- Every build will prepare a Dockerfile and push docker images to docker-hub.
- Every docker image will be deployed (Continuous Deployment) to a kubernetes-cluster.



Fork the given repository to your own account and use it as the application for your pipeline project

GitHub: <https://github.com/bhavukm/cicd-pipeline-train-schedule-autodeploy>

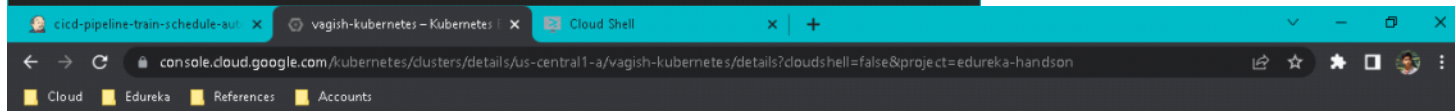
```
https://ssh.cloud.google.com/v2/ssh/projects/edureka-handson/zones/asia-south1-a/instances/instance-master?authuser=0&hl=en_US...
ssh.cloud.google.com/v2/ssh/projects/edureka-handson/zones/asia-south1-a/instances/instance-master?authuser=0&hl=en_US&project=...

SSH-in-browser
UPLOAD FILE
DOWNLOAD FILE

root@instance-master:~# kubectl get nodes
NAME                                STATUS    ROLES    AGE   VERSION
gke-vagish-kubernetes-default-pool-cf69a8dc-78mk Ready    <none>   38m   v1.24.9-gke.3200
gke-vagish-kubernetes-default-pool-cf69a8dc-v8v7 Ready    <none>   38m   v1.24.9-gke.3200
root@instance-master:~# service jenkins status
jenkins.service - Jenkins Continuous Integration Server
   Loaded: loaded (/lib/systemd/system/jenkins.service; enabled; vendor preset: enabled)
   Active: active (running) since Sun 2023-03-19 15:02:12 UTC; 1min 43s ago
     Main PID: 125049 (java)
        Tasks: 46 (limit: 4691)
      Memory: 382.4M
         CPU: 26.005s
    CGroup: /system.slice/jenkins.service
            └─125049 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var

Mar 19 15:02:09 instance-master jenkins[125049]: WARNING: Use --illegal-access=warn to enable warnings of fu
Mar 19 15:02:09 instance-master jenkins[125049]: WARNING: All illegal access operations will be denied in a
Mar 19 15:02:11 instance-master jenkins[125049]: 2023-03-19 15:02:11.079+0000 [id=13] INFO h.jp
Mar 19 15:02:11 instance-master jenkins[125049]: 2023-03-19 15:02:11.809+0000 [id=32] INFO jenk
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Mar 19 15:02:11 instance-master jenkins[125049]: 2023-03-19 15:02:11.811+0000 [id=31] INFO jenk
Mar 19 15:02:11 instance-master jenkins[125049]: 2023-03-19 15:02:11.829+0000 [id=32] INFO jenk
Mar 19 15:02:11 instance-master jenkins[125049]: 2023-03-19 15:02:11.945+0000 [id=29] INFO jenk
Mar 19 15:02:12 instance-master jenkins[125049]: 2023-03-19 15:02:12.036+0000 [id=22] INFO hudo
Mar 19 15:02:12 instance-master systemd[1]: Started Jenkins Continuous Integration Server.

root@instance-master:~# curl ifconfig.me
95.200.236.221root@instance-master:~#
```



☰

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Edureka-Handson

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2

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Kubernetes Engine

Clusters

EDIT

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OPERATIONS

HELP ASSISTANT

Clusters

Workloads

Services & Ingress

Applications

Secrets & ConfigMaps

Storage

Object Browser

Migrate to Containers

Backup for GKE

Marketplace

Release Notes

✓

vagish-kubernetes

DETAILS

NODES

STORAGE

OBSERVABILITY

LOGS

Cluster basics

Name	vagish-kubernetes	🔒
Location type	Zonal	🔒
Control plane zone	us-central1-a	🔒
Default node zones	us-central1-a	✏️
Release channel	Regular channel	✏️ UPGRADE AVAILABLE
Version	1.24.9-gke.3200	
Total size	2	📄
External endpoint	95.224.18.53 Show cluster certificate	✏️
Internal endpoint	10.128.0.51 Show cluster certificate	🔒

