

Lab Final Task

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EPAM DevOps Lab 2021



Used Technologies and Tools

Git/GitHub



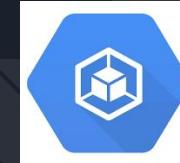
Docker/Docker Hub



Terraform



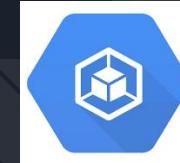
Kubernetes



GCP/GKE



Jenkins



Helm



Prometheus



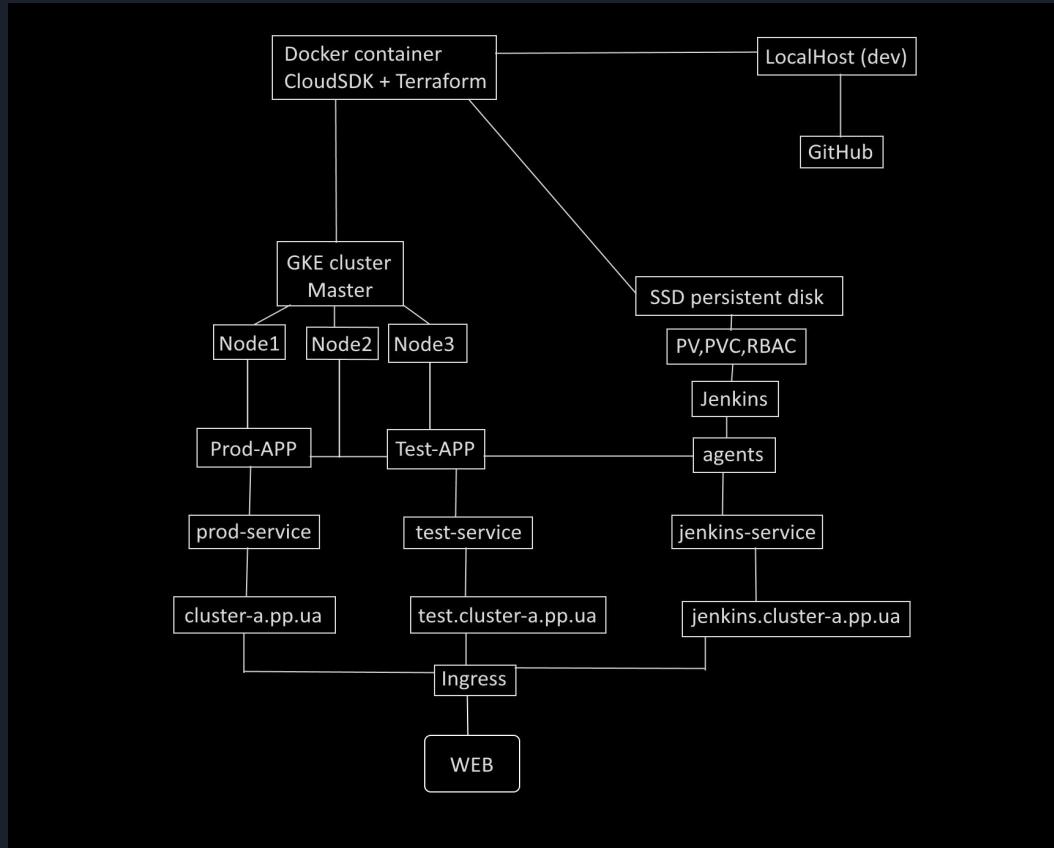
Grafana



Contour ingress controller



Scheme of task.





Common Steps of Task

1. Provisioning GKE cluster by Terraform.
2. Deploy Contour Ingress Controller.
3. Setup PV and PVC, RBAC for Jenkins.
4. Deploy Jenkins and configure it.
5. Make a CI/CD pipeline.
6. Install Monitoring for cluster.

Provisioning steps.

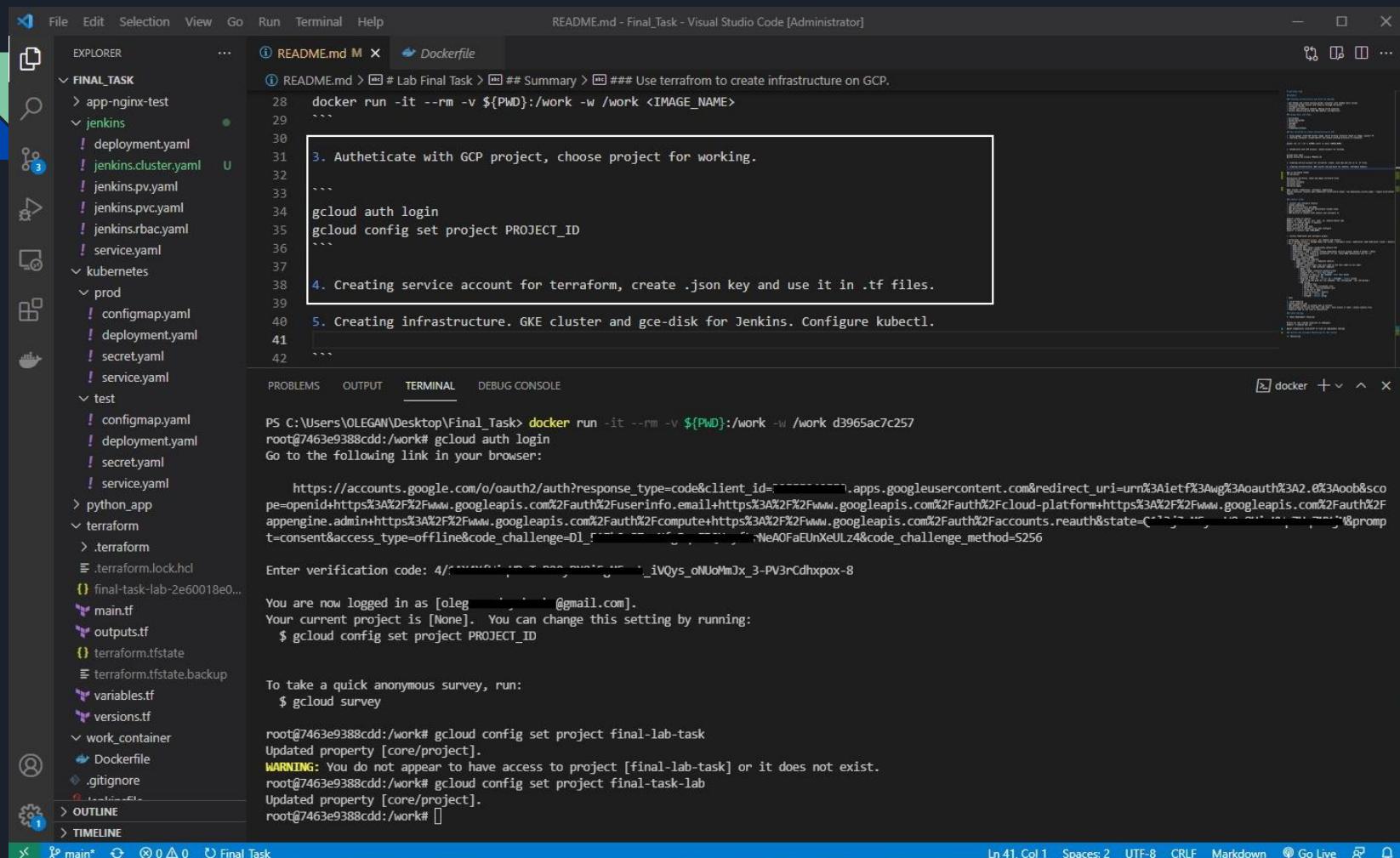
The screenshot shows a Visual Studio Code interface with the following details:

