

# Система

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- minikube v1.36.0 on Ubuntu 24.04
- minikube запускается с --device=docker

## Развертывание кластера через команду

```
./deploy.sh
```

(подразумевает локальную установку утилиты istioctl)

```
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_ppprpo$ ./deploy.sh
Starting Minikube and setting up Istio...
🐳 minikube v1.36.0 on Ubuntu 24.04
🔧 Using the docker driver based on user configuration
🔧 Using Docker driver with root privileges
👉 Starting "minikube" primary control-plane node in "minikube" cluster
📦 Pulling base image v0.0.47 ...
🔥 Creating docker container (CPUs=2, Memory=7800MB) ...
🔧 Preparing Kubernetes v1.33.1 on Docker 28.1.1 ...
  ▪ Generating certificates and keys ...
  ▪ Booting up control plane ...
  ▪ Configuring RBAC rules ...
🔗 Configuring bridge CNI (Container Networking Interface) ...
🔧 Verifying Kubernetes components...
  ▪ Using image gcr.io/k8s-minikube/storage-provisioner:v5
🌟 Enabled addons: default-storageclass, storage-provisioner
💡 kubectl not found. If you need it, try: 'minikube kubectl -- get pods -A'
🏠 Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
Downloading Istio 1.18.0...
✔ Istio core installed
✔ Istiod installed
✔ Ingress gateways installed
✔ Egress gateways installed
✔ Installation complete
Making this installation the default for injection and validation.
namespace/default labeled
Building Docker image...
[+] Building 22.9s (10/10) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 203B
=> [internal] load metadata for docker.io/library/python:3.9-slim
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [1/5] FROM docker.io/library/python:3.9-slim@sha256:aff2066ec8914f7383e115bbbcde4d24da428eac377b0d4bb73806de992d240f
=> => resolve docker.io/library/python:3.9-slim@sha256:aff2066ec8914f7383e115bbbcde4d24da428eac377b0d4bb73806de992d240f
=> => sha256:aff2066ec8914f7383e115bbbcde4d24da428eac377b0d4bb73806de992d240f 10.41kB / 10.41kB
=> => sha256:f7fd8c365a9301d29cd94475d18135c8942a920aa7d9ba51b95effdf57cfdc6 1.75kB / 1.75kB
=> => sha256:1be4b628ef55a9605903ad2bd51a67d70404c36d618bdb2758422db28b771def 5.29kB / 5.29kB
=> => sha256:61320b01ae5e0798393ef25f2dc72faf43703e60ba089b07d7170acbabbf8f62 28.23MB / 28.23MB
=> => sha256:2481a58f9b3dcc989088df77c786078a59d807e6409a9d165ed4587814cdfbe0 3.51MB / 3.51MB
=> => sha256:1692d37168f614092ffdf355652aa0a07223ed129e6417aa144564fbd3d773884 14.93MB / 14.93MB
=> => sha256:a0684e18c375e78b2595b04f87cae91cff938ec9996b274e397c73f96605c69d 248B / 248B
=> => extracting sha256:61320b01ae5e0798393ef25f2dc72faf43703e60ba089b07d7170acbabbf8f62
=> => extracting sha256:2481a58f9b3dcc989088df77c786078a59d807e6409a9d165ed4587814cdfbe0
=> => extracting sha256:1692d37168f614092ffdf355652aa0a07223ed129e6417aa144564fbd3d773884
=> => extracting sha256:a0684e18c375e78b2595b04f87cae91cff938ec9996b274e397c73f96605c69d
=> [internal] load build context
=> => transferring context: 1.80kB
=> [2/5] WORKDIR /app
=> [3/5] COPY requirements.txt .
=> [4/5] RUN pip install --no-cache-dir -r requirements.txt
=> [5/5] COPY app.py .
=> exporting to image
=> => exporting layers
```

```

=> => transferring context: 2B
=> [1/5] FROM docker.io/library/python:3.9-slim@sha256:aff2066ec8914f7383e115bbbcde4d24da428eac377b0d4bb73806de992d240f
=> => resolve docker.io/library/python:3.9-slim@sha256:aff2066ec8914f7383e115bbbcde4d24da428eac377b0d4bb73806de992d240f
=> => sha256:aff2066ec8914f7383e115bbbcde4d24da428eac377b0d4bb73806de992d240f 10.41kB / 10.41kB
=> => sha256:f7fd8c365a9301d29cd94475d18135c8942a920aa7d9ba51b95effdf57cfdc6 1.75kB / 1.75kB
=> => sha256:1be4b628ef55a9605903ad2bd51a67d70404c36d618bdb2758422db28b771def 5.29kB / 5.29kB
=> => sha256:61320b01ae5e0798393ef25f2dc72faf43703e60ba089b07d7170acbabbf8f62 28.23MB / 28.23MB
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=> => sha256:1692d37168f614092ffdf355652aa0a07223ed129e6417aa144564fbd3d773884 14.93MB / 14.93MB
=> => sha256:a0684e18c375e78b2595b04f87cae91cff938ec9996b274e397c73f96605c69d 248B / 248B
=> => extracting sha256:61320b01ae5e0798393ef25f2dc72faf43703e60ba089b07d7170acbabbf8f62
=> => extracting sha256:2481a58f9b3dcc989088df77c786078a59d807e6409a9d165ed4587814cdfbe0
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=> => extracting sha256:a0684e18c375e78b2595b04f87cae91cff938ec9996b274e397c73f96605c69d
=> [internal] load build context
=> => transferring context: 1.80kB
=> [2/5] WORKDIR /app
=> [3/5] COPY requirements.txt .
=> [4/5] RUN pip install --no-cache-dir -r requirements.txt
=> [5/5] COPY app.py .
=> exporting to image
=> => exporting layers
=> => writing image sha256:12a2cecf8efcdad66aa397a36cb337f5a9d3d5cc2e46cb884fe7cd99739105f
=> => naming to docker.io/library/custom-app

Applying manifests...
configmap/app-config created
deployment.apps/custom-app created
service/custom-app-svc created
daemonset.apps/log-agent created
cronjob.batch/log-archiver created
gateway.networking.istio.io/custom-gateway created
virtualservice.networking.istio.io/custom-app-vs created
destinationrule.networking.istio.io/custom-app-dr created
Waiting for deployment rollout...
Waiting for deployment "custom-app" rollout to finish: 0 of 3 updated replicas are available...
Waiting for deployment "custom-app" rollout to finish: 1 of 3 updated replicas are available...
Waiting for deployment "custom-app" rollout to finish: 2 of 3 updated replicas are available...
deployment "custom-app" successfully rolled out
Checking DaemonSet...
Waiting for daemon set "log-agent" rollout to finish: 0 of 1 updated pods are available...
daemon set "log-agent" successfully rolled out