Automation

```
https://ssh.cloud.google.com/v2/ssh/projects/edureka-handson/zones/asia-south1-a/instances/instance-master?authuser=0&hl=en_US...
ssh.cloud.google.com/v2/ssh/projects/edureka-handson/zones/asia-south1-a/instances/instance-master?authuser=0&hl=en_US&project=...

SSH-in-browser
UPLOAD FILE
DOWNLOAD FILE

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```
https://ssh.cloud.google.com/v2/ssh/projects/edureka-handson/zones/asia-south1-a/instances/instance-master?authuser=0&hl=en_US...
ssh.cloud.google.com/v2/ssh/projects/edureka-handson/zones/asia-south1-a/instances/instance-master?authuser=0&hl=en_US&project...
SSH-in-browser
UPLOAD FILE
DOWNLOAD FILE

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NAME                                STATUS    ROLES    AGE   VERSION
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Mar 19 15:02:12 instance-master jenkins[125049]: 2023-03-19 15:02:12.036+0000 [id=22] INFO huda
Mar 19 15:02:12 instance-master systemd[1]: Started Jenkins Continuous Integration Server.

root@instance-master:~# curl ifconfig.me
35.200.236.221root@instance-master:~# gcloud container clusters get-credentials vagish-kubernetes --zone us-c
entrall1-a --project edureka-handson
Fetching cluster endpoint and auth data.
kubeconfig entry generated for vagish-kubernetes.
root@instance-master:~#
```

```
https://ssh.cloud.google.com/v2/ssh/projects/edureka-handson/zones/asia-south1-a/instances/instance-master?authuser=0&hl=en_US...
ssh.cloud.google.com/v2/ssh/projects/edureka-handson/zones/asia-south1-a/instances/instance-master?authuser=0&hl=en_US&project...
SSH-in-browser
UPLOAD FILE
DOWNLOAD FILE

root@instance-master:~# kubectl get all -o wide
NAME                                TYPE    CLUSTER-IP    EXTERNAL-IP    PORT(S)    AGE   SELECTOR
service/kubernetes ClusterIP  10.112.0.1    <none>         443/TCP     41m   <none>
root@instance-master:~#
```

Launch an instance | Instance details | Amazon EKS cluster | New Tab | bhavukm/cicd-pipeline | Personal Access Token

github.com/settings/tokens

Cloud | Edureka | References | Accounts

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Some of the scopes you've selected are included in other scopes. Only the minimum set of necessary scopes has been saved.

Settings / Developer settings

GitHub Apps | OAuth Apps | **Personal access tokens** | Fine-grained tokens (Beta) | Tokens (classic)

Personal access tokens (classic)

Generate new token | Revoke all

Tokens you have generated that can be used to access the GitHub API.

Make sure to copy your personal access token now. You won't be able to see it again!

Copied!

✓ ghp_Tk dUKWhH72Ln8RhUt d3FbVvagr17NA4BNS45 ✓ Delete

Personal access tokens (classic) function like ordinary OAuth access tokens. They can be used instead of a password for Git over HTTPS, or can be used to authenticate to the API over Basic Authentication.

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cicd-pipeline-train-schedule #1

Not secure | 35.200.236.221:8080/job/cicd-pipeline-train-schedule/1/console

Dashboard > cicd-pipeline-train-schedule > #1

```
Commit message: upgrade java version
First time build. Skipping changelog.
[Pipeline] }
[Pipeline] // stage
[Pipeline] withEnv
[Pipeline] {
[Pipeline] withEnv
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Build)
[Pipeline] echo
Running build automation
[Pipeline] sh
+ chmod +x gradlew
[Pipeline] sh
+ ./gradlew build --no-daemon
Downloading https://services.gradle.org/distributions/gradle-6.3-bin.zip
.....
Unzipping /var/lib/jenkins/.gradle/wrapper/dists/gradle-6.3-bin/8tpu6egwscjzp10cljckl0rx/gradle-6.3-bin.zip to
/var/lib/jenkins/.gradle/wrapper/dists/gradle-6.3-bin/8tpu6egwscjzp10cljckl0rx
```