- File Explorer:** Shows a project structure with folders like FINAL_TASK, jenkins, kubernetes, prod, test, python_app, terraform, and files such as README.md, Dockerfile, deployment.yaml, service.yaml, configmap.yaml, secret.yaml, and various .tf files.
- Editor:** Displays a file named README.md containing provisioning steps. A portion of the content is highlighted with a red box:

```
15 * Git/GitHub
16 * Docker/DockerHub
17 * Terraform
18 * GCP/GKE
19 * Jenkins
20 * Prometheus/Grafana
21
22 ### Use terrafrom to create infrastructure on GCP.
23
24 1. Using google cloud-sdk docker image. Build working container based on image, install TF.
25 2. Starting container (cloud-sdk+tf) and attach working directory to container.
26
27 ...
28 docker run -it --rm -v ${PWD}:/work -w /work <IMAGE_NAME>
29 ...
30
31 3. Authenticate with GCP project, choose project for working.
32
33 ...
34 gcloud auth login
35 gcloud config set project PROJECT_ID
36 ...
37
```
- Terminal:** Shows a PowerShell session (PS) running on C:\Users\OLEGAN\Desktop\Final_Task. It lists Docker images and runs a command to start a container attached to the current working directory.

```
PS C:\Users\OLEGAN\Desktop\Final_Task> docker images
REPOSITORY          TAG      IMAGE ID      CREATED       SIZE
work-container-1   latest   d3965ac7c257  2 weeks ago  2.65GB
PS C:\Users\OLEGAN\Desktop\Final_Task> docker run -it --rm -v ${PWD}:/work -w /work d3965ac7c257
root@7463e9388cdd:/work#
```

Provisioning steps.



Provisioning steps.

The screenshot shows a Visual Studio Code interface with the title "README.md - Final_Task - Visual Studio Code [Administrator]". The left sidebar displays a file tree with a folder structure under "FINAL_TASK". The main editor area contains a code editor with several tabs: "README.md M", "Dockerfile", and "Dockerfile". The "README.md" tab is active and shows a section titled "5. Creating infrastructure. GKE cluster and gce-disk for Jenkins. Configure kubectl." followed by a series of commands:

```
5. Creating infrastructure. GKE cluster and gce-disk for Jenkins. Configure kubectl.  
...  
#go to terraform folder  
cd terraform/  
  
#initialize terraform, check and apply terraform files  
terraform init  
terraform validate  
terraform plan  
terraform apply  
  
#get cluster credentials, configure .kubeconfig  
gcloud container clusters get-credentials $(terraform output --json kubernetes_cluster_name) --region $(terraform output --json region)
```

Below the code editor, the "PROBLEMS", "OUTPUT", "TERMINAL", and "DEBUG CONSOLE" tabs are visible. The "TERMINAL" tab is active, showing a terminal session with the following output:

```
Updated property [core/project].  
WARNING: You do not appear to have access to project [final-lab-task] or it does not exist.  
root@7463e9388cdd:/work# gcloud config set project final-task-lab  
Updated property [core/project].  
root@7463e9388cdd:/work# cd terraform/  
root@7463e9388cdd:/work/terraform# terraform init  
  
Initializing the backend...  
  
Initializing provider plugins...  
- Reusing previous version of hashicorp/google from the dependency lock file  
- Using previously-installed hashicorp/google v3.73.0  
  
Terraform has been successfully initialized!  
  
You may now begin working with Terraform. Try running "terraform plan" to see  
any changes that are required for your infrastructure. All Terraform commands  
should now work.  
  
If you ever set or change modules or backend configuration for Terraform,  
rerun this command to reinitialize your working directory. If you forget, other  
commands will detect it and remind you to do so if necessary.  
root@7463e9388cdd:/work/terraform# terraform validate  
Success! The configuration is valid.
```

The status bar at the bottom shows "Ln 41, Col 1" and other standard status indicators.

Provisioning steps.

