

Лабораторная работа №4

Задание 1.

Скрины:

```
UW PICO 5.09

apiVersion: apps/v1
kind: Deployment
metadata:
  name: explore-deploy
  labels:
    app: nginx
    environment: test
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx-container
        image: nginx:1.25
        ports:
        - containerPort: 80
```

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.

```
ptashko@MacBook-Air--Artem K8S % kubectl apply -f test2.yaml
deployment.apps/explore-deploy created
ptashko@MacBook-Air--Artem K8S % kubectl get deployments
NAME          READY   UP-TO-DATE   AVAILABLE   AGE
explore-deploy 3/3      3            3           19s
ptashko@MacBook-Air--Artem K8S % kubectl port-forward deployment/explore-deploy
error: TYPE/NAME and list of ports are required for port-forward
See 'kubectl port-forward -h' for help and examples
ptashko@MacBook-Air--Artem K8S % kubectl port-forward deployment/explore-deploy 8080:80
Forwarding from 127.0.0.1:8080 -> 80
Forwarding from [::1]:8080 -> 80
Handling connection for 8080
```

```
ptashko@MacBook-Air--Artem K8S % kubectl get deployment explore-deploy -o wide
NAME          READY   UP-TO-DATE   AVAILABLE   AGE   CONTAINERS   IMAGES   SELECTOR
explore-deploy 3/3     3            3           22s   nginx-container  nginx:1.25  app=nginx
ptashko@MacBook-Air--Artem K8S % kubectl describe deployment explore-deploy
Name:          explore-deploy
Namespace:     default
CreationTimestamp: Fri, 03 Oct 2025 13:17:54 +0300
Labels:        app=nginx
               environment=test
Annotations:    deployment.kubernetes.io/revision: 1
Selector:      app=nginx
Replicas:      3 desired | 3 updated | 3 total | 3 available | 0 unavailable
StrategyType:  RollingUpdate
MinReadySeconds: 0
RollingUpdateStrategy: 25% max unavailable, 25% max surge
Pod Template:
  Labels:  app=nginx
  Containers:
    nginx-container:
      Image:      nginx:1.25
      Port:       80/TCP
      Host Port:  0/TCP
      Environment: <none>
      Mounts:      <none>
      Volumes:     <none>
      Node-Selectors: <none>
      Tolerations: <none>
Conditions:
  Type           Status  Reason
  ----           -
  Available      True    MinimumReplicasAvailable
  Progressing    True    NewReplicaSetAvailable
OldReplicaSets: <none>
NewReplicaSet:  explore-deploy-768d5b45f7 (3/3 replicas created)
Events:
  Type           Reason              Age   From          Message
  ----           -
  Normal         ScalingReplicaSet   33s   deployment-controller  Scaled up replica set explore-deploy-768d5b45f7 from 0 to 3
ptashko@MacBook-Air--Artem K8S % kubectl get pods -l app=nginx
NAME                                READY   STATUS    RESTARTS   AGE
explore-deploy-768d5b45f7-5kt46     1/1     Running   0           46s
explore-deploy-768d5b45f7-7vtlp     1/1     Running   0           46s
explore-deploy-768d5b45f7-hlzjg     1/1     Running   0           46s
ptashko@MacBook-Air--Artem K8S % kubectl logs deployment/explore-deploy --tail=5
Found 3 pods, using pod/explore-deploy-768d5b45f7-5kt46
2025/10/03 10:17:55 [notice] #1: start worker process 32
```

Ответы на вопросы:

Сколько Pod'ов управляется этим Deployment?

Ответ: 3

Какая стратегия обновления используется по умолчанию?

Ответ: RollingUpdate

Какой образ используется в контейнерах?

Ответ: nginx:1.25

Какая версия nginx запущена в Pod'ах?

Ответ: 1.25.5

Какой селектор использует Deployment для управления Pod'а?

Ответ: app=nginx

Задание 2.

Скрины:

```
ptashko@MacBook-Air--Artem K8S % kubectl exec -it explore-deploy-768d5b45f7-5kt46 -- nginx -v
nginx version: nginx/1.25.5
ptashko@MacBook-Air--Artem K8S % kubectl scale deployment explore-deploy --replicas=5
deployment.apps/explore-deploy scaled
ptashko@MacBook-Air--Artem K8S % kubectl set image deployment/explore-deploy nginx=nginx:1.26
error: unable to find container named "nginx"
ptashko@MacBook-Air--Artem K8S % nano test2*
ptashko@MacBook-Air--Artem K8S % kubectl set image deployment/explore-deploy nginx-container=nginx:1.26
deployment.apps/explore-deploy image updated
ptashko@MacBook-Air--Artem K8S % kubectl get pods -l app=nginx --watch
NAME                                READY   STATUS    RESTARTS   AGE
explore-deploy-9875d7b66-5rbgn      1/1     Running   0           3m8s
explore-deploy-9875d7b66-67hz2      1/1     Running   0           2m51s
explore-deploy-9875d7b66-g96n9      1/1     Running   0           3m8s
explore-deploy-9875d7b66-jc68w      1/1     Running   0           2m52s
explore-deploy-9875d7b66-w5hkw      1/1     Running   0           3m8s
^C
ptashko@MacBook-Air--Artem K8S % kubectl rollout status deployment/explore-deploy
deployment "explore-deploy" successfully rolled out
```

Ответы на вопросы:

Как изменилось количество Pod'ов после масштабирования?