REST API | Jenkins 2.387.1

cid-pipeline-train-schedule #1 x +

← → ↻ Not secure | 35.200.236.221:8080/job/cid-pipeline-train-schedule/1/console

Dashboard > cid-pipeline-train-schedule > #1

```

+ npm@6.9.0
added 426 packages from 800 contributors in 8.338s

> Task :npmInstall
npm WARN deprecated libcipm@4.0.8: This module is no longer used. Please see @npmcli/arborist if you would like to build and
reify package trees programmatically.
npm WARN deprecated gentle-fs@2.3.1: This package is deprecated and will not be receiving further updates
npm WARN deprecated readdir-scoped-modules@1.1.0: This functionality has been moved to @npmcli/fs
npm WARN deprecated request@2.88.2: request has been deprecated, see https://github.com/request/request/issues/3142
npm WARN deprecated uuid@3.4.0: Please upgrade to version 7 or higher. Older versions may use Math.random() in certain
circumstances, which is known to be problematic. See https://v8.dev/blog/math-random for details.
npm WARN deprecated read-package-tree@5.3.1: The functionality that this package provided is now in @npmcli/arborist
npm WARN deprecated libnpmconfig@1.2.1: This module is not used anymore. npm config is parsed by npm itself and by @npmcli/config
npm WARN deprecated stringify-package@1.0.1: This module is not used anymore, and has been replaced by @npmcli/package-json
npm WARN deprecated har-validator@5.1.5: this library is no longer supported
npm WARN deprecated node-fetch-npm@2.0.4: This module is not used anymore, npm uses minipass-fetch for its fetch implementation
now

REST API Jenkins 2.387.1
```

cid-pipeline-train-schedule #1 x +

← → ↻ Not secure | 35.200.236.221:8080/job/cid-pipeline-train-schedule/1/console

Dashboard > cid-pipeline-train-schedule > #1

```

> mocha

Index Page
GET / [32m200 [0m [0m179.750 ms - 8290[0m
✓ renders successfully (211ms)

Trains API
GET /trains [32m200 [0m [0m2.261 ms - 1093[0m
✓ returns data successfully

2 passing (231ms)

> Task :npm_build
> Task :zip
> Task :build

Deprecated Gradle features were used in this build, making it incompatible with Gradle 7.0.
Use '--warning-mode all' to show the individual deprecation warnings.
See https://docs.gradle.org/6.3/userguide/command_line_interface.html#sec:command_line_warnings

BUILD SUCCESSFUL in 1m 5s
6 actionable tasks: 6 executed
[Pipeline] archiveArtifacts
Archive artifacts
```


The screenshot shows the Jenkins web interface for a pipeline named 'cicc-pipeline-train-schedule'. The top navigation bar includes the Jenkins logo, a search bar, and user information for 'Vagish Jaiswal'. The left sidebar contains various management options. The main content area shows the pipeline's status, a link to build now, and a section for 'Last Successful Artifacts' with a downloadable file 'trainSchedule.zip'. Below this is the 'Stage View' table, which details the stages of the pipeline and their durations. A build log snippet at the bottom indicates a successful build on March 19 at 22:39 with no changes.

Declarative: Checkout SCM	Build	Build Docker Image	Push Docker Image	CanaryDeploy	DeployToProduction
1s	1min 6s	0ms	0ms	0ms	0ms