File Edit Selection View Go Run Terminal Help README.md - Final_Task - Visual Studio Code [Administrator]

EXPLORER FINAL_TASK README.md main.tf

Lab Final Task > ## Summary > ### Use terraform to create infrastructure on GCP.

```
48 #go to terraform folder
49 cd terraform/
50
51 #initialize terraform, check and apply terraform files
52 terraform init
53 terraform validate
54 terraform plan
55 terraform apply
56
57 #get cluster credentials, configure .kubeconfig
58 gcloud container clusters get-credentials $(terraform output -raw kubernetes_cluster_name) --region $(terraform output -raw region)
59 ...
60
61 ### Jenkins CI/CD.
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE docker + ^ x

```
google_container_node_pool.default: Still creating... [10s elapsed]
google_container_node_pool.default: Still creating... [20s elapsed]
google_container_node_pool.default: Still creating... [30s elapsed]
google_container_node_pool.default: Still creating... [40s elapsed]
google_container_node_pool.default: Still creating... [50s elapsed]
google_container_node_pool.default: Still creating... [1m0s elapsed]
google_container_node_pool.default: Still creating... [1m10s elapsed]
google_container_node_pool.default: Still creating... [1m20s elapsed]
google_container_node_pool.default: Still creating... [1m30s elapsed]
google_container_node_pool.default: Still creating... [1m40s elapsed]
google_container_node_pool.default: Creation complete after 1m44s [id=projects/final-task-lab/locations/europe-central2/clusters/final-task-cluster/nodePools/final-task-cluster-node-pool]

Apply complete! Resources: 3 added, 0 changed, 0 destroyed.

Outputs:

endpoint = "34.116.245.164"
kubernetes_cluster_name = "final-task-cluster"
master_version = "1.19.9-gke.1900"
region = "europe-central2"
root@7463e9388cdd:/work/terraform# gcloud container clusters get-credentials $(terraform output -raw kubernetes_cluster_name) --region $(terraform output -raw region)
root@7463e9388cdd:/work/terraform#
```

Fetching cluster endpoint and auth data.
kubeconfig entry generated for final-task-cluster.
root@7463e9388cdd:/work/terraform#

main* 0 △ 0 Final_Task Ln 60, Col 1 Spaces: 2 UTF-8 CRLF Markdown Go Live

Install Ingress and configure Cloud DNS

```
* Install Contour Ingress Controller  
...  
#deploy ingress  
kubectl apply -f https://projectcontour.io/quickstart/contour.yaml  
...|
```

NS-серверы

Собственные серверы имен ▾

Список своих серверов имен Изменить

1. ns-cloud-b1.googledomains.com
2. ns-cloud-b3.googledomains.com
3. ns-cloud-b4.googledomains.com
4. ns-cloud-b2.googledomains.com

Filter Filter record sets

<input type="checkbox"/>	DNS name ↑	Type	TTL (seconds)	Data	<input type="button" value="✎"/>
<input type="checkbox"/>	finaltask-a.pp.ua.	A	300	• 34.118.5.226	<input type="button" value="✎"/>
<input type="checkbox"/>	finaltask-a.pp.ua.	SOA	21600	• ns-cloud-b1.googledomains.com. cloud-dns-hostmaster.google.com. 1 21600 3600 259200 300	<input type="button" value="✎"/>
<input type="checkbox"/>	finaltask-a.pp.ua.	NS	21600	• ns-cloud-b1.googledomains.com. • ns-cloud-b2.googledomains.com. • ns-cloud-b3.googledomains.com. • ns-cloud-b4.googledomains.com.	<input type="button" value="✎"/>
<input type="checkbox"/>	jenkins.finaltask-a.pp.ua.	A	300	• 34.118.5.226	<input type="button" value="✎"/>
<input type="checkbox"/>	test.finaltask-a.pp.ua.	A	300	• 34.118.5.226	<input type="button" value="✎"/>
<input type="checkbox"/>	www.finaltask-a.pp.ua.	A	300	• 34.118.5.226	<input type="button" value="✎"/>

Install Ingress and configure Cloud DNS

The screenshot shows the Visual Studio Code interface with the following details:

- File Explorer (Left):** Shows a project structure under "FINAL_TASK".
 - ingress**: Contains "ingress-hosts.yaml" (marked with a "U" icon).
 - jenkins**: Contains "deployment.yaml", "jenkins.cluster.yaml", "jenkins.pv.yaml", "jenkins.pvc.yaml", "jenkins.rbac.yaml", and "service.yaml".
 - kubernetes**: Contains "prod" and "test".
 - prod**: Contains "configmap.yaml", "deployment.yaml", "secret.yaml", and "service.yaml" (marked with an "M" icon).
 - test**: Contains "configmap.yaml", "deployment.yaml", "secret.yaml", and "service.yaml" (marked with an "M" icon).
 - python_app**: Contains "src", "Dockerfile", and ".terraform".
 - .terraform**: Contains ".terraform.lock.hcl", "main.tf", "outputs.tf", "terraform.tfstate", "terraform.tfstate.backup", "variables.tf", and "versions.tf".
- Editor (Center):** Displays the content of "ingress-hosts.yaml".