```

```
Deployment complete!
Access endpoints through Istio Gateway:
export INGRESS_PORT=$(kubectl -n istio-system get service istio-ingressgateway -o jsonpath='{.spec.ports[?(@.name=="http2")].nodePort}')
export INGRESS_HOST=$(minikube ip)
curl http://$INGRESS_HOST:$INGRESS_PORT

View agent logs with:
kubectl logs -l app=log-agent

View archives in Minikube:
minikube ssh 'ls -lh /var/log/app-archives'
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_ppprpo$
```

Д32:

## Финальные тесты для проверки работы Istio-конфигураций:

### 1. Проверка установки Istio

```
# Проверим версию Istio и статус компонентов
istioctl version
kubectl -n istio-system get pods
```

```
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_ppprpo$ # Проверим версию Istio и статус компонентов
istioctl version
minikube kubectl -- -n istio-system get pods
client version: 1.18.0
control plane version: 1.18.0
data plane version: 1.18.0 (6 proxies)
NAME                                READY   STATUS    RESTARTS   AGE
istio-egressgateway-69c59fffb-c8vhl 1/1     Running   0           2m
istio-ingressgateway-56d44ff5ff-wg7jh 1/1     Running   0           2m
istiod-7d5b649b57-flvhs              1/1     Running   0           2m26s
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_ppprpo$
```

### 2. Проверка Gateway и базовой маршрутизации

```
# Получим параметры доступа
export INGRESS_PORT=$(kubectl -n istio-system get service istio-ingressgateway -o jsonpath='{.spec.ports[?(@.name=="http2")].nodePort}')
export INGRESS_HOST=$(minikube ip)

# Тест основных эндпоинтов
curl -v http://$INGRESS_HOST:$INGRESS_PORT/
curl -v http://$INGRESS_HOST:$INGRESS_PORT/status
```

```
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_pprpo$ export INGRESS_PORT=$(minikube kubectl -- -n istio-system get service istio-ingressgateway -o jsonpath='{.spec.ports[?(@.name=="http2")]}.nodePort')
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_pprpo$ export INGRESS_HOST=$(minikube ip)
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_pprpo$ curl -v http://$INGRESS_HOST:$INGRESS_PORT/status
* Trying 192.168.49.2:32528...
* Connected to 192.168.49.2 (192.168.49.2) port 32528
> GET / HTTP/1.1
> Host: 192.168.49.2:32528
> User-Agent: curl/8.9.1
> Accept: */*
>
* Request completely sent off
< HTTP/1.1 200 OK
< content-type: text/html; charset=utf-8
< content-length: 25
< server: istio-envoy
< date: Sun, 25 May 2025 21:53:15 GMT
< x-envoy-upstream-service-time: 7
<
* Connection #0 to host 192.168.49.2 left intact
Welcome to the custom app* Trying 192.168.49.2:32528...
* Connected to 192.168.49.2 (192.168.49.2) port 32528
> GET /status HTTP/1.1
> Host: 192.168.49.2:32528
> User-Agent: curl/8.9.1
> Accept: */*
>
* Request completely sent off
< HTTP/1.1 200 OK
< content-type: application/json
< content-length: 57
< server: istio-envoy
< date: Sun, 25 May 2025 21:53:15 GMT
< x-envoy-upstream-service-time: 1
<
{"hostname":"custom-app-57798d57c8-n77nq","status":"ok"}
* Connection #0 to host 192.168.49.2 left intact
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_pprpo$
```