Build Log Snippet:

```
#1
Mar 19 22:39 No Changes
```

```
cid-pipeline-train-schedule #8 x +
Not secure | 35.200.236.221:8080/job/cid-pipeline-train-schedule/8/console
Dashboard > cid-pipeline-train-schedule > #8

[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Build Docker Image)
[Pipeline] script
[Pipeline] {
[Pipeline] sh
+ sudo docker build -t vagish999/train-schedule .
Sending build context to Docker daemon 3.143MB

Step 1/7 : FROM node:carbon
--> 8eeadf3757f4
Step 2/7 : WORKDIR /usr/src/app
--> Using cache
--> 837c22680d33
Step 3/7 : COPY package*.json ./
--> Using cache
--> abd960cd3a23
Step 4/7 : RUN npm install
--> Using cache
--> 543454f1bfa0
Step 5/7 : COPY . .
--> a5ffc30b5cb2
Step 6/7 : EXPOSE 8080
--> Running in 1d189a0eefaa
Removing intermediate container 1d189a0eefaa
--> d6102efa4181
Step 7/7 : CMD [ "npm", "start" ]
```

```
cid-pipeline-train-schedule #12 x +
Not secure | 35.200.236.221:8080/job/cid-pipeline-train-schedule/12/console
Dashboard > cid-pipeline-train-schedule > #12

Step 5/7 : COPY . .
--> c81ba1e3ba09
Step 6/7 : EXPOSE 8080
--> Running in 13d0316b406c
Removing intermediate container 13d0316b406c
--> f6bcb0b27f14
Step 7/7 : CMD [ "npm", "start" ]
--> Running in a73d52d2ee67
Removing intermediate container a73d52d2ee67
--> ff0969f5c145
Successfully built ff0969f5c145
Successfully tagged vagish999/train-schedule:latest
[Pipeline] sh
+ sudo docker run --name temp_container vagish999/train-schedule sh -c echo Hello, World!
Hello, World!
[Pipeline] sh
+ sudo docker commit temp_container vagish999/train-schedule
sha256:67fcaaa734fd72474acc6972bd5f140b21ba9796eb8f59c8a7a4fe5cc9b9a814
[Pipeline] sh
+ sudo docker rm temp_container
temp_container
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Push Docker Image)
[Pipeline] sh
+ sudo docker login -u vagish999 -p Kakashi@111
WARNING! Using --password via the CLI is insecure. Use --password-stdin
```

```
cicd-pipeline-train-schedule #12 x +
← → ↻ Not secure | 35.200.236.221:8080/job/cicd-pipeline-train-schedule/12/console
Dashboard > cicd-pipeline-train-schedule > #12

WARNING: Using --password via the CLI is insecure. Use --password-stdin.
WARNING: Your password will be stored unencrypted in /root/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
[Pipeline] sh
+ sudo docker tag vagish999/train-schedule:latest vagish999/vagish999/train-schedule:1
[Pipeline] sh
+ sudo docker tag vagish999/train-schedule:latest vagish999/vagish999/train-schedule:latest
[Pipeline] sh
+ sudo docker push vagish999/vagish999/train-schedule:1
The push refers to repository [docker.io/vagish999/vagish999/train-schedule]
69cf02053999: Preparing
bde522f0c68c: Preparing
1fd243079361: Preparing
70abe812cd63: Preparing
423451ed44f2: Preparing
b2aaf85d6633: Preparing
88601a85ce11: Preparing
42f9c2f9c08e: Preparing
99e8bd3efaaf: Preparing
bee1e39d7c3a: Preparing
1f59a4b2e206: Preparing
0ca7f54856c0: Preparing
ebb9ae013834: Preparing
b2aaf85d6633: Waiting
88601a85ce11: Waiting
```

```
cicd-pipeline-train-schedule #13 x +
← → ↻ Not secure | 35.200.236.221:8080/job/cicd-pipeline-train-schedule/13/console
Dashboard > cicd-pipeline-train-schedule > #13

423451ed44f2: Preparing
b2aaf85d6633: Preparing
88601a85ce11: Preparing
42f9c2f9c08e: Preparing
99e8bd3efaaf: Preparing
bee1e39d7c3a: Preparing
1f59a4b2e206: Preparing
0ca7f54856c0: Preparing
ebb9ae013834: Preparing
b2aaf85d6633: Waiting
88601a85ce11: Waiting
42f9c2f9c08e: Waiting
99e8bd3efaaf: Waiting
bee1e39d7c3a: Waiting
1f59a4b2e206: Waiting
0ca7f54856c0: Waiting
ebb9ae013834: Waiting
423451ed44f2: Pushed
70abe812cd63: Pushed
1fd243079361: Pushed
a8dc3fd3954f: Pushed
42f9c2f9c08e: Pushed
b2aaf85d6633: Pushed
bde522f0c68c: Pushed
```