```
apiVersion: networking.k8s.io/v1beta1
kind: Ingress
metadata:
  name: ingress-hosts
spec:
  rules:
    # uncomment this part below for test namespace
    # - host: www.finaltask-a.pp.ua
    #   http:
    #     paths:
    #       - backend:
    #           serviceName: prod-service
    #           servicePort: 80
    # uncomment this part below for test namespace
    # - host: finaltask-a.pp.ua
    #   http:
    #     paths:
    #       - backend:
    #           serviceName: prod-service
    #           servicePort: 80
    # uncomment this part below for test namespace
    # - host: test.finaltask-a.pp.ua
    #   http:
    #     paths:
    #       - backend:
    #           serviceName: test-service
    #           servicePort: 80
    # uncomment this part below for test namespace
    # - host: jenkins.finaltask-a.pp.ua
    #   http:
    #     paths:
    #       - backend:
    #           serviceName: jenkins
    #           servicePort: 8080
```
- Bottom Status Bar:** Shows file information: "main*" (active), "0 main*", "0 △ 0", "ingress", "Ln 8, Col 47", "Spaces: 2", "UTF-8", "CRLF", "YAML", "Go Live", and icons for "Find", "Replace", and "Search".

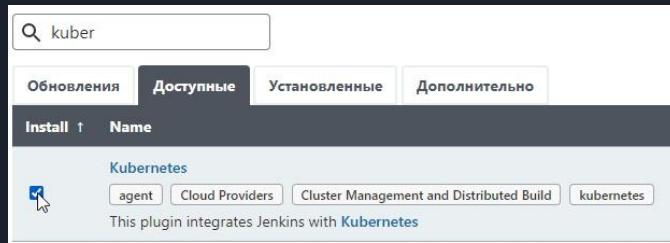
Setup cloud storage, install Jenkins.

The screenshot shows a Visual Studio Code interface with the title "README.md - Final_Task - Visual Studio Code [Administrator]". The Explorer sidebar on the left lists files and folders related to a Jenkins CI/CD pipeline, including "jenkins", "kubernetes", "test", "python_app", "terraformer", and "work_container". The main editor area displays a "main.tf" file containing Terraform code for setting up a Jenkins environment. The terminal tab at the bottom shows the execution of the Terraform script, which creates a Kubernetes namespace, applies the Jenkins manifest, and retrieves the password for the first-time configuration. The output shows the creation of various Kubernetes resources like pods, services, and roles.

```
70  ```
71  #create namespace for Jenkins
72  kubectl create ns jenkins
73
74  #apply all items like pv, pvc, rbac, sa, jenkins-master pod
75  kubectl -n jenkins apply -f jenkins/
76
77  #show jenkins pod name
78  kubectl -n jenkins get pods
79
80  #grab password to jenkins first time configure
81  kubectl -n jenkins logs <POD_NAME>
82  ```
83
84 7. Install Kubernetes and configure plugin.
```