### 3. Проверка обработки неизвестных маршрутов

```
curl -v http://$INGRESS_HOST:$INGRESS_PORT/wrong-url
```

```
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_pprpo$ curl -v http://$INGRESS_HOST:$INGRESS_PORT/wrong-url
* Trying 192.168.49.2:32528...
* Connected to 192.168.49.2 (192.168.49.2) port 32528
> GET /wrong-url HTTP/1.1
> Host: 192.168.49.2:32528
> User-Agent: curl/8.9.1
> Accept: */*
>
* Request completely sent off
< HTTP/1.1 404 Not Found
< content-length: 9
< content-type: text/plain
< date: Sun, 25 May 2025 21:54:46 GMT
< server: istio-envoy
<
* Connection #0 to host 192.168.49.2 left intact
Not Found(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_pprpo$
```

### 4. Проверка балансировки нагрузки (LEAST\_CONN)

PROF

```
# Запустим 10 последовательных запросов к /status
for i in {1..10}; do
    curl -s http://$INGRESS_HOST:$INGRESS_PORT/status | jq .hostname
done
```

```
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_pprpo$ for i in {1..10}; do curl -s http://$INGRESS_HOST:$INGRESS_PORT/status | jq .hostname; done
"custom-app-57798d57c8-n77nq"
"custom-app-57798d57c8-xnlhs"
"custom-app-57798d57c8-xnlhs"
"custom-app-57798d57c8-nw94v"
"custom-app-57798d57c8-n77nq"
"custom-app-57798d57c8-n77nq"
"custom-app-57798d57c8-xnlhs"
"custom-app-57798d57c8-nw94v"
"custom-app-57798d57c8-nw94v"
"custom-app-57798d57c8-xnlhs"
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_pprpo$
```

## 5. Проверка логов Istio-прокси

```
minikube kubectl -- logs $POD_NAME -c istio-proxy | grep -E  
'(timeout|retry)'
```

```
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_ppprpo$ minikube kubectl -- logs $POD_NAME -c istio-proxy | grep -E '(timeout|retry)'  
2025-05-25T21:50:52.190760Z    info    FLAG: --s2a timeout="3s"  
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_ppprpo$
```

## 6. Полная проверка системы

```
# Проверим все ключевые компоненты  
minikube kubectl -- get gateway,virtualservice,destinationrule  
minikube kubectl -- get pods -l app=custom-app  
minikube kubectl -- get pods -l app=log-agent
```

```
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_ppprpo$ minikube kubectl get gateway,virtualservice,destinationrule  
NAME                                     AGE  
gateway.networking.istio.io/custom-gateway 9m57s  
  
NAME                                     GATEWAYS          HOSTS          AGE  
virtualservice.networking.istio.io/custom-app-vs ["custom-gateway"] ["*"] 9m57s  
  
NAME                                     HOST              AGE  
destinationrule.networking.istio.io/custom-app-dr custom-app-svc.default.svc.cluster.local 9m57s  
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_ppprpo$
```

```
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_ppprpo$ minikube kubectl -- get pods -l app=custom-app  
NAME                                     READY   STATUS    RESTARTS   AGE  
custom-app-57798d57c8-n77nq            2/2     Running   0           10m  
custom-app-57798d57c8-nw94v            2/2     Running   0           10m  
custom-app-57798d57c8-xnlhs            2/2     Running   0           10m  
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_ppprpo$
```

```
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_ppprpo$ minikube kubectl -- get pods -l app=log-agent  
NAME                                     READY   STATUS    RESTARTS   AGE  
log-agent-crdkg                         2/2     Running   0           11m  
(base) badmotherfucker@BadMotherFuckerPC:~/study/test_4_ppprpo$
```