cid-pipeline-train-schedule #18 x +

Not secure | 35.200.236.221:8080/job/cid-pipeline-train-schedule/18/console

Dashboard > cid-pipeline-train-schedule > #18

```
[Pipeline] stage
[Pipeline] { (CanaryDeploy)
[Pipeline] withEnv
[Pipeline] {
[Pipeline] sh
+ sudo kubectl apply -f train-schedule-kube-canary.yml
service/train-schedule-service-canary unchanged
deployment.apps/train-schedule-deployment-canary created
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (DeployToProduction)
[Pipeline] withEnv
[Pipeline] {
[Pipeline] input
Deploy to Production?
Proceed or Abort
[Pipeline] }
```

REST API Jenkins 2.387.1

cid-pipeline-train-schedule #18 x +

Not secure | 35.200.236.221:8080/job/cid-pipeline-train-schedule/18/console

Dashboard > cid-pipeline-train-schedule > #18

```
[Pipeline] input
Deploy to Production?
Proceed or Abort
Approved by Vagish Jaiswal
[Pipeline] milestone
Trying to pass milestone 1
[Pipeline] sh
+ sudo kubectl apply -f train-schedule-kube-canary.yml
service/train-schedule-service-canary unchanged
deployment.apps/train-schedule-deployment-canary unchanged
[Pipeline] sh
+ sudo kubectl apply -f train-schedule-kube.yml
service/train-schedule-service created
deployment.apps/train-schedule-deployment created
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

https://ssh.cloud.google.com/v2/ssh/projects/edureka-handson/zones/asia-south1-a/instances/instance-master?authuser=0&hl=en_US&projectNumber=156854581063&useAdminProxy=true · Google Chrome

ssh.cloud.google.com/v2/ssh/projects/edureka-handson/zones/asia-south1-a/instances/instance-master?authuser=0&hl=en_US&projectNumber=156854581063&useAdminProxy=true

SSH-in-browser

UPLOAD FILE DOWNLOAD FILE

```
jenkins@instance-master:~/workspace/cicd-pipeline-train-schedule$ sudo kubectl get all
NAME                                READY   STATUS             RESTARTS   AGE
pod/train-schedule-deployment-858bb4cc9-8m6cd    0/1     CrashLoopBackOff   2 (15s ago)  48s
pod/train-schedule-deployment-858bb4cc9-dvurt     0/1     CrashLoopBackOff   1 (15s ago)  48s
pod/train-schedule-deployment-canary-6df9bf57c8-qv56f  0/1     CrashLoopBackOff   2 (16s ago)  69s

NAME                                 TYPE          CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
service/kubernetes                   ClusterIP      10.112.0.1       <none>            443/TCP           3h51m
service/train-schedule-service        NodePort       10.112.3.55      <none>            8080:30009/TCP    50s
service/train-schedule-service-canary NodePort       10.112.0.31      <none>            8080:30001/TCP    115s

NAME                                READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/train-schedule-deployment  0/2     2             0           49s
deployment.apps/train-schedule-deployment-canary  0/1     1             0           70s

NAME                                DESIRED   CURRENT   READY   AGE
replicaset.apps/train-schedule-deployment-858bb4cc9    2         2         0       50s
replicaset.apps/train-schedule-deployment-canary-6df9bf57c8  1         1         0       71s
jenkins@instance-master:~/workspace/cicd-pipeline-train-schedule$
```

Find your train!

Select your train below to see its current schedule.

Trains

[Flying Scotsman](#) [Golden Arrow](#) [Hogwarts Express](#) [Orient Express](#)

Select a train to view its current schedule.

Find your train!

Select your train below to see its current schedule.

Trains

[Flying Scotsman](#) [Golden Arrow](#) [Hogwarts Express](#) [Orient Express](#)

Hogwarts Express

Station			
Sycamore	ON-TIME	Arrives 12:00pm	Departs 12:10pm
Pine	ON-TIME	Arrives 1:00pm	Departs 1:10pm