```
root@7463e9388cdd:/work# kubectl create ns jenkins
namespace/jenkins created
root@7463e9388cdd:/work# kubectl -n jenkins apply -f jenkins/
deployment.apps/jenkins created
clusterrolebinding.rbac.authorization.k8s.io/testadminclusterbinding created
persistentvolume/jenkins created
persistentvolumeclaim/jenkins-claim created
serviceaccount/jenkins created
clusterrole.rbac.authorization.k8s.io/jenkins created
rolebinding.rbac.authorization.k8s.io/jenkins created
service/jenkins created
root@7463e9388cdd:/work# kubectl -n jenkins get pods
NAME          READY   STATUS    RESTARTS   AGE
jenkins-6d578d8c6c-j26kr  0/1     ContainerCreating   0      19s
root@7463e9388cdd:/work# kubectl -n jenkins logs jenkins-6d578d8c6c-j26kr
Running from: /usr/share/jenkins/jenkins.war
webroot: EnvVars.masterEnvVars.get("JENKINS_HOME")
2021-07-09 10:28:05.245+0000 [id=1]  INFO  org.eclipse.jetty.util.log.Log#initialized: Logging initialized @614ms to org.eclipse.jetty.util.log.JavaUtilLog
2021-07-09 10:28:05.410+0000 [id=1]  INFO  winstow.Logger#logInternal: Beginning extraction from war file
2021-07-09 10:28:07.099+0000 [id=1]  WARNING o.e.j.s.handler.ContextHandler#setContextPath: Empty contextPath
2021-07-09 10:28:07.176+0000 [id=1]  INFO  org.eclipse.jetty.server.Server#doStart: jetty-9.4.42.v20210604; built: 2021-06-04T17:33:38.939Z; git: 5cd5e6d2375eeab
146813b0de9f19eda6ab6e6cb; jvm 1.8.0_292-b10
2021-07-09 10:28:07.535+0000 [id=1]  INFO  o.e.j.w.StandardDescriptorProcessor#visitServlet: NO JSP Support for /, did not find org.eclipse.jsp.JettyJspServlet
2021-07-09 10:28:07.591+0000 [id=1]  INFO  o.e.j.s.s.DefaultSessionIdManager#doStart: DefaultSessionIdManager workerName=node0
2021-07-09 10:28:07.591+0000 [id=1]  INFO  o.e.j.s.s.DefaultSessionIdManager#doStart: No SessionScavenger set, using defaults
```

Setup Jenkins and Kubernetes plugin.



Configure Clouds

Kubernetes

Name ?
kubernetes

Kubernetes URL ?
https://kubernetes.default:443

Use Jenkins Proxy

Kubernetes server certificate key ?

Disable https certificate check

Kubernetes Namespace
 jenkins

Credentials
 - none - Add

Connected to Kubernetes v1.19.9-gke.1900

Pod Templates

Pod Template
Name ?
jenkins-slave

Namespace ?
jenkins

Labels ?
jenkins-slave

Environment variables ?
 Add Environment Variable

Volumes ?

Host Path Volume
Host path ?
/var/run/docker.sock

Mount path ?
/var/run/docker.sock

Container Template

Name ?
jnlp

Docker image ?
aimvector/jenkins-slave

Always pull image

Working directory ?
/home/jenkins/agent

Command to run ?

Arguments to pass to the command ?

Allocate pseudo-TTY

Configure a pipeline.

We'll send a POST request to the URL below with details of any subscribed events (JSON, x-www-form-urlencoded, etc). More information can be found in our documentation.

Payload URL *

http://34.116.255.183:8080/github-webhook/

Content type

application/json

Secret

(empty)

Which events would you like to trigger this webhook?

Just the push event.

Send me everything.

Let me select individual events.

Active

We will deliver event details when this hook is triggered.

Update webhook

Delete webhook

- Do not allow concurrent builds
- Do not allow the pipeline to resume if the controller restarts
- GitHub project

Project url

https://github.com/OLG-MAN/Lab_Final_Task

- Pipeline speed/durability override
- Preserve stashes from completed builds
- Throttle builds
- Удалять устаревшие сборки

Strategy

Log Rotation

Сколько дней хранить результаты сборки

(empty)

Если указано, информация о сборках будет храниться это количество дней.

Сколько последних сборок хранить

5

Если указано, будет храниться информация об этом количестве сборок.

SCM

Git

Repositories

Repository URL

https://github.com/OLG-MAN/Lab_Final_Task

Credentials

- none -

Add

Branches to build

Branch Specifier (blank for 'any')

*/main

Просмотрщик репозитория

(Автоматически)

Additional Behaviours

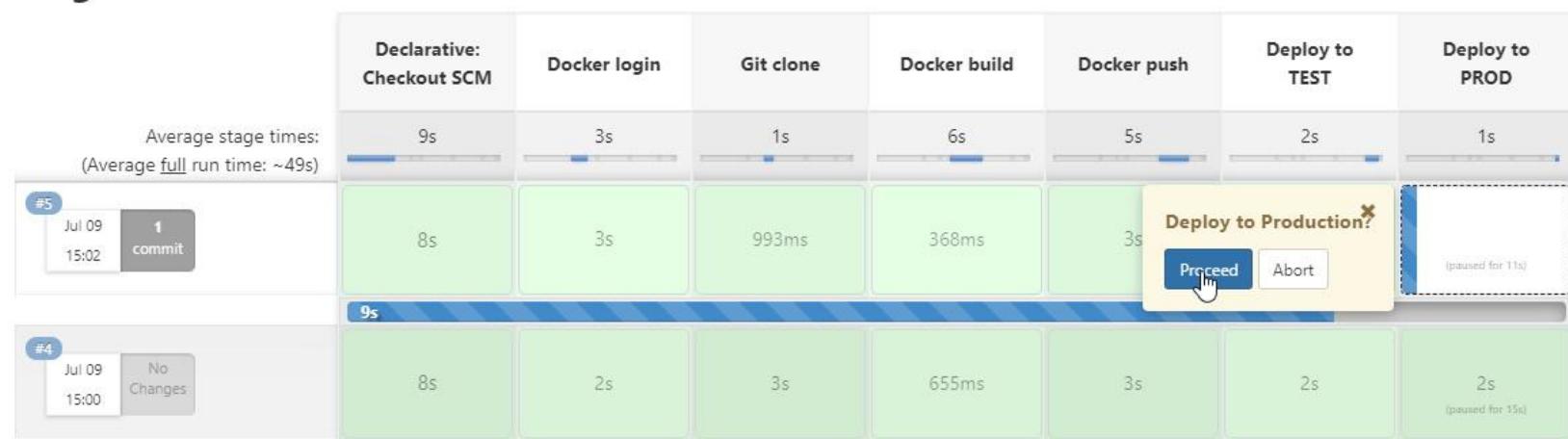
Добавить

Script Path

Jenkinsfile

Configure a pipeline.

Stage View



Check Resources

File Edit Selection View Go Run Terminal Help README.md - Final_Task - Visual Studio Code [Administrator]

EXPLORER ... README.md service.yaml deployment.yaml \test base.html deployment.yaml \prod Jenkinsfile

FINAL_TASK

- base.html
- index.html
- search_results.html
- __init__.py
- general.py
- products
- static
 - css
 - fonts
 - images
 - banners
 - 1.jpg
 - items
 - logos
 - misc
 - favicon.ico
 - logo.png
 - js
 - __init__.py
 - dbschema.py
 - models-dev.py
 - models.py
 - site.db
 - app.py
 - requirements.txt
 - Dockerfile
- terraform
 - .terraform
 - .terraform.lock.hcl
 - final-task-lab-2e60018e0...
 - main.tf
 - outputs.tf
 - terraform.tfstate
- OUTLINE
- TIMELINE

135 ### Check web-app
136
137 9. Check Deployment resources
138 ...
139
140 #check all new created resources in namespace
141 kubectl -n <NAMESPACE> get all
142
143 #grab Loadbalancer externalIP to find our deployment of web-app
144 ...
145
146 ### Install and configure Monitoring for k8s cluster

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
root@7463e9388cdd:/work# kubectl -n test get all
NAME           READY   STATUS    RESTARTS   AGE
pod/test-deploy-858dff76f8-9q4vd  1/1    Running   0          2m25s
pod/test-deploy-858dff76f8-hmvsx  1/1    Running   0          2m22s

NAME              TYPE        CLUSTER-IP      EXTERNAL-IP      PORT(S)       AGE
service/test-service  LoadBalancer  10.39.243.246  34.118.96.105  80:32166/TCP  28m

NAME           READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/test-deploy  2/2     2           2           28m

NAME           DESIRED  CURRENT   READY   AGE
replicaset.apps/test-deploy-5f8b7d6b95  0     0     0     7m16s
replicaset.apps/test-deploy-68c976f8bf  0     0     0     28m
replicaset.apps/test-deploy-6bf8f85d8d  0     0     0     26m
replicaset.apps/test-deploy-858dff76f8  2     2     2     2m26s

root@7463e9388cdd:/work# kubectl -n prod get all
NAME           READY   STATUS    RESTARTS   AGE
pod/prod-deploy-9b54b966b-nb4g5  1/1    Running   0          2m22s
pod/prod-deploy-9b54b966b-pbt6d  1/1    Running   0          2m22s

NAME              TYPE        CLUSTER-IP      EXTERNAL-IP      PORT(S)       AGE
service/prod-service  LoadBalancer  10.39.250.246  34.116.183.238  80:30322/TCP  27m

NAME           READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/prod-deploy  2/2     2           2           2m22s

NAME           DESIRED  CURRENT   READY   AGE
replicaset.apps/prod-deploy-9b54b966b  2     2     2     2m22s
```

+ ^ x

docker powershell

Ln 145, Col 1 Spaces: 2 UTF-8 CRLF Markdown Go Live

Configure Ingress

The screenshot shows a Visual Studio Code interface with two main panes. The left pane is the Explorer view, displaying a file tree for a project named 'FINAL_TASK'. The right pane contains two tabs: 'ingress-hosts.yaml' and 'service.yaml'. The 'ingress-hosts.yaml' tab is active, showing YAML configuration for an Ingress resource. The 'service.yaml' tab is also visible. Below the code editor is a status bar with various icons and text.

File Tree (EXPLORER):

- FINAL_TASK
 - > app-nginx-test
 - > helm
 - ✓ ingress
 - ! ingress-hosts.yaml
 - ✓ jenkins
 - ! deployment.yaml
 - ! jenkins.cluster.yaml
 - ! jenkins.pv.yaml
 - ! jenkins.pvc.yaml
 - ! jenkins.rbac.yaml
 - ! service.yaml
 - ✓ kubernetes
 - ✓ prod
 - ! configmap.yaml
 - ! deployment.yaml
 - ! secret.yaml
 - ! service.yaml
 - ✓ test
 - ! configmap.yaml
 - ! deployment.yaml
 - ! secret.yaml
 - ! service.yaml
 - > python_app
 - > src
 - Dockerfile
 - ✓ terraform
 - > .terraform
 - .terraform.lock.hcl
 - ! final-task-lab-2e60018e0...
 - ! main.tf
 - ! outputs.tf
 - ! terraform.tfstate
 - ! terraform.tfstate.backup
 - ! variables.tf
 - ! versions.tf

<input type="checkbox"/>	Name	Status	Type	Endpoints	Pods	Namespace	Clusters
	contour	OK	Cluster IP	10.39.254.94	2/2	projectcontour	final-task-cluster
	envoy	OK	External load balancer	34.118.5.226:80	3/3	projectcontour	final-task-cluster
	jenkins	OK	Cluster IP	10.39.246.104	1/1	jenkins	final-task-cluster
	prod-service	OK	Cluster IP	10.39.245.200	2/2	prod	final-task-cluster
	test-service	OK	Cluster IP	10.39.245.129	2/2	test	final-task-cluster

Check Resources

The screenshot shows a web browser window with the following details:

- Address Bar:** C Not secure | finaltask-a.pp.ua
- Title Bar:** NepBazar
- Header:** VERSION 3, Search icon, Shopping cart icon (0), User icon, Welcome! Sign in | Register
- Banner:** A large pink-to-blue gradient banner with the text "GREAT BANNER" and "Hey I am demo banner just for design".
- Features Section:** Three cards:
 - Fast delivery:** Icon of a truck, text: "Fast delivery", "Dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore".
 - Creative Strategy:** Icon of a document with a lightbulb, text: "Creative Strategy", "Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod".
 - High secured:** Icon of a lock, text: "High secured", "Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod".
- Popular products:** A row of four product thumbnails: a blue polo shirt, a brown parka jacket, a pair of blue jeans, and a blue backpack.

Check Resources

C ⚠ Not secure | test.finaltask-a.pp.ua

NepBazar VERSION 3   Welcome! Sign in | Register

Fashion Apparels Bicycles Jewelry

GREAT BANNER

Hey I am demo banner just for design

 **Fast delivery**
Dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore

 **Creative Strategy**
Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod

 **High secured**
Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod

Popular products



Check Resources

⚠ Not secure | jenkins.finaltask-a.pp.ua/job/pipeline/

jenkins

pipeline

Dashboard

сейчас

ки

Pipeline

e View

Syntax

Hook Log

сборок

тренд

поиск

oleg

вых

Pipeline pipeline

Recent Changes

Stage View

Average stage times:
(Average full run time: ~1min 21s)

#	Date	Changes	Declarative: Checkout SCM	Docker login	Git clone	Docker build	Docker push	Deploy to TEST	Deploy to PROD
#10	Jul 12 15:15	No Changes	9s	3s	1s	7s	7s	2s	2s
#9	Jul 09 18:20	1 commit	9s	3s	1s	673ms	3s	3s	2s
#8	Jul 09 17:34	1 commit	9s	3s	1s	17s	11s	2s	2s
#7	Jul 09 15:25	1 commit	8s	2s	1s	355ms	3s	3s	2s
#6	Jul 09 15:20	1 commit	9s	3s	1s	1s	10s	2s	2s

Monitoring. Install Helm

The screenshot shows a Visual Studio Code interface with a terminal window open. The terminal is running a script to install Helm and configure monitoring for a Kubernetes cluster. The script includes commands to curl for the Helm script, chmod it, and run it. It also checks the Helm version and adds the Prometheus Community Helm chart repository.

```
147 ## Lab Final Task > ## Summary > ## Install and configure Monitoring for k8s cluster
148     ### Install and configure Monitoring for k8s cluster
149
150 10. Monitoring
151
152 * Install Helm
153
154 ```
155 #install helm
156 curl -fsSL -o get_helm.sh https://raw.githubusercontent.com/helm/helm/master/scripts/get-helm-3
157 chmod 700 get_helm.sh
158 ./get_helm.sh
159
160 #check helm
161 helm version
162
163
164 * Add prometheus-community helm chart in K8s cluster.
165
166
167 helm repo add prometheus-community https://prometheus-community.github.io/helm-charts
168 helm repo update
169
170
```

The terminal also lists several services running on the cluster, including alertmanager, kube-prometheus-stack-grafana, kube-state-metrics, kube-prometheus-stack-operator, kube-prometheus-stack-prometheus-node-exporter-nzfw, kube-prometheus-stack-prometheus-node-exporter-pn7t, kube-prometheus-stack-prometheus-node-exporter-r6gmd, and prometheus-operated. The final command shown is `kubectl get svc`.

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
alertmanager-operated	ClusterIP	None	<none>	9093/TCP,9094/TCP,9094/UDP	79m
kubernetes	ClusterIP	10.39.240.1	<none>	443/TCP	4h26m
my-kube-prometheus-stack-alertmanager	ClusterIP	10.39.240.111	<none>	9093/TCP	79m
my-kube-prometheus-stack-grafana	LoadBalancer	10.39.255.77	34.118.109.169	80:32069/TCP	79m
my-kube-prometheus-stack-kube-state-metrics	ClusterIP	10.39.240.54	<none>	8088/TCP	79m
my-kube-prometheus-stack-operator	ClusterIP	10.39.254.242	<none>	443/TCP	79m
my-kube-prometheus-stack-prometheus	LoadBalancer	10.39.253.58	34.118.103.55	9090:31946/TCP	79m
my-kube-prometheus-stack-prometheus-node-exporter	ClusterIP	10.39.240.64	<none>	9108/TCP	79m
prometheus-operated	ClusterIP	None	<none>	9090/TCP	79m

Monitoring. Install Prometheus and Grafana

The screenshot shows a Visual Studio Code interface with a dark theme. On the left is the Explorer sidebar containing project files like README.md, .gitignore, Jenkinsfile, and various Kubernetes configuration files (deployment.yaml, service.yaml, etc.) for app-nginx-test, helm, jenkins, kubernetes, prod, test, python_app, terraform, and work_container. The main area is a terminal window displaying a script for monitoring setup:

```
* Install prometheus-community/kube-prometheus-stack
...
# We can check latest version in https://artifacthub.io/packages/helm/prometheus-community/kube-prometheus-stack
helm install my-kube-prometheus-stack prometheus-community/kube-prometheus-stack --version 16.12.1
...
* Check pods and services that created.
...
#check pods and services in defalt namespace
kubectl get pods
kubectl get svc
...
* Edit Prometheus and Grafana services to have access and configure it.
...
#edit services change type to LoadBalancer
kubectl edit svc my-kube-prometheus-stack-grafana
kubectl edit svc my-kube-prometheus-stack-prometheus
...
#check and grab IP's from prometheus and grafana
kubectl get svc
...
my-kube-prometheus-stack-prometheus-node-exporter-nfwm      1/1   Running  0          79m
my-kube-prometheus-stack-prometheus-node-exporter-pn7t       1/1   Running  0          79m
my-kube-prometheus-stack-prometheus-node-exporter-r6gmd     1/1   Running  0          79m
prometheus-my-kube-prometheus-stack-prometheus-0           2/2   Running  1          79m
root@7463e9388cdd:/work/helm# kubectl get svc
NAME                TYPE        CLUSTER-IP   EXTERNAL-IP    PORT(S)          AGE
alertmanager-operated ClusterIP  None         <none>        9093/TCP,9094/TCP,9094/UDP   79m
kubernetes           ClusterIP  10.39.240.1  <none>        443/TCP          4h26m
my-kube-prometheus-stack-alertmanager ClusterIP  10.39.240.111 <none>        9093/TCP          79m
my-kube-prometheus-stack-grafana       LoadBalancer 10.39.255.77  34.118.109.169  80:32069/TCP    79m
my-kube-prometheus-stack-kube-state-metrics ClusterIP  10.39.240.54  <none>        8880/TCP          79m
my-kube-prometheus-stack-operator      ClusterIP  10.39.254.242 <none>        443/TCP          79m
my-kube-prometheus-stack-prometheus  LoadBalancer 10.39.253.50  34.118.103.55   9090:31946/TCP   79m
my-kube-prometheus-stack-prometheus-node-exporter ClusterIP  10.39.240.64  <none>        9108/TCP          79m
prometheus-operated                 ClusterIP  None         <none>        9090/TCP          79m
root@7463e9388cdd:/work/helm#
```

The bottom status bar shows the file is README.md, the line number is Ln 202, column is Col 73, and the mode is Markdown.

Configure Prometheus and Grafana.

Not secure | 34.118.103.55:9090/alerts

Prometheus Alerts Graph Status Help Classic UI

Inactive (110) Pending (0) Firing (5)

/etc/prometheus/rules/prometheus-my-kube-prometheus-stack-prometheus-rulefiles-0/default-my-kube-prometheus-stack-alertmanager.rules.yaml > alertmanager.rules

> AlertmanagerFailedReload (0 active)

> AlertmanagerMembersInconsistent (0 active)

> AlertmanagerFailedToSendAlerts (0 active)

> AlertmanagerClusterFailedToSendAlerts (0 active)

> AlertmanagerClusterConfigInconsistent (0 active)

> AlertmanagerClusterDown (0 active)

> AlertmanagerClusterCrashlooping (0 active)

Not secure | 34.118.109.169/login

* Go to LoadBalancer IP of Grafana to configure it.
- Data sources already configured to Prometheus
- We can click to dashboard | manage | Choose Resource for Monitoring

Welcome to Grafana

Email or username

Password

Log in

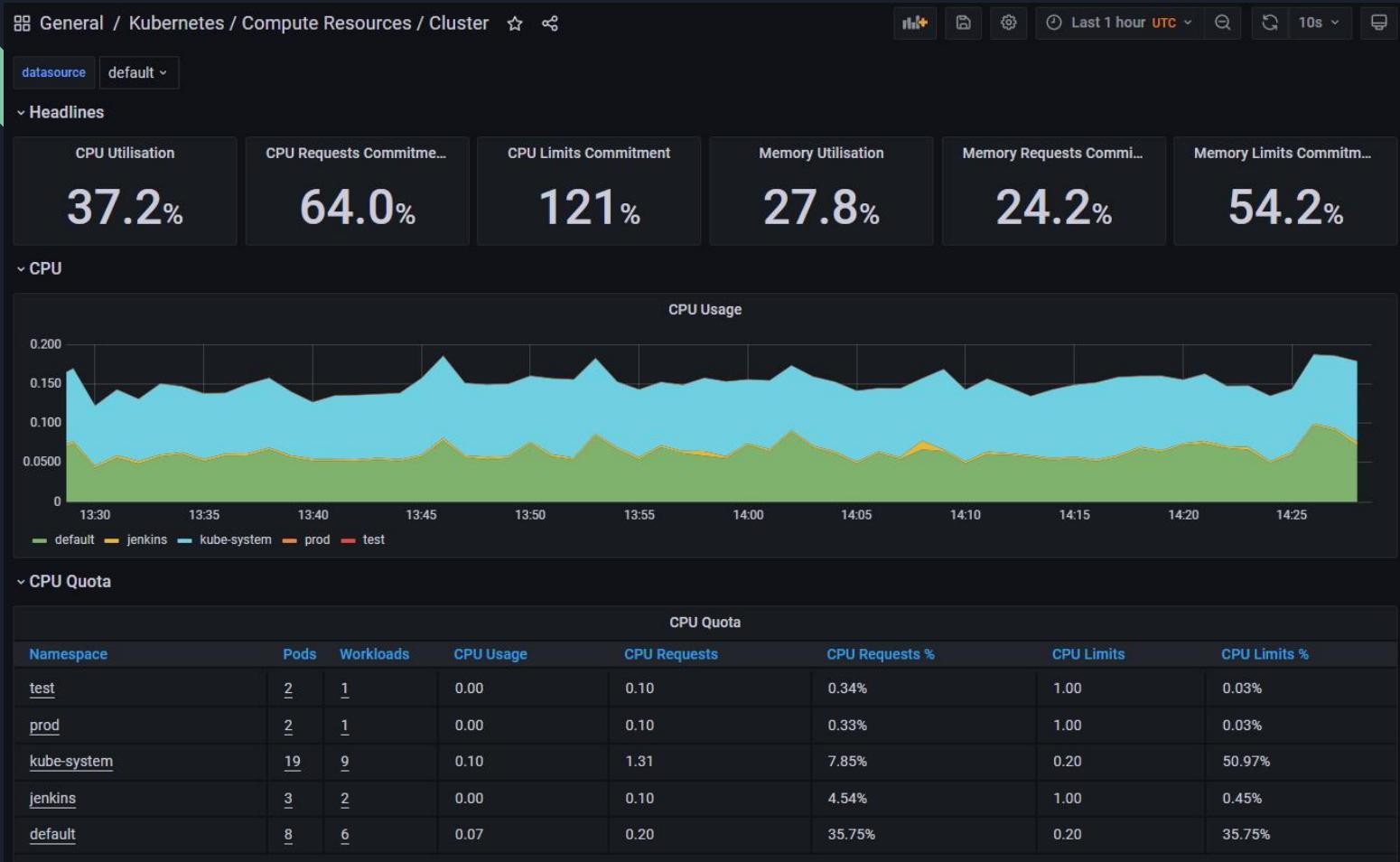
Forgot your password?

Monitoring with Prometheus and Grafana.

The screenshot shows the Grafana 'Dashboards' management interface. At the top, there are navigation links for 'Dashboards', 'Manage' (which is currently selected), 'Playlists', 'Snapshots', and 'Library panels'. Below this is a search bar labeled 'Search dashboards by name' and three buttons: 'New Dashboard', 'New Folder', and 'Import'. The main area displays a list of dashboards under a 'General' folder. Each dashboard entry includes a checkbox, a thumbnail icon, a title, a 'General' link, and a 'Mixin' tag badge. The 'Mixin' badges for the listed dashboards are: 'alertmanager-mixin', 'coredns dns', 'etcd', 'kubernetes-mixin', 'kubernetes-mixin', 'kubernetes-mixin', 'kubernetes-mixin', and 'kubernetes-mixin'. A hand cursor is visible over the 'Kubernetes / Compute Resources / Cluster' entry. The bottom of the screen shows a partial view of the browser's address bar and status bar.

- Alertmanager / Overview alertmanager-mixin
- CoreDNS coredns dns
- etcd
- Kubernetes / API server kubernetes-mixin
- Kubernetes / Compute Resources / Cluster kubernetes-mixin
- Kubernetes / Compute Resources / Namespace (Pods) kubernetes-mixin
- Kubernetes / Compute Resources / Namespace (Workloads) kubernetes-mixin
- Kubernetes / Compute Resources / Node (Pods) kubernetes-mixin

Monitoring with Prometheus and Grafana.

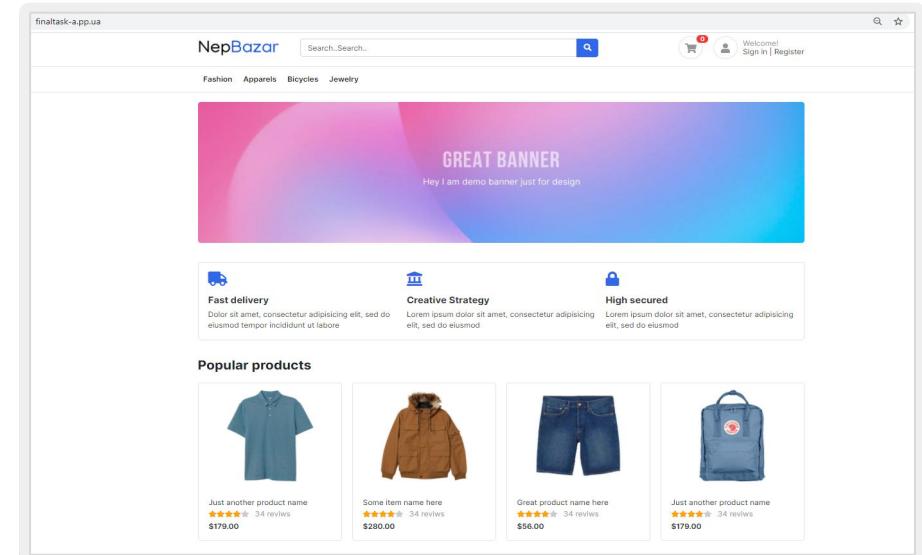


Final result.

We can see our application by going to the address
<http://finaltask-a.pp.ua>

Also we can go to GitHub repo with source code and detailed readme.

https://github.com/OLG-MAN/Lab_Final_Task



Thanks for watching.

email: mandrik89@gmail.com

cv: <https://olg-man.github.io/cv2021/>