Ответ: с 3 на 5

Сколько времени заняло обновление до версии 1.26?

Ответ: 2s

Какие Pod'ы были созданы при обновлении (проверьте по именам)?

Ответ:

explore-deploy-9875d7b66-5rbgn
explore-deploy-9875d7b66-67hz2
explore-deploy-9875d7b66-g96n9
explore-deploy-9875d7b66-jc68w
explore-deploy-9875d7b66-w5hkw

Как проверить, что откат прошел успешно?

Ответ: deployment "explore-deploy" successfully rolled out

Задание 3.

Скрины:

```
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apiVersion: apps/v1
kind: Deployment
metadata:
  name: production-app
  labels:
    app: production
    env: staging
spec:
  replicas: 4
  strategy:
    type: RollingUpdate
    rollingUpdate:
      maxSurge: 1
      maxUnavailable: 0
  selector:
    matchLabels:
      app: production
  template:
    metadata:
      labels:
        app: production
    spec:
      containers:
        - name: nginx-container
          image: nginx:1.25
          ports:
            - containerPort: 80
          resources:
            limits:
              memory: "128Mi"
              cpu: "500m"
            requests:
              memory: "64Mi"
              cpu: "250m"
```

```
ptashko@MacBook-Air--Artem K8S % nano test2*
ptashko@MacBook-Air--Artem K8S % kubectl apply -f test2.yaml
deployment.apps/production-app created
```

Задание 4.

Скрины:

```
UW PICO 5.09

apiVersion: apps/v1
kind: Deployment
metadata:
  name: production-app
  labels:
    app: production
    env: staging
spec:
  replicas: 3
  strategy:
    type: RollingUpdate
    rollingUpdate:
      maxSurge: 1
      maxUnavailable: 0
  selector:
    matchLabels:
      app: production
  template:
    metadata:
      labels:
        app: production
    spec:
      containers:
        - name: nginx-container
          image: nginx:1.25
          ports:
            - containerPort: 80
          resources:
            limits:
              memory: "128Mi"
              cpu: "500m"
            requests:
              memory: "64Mi"
              cpu: "250m"
```

```
ptashko@MacBook-Air--Artem K8S % kubectl rollout history deployment/production-app --revision=1
deployment.apps/production-app with revision #1
```

```
Pod Template:
  Labels:      app=production
              pod-template-hash=669d8644df
```

```
Containers:
  nginx-container:
    Image:      nginx:1.25
    Port:      80/TCP
    Host Port: 0/TCP
    Limits:
      cpu:      500m
      memory:   128Mi
    Requests:
      cpu:      250m
      memory:   64Mi
    Environment:  <none>
    Mounts:       <none>
    Volumes:      <none>
    Node-Selectors:  <none>
    Tolerations:   <none>
```

```
ptashko@MacBook-Air--Artem K8S % kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
production-app-669d8644df-rjxgh     1/1     Running   0           4m48s
production-app-669d8644df-xfnn7     1/1     Running   0           107s
production-app-669d8644df-z4xnl     1/1     Running   0           5m45s
ptashko@MacBook-Air--Artem K8S % kubectl delete pod production-app-669d8644df-rjxgh
pod "production-app-669d8644df-rjxgh" deleted from default namespace
ptashko@MacBook-Air--Artem K8S %
```

```
kubectl

Last login: Mon Oct 6 08:19:50 on ttys000
ptashko@MacBook-Air--Artem ~ % kubectl get pods --watch
NAME                                READY   STATUS    RESTARTS   AGE
production-app-669d8644df-rjxgh     1/1     Running   0           4m31s
production-app-669d8644df-xfnn7     1/1     Running   0           90s
production-app-669d8644df-z4xnl     1/1     Running   0           5m28s
production-app-669d8644df-rjxgh     1/1     Terminating   0           5m1s
production-app-669d8644df-rjxgh     1/1     Terminating   0           5m1s
production-app-669d8644df-vmrvx     0/1     Pending        0           0s
production-app-669d8644df-vmrvx     0/1     Pending        0           0s
production-app-669d8644df-vmrvx     0/1     ContainerCreating   0           0s
production-app-669d8644df-rjxgh     0/1     Completed      0           5m1s
production-app-669d8644df-vmrvx     1/1     Running        0           1s
production-app-669d8644df-rjxgh     0/1     Completed      0           5m2s
production-app-669d8644df-rjxgh     0/1     Completed      0           5m2s
production-app-669d8644df-rjxgh     0/1     Completed      0           5m2s
```

```
Containers:
  nginx-container:
    Image:      nginx:1.25
    Port:       80/TCP
    Host Port:  0/TCP
    Limits:
      cpu:      500m
      memory:   128Mi
    Requests:
      cpu:      250m
      memory:   64Mi
    Environment:
      Mounts:   <none>
    Volumes:    <none>
    Node-Selectors:
    Tolerations: <none>

ptashko@MacBook-Air--Artem
NAME
production-app-669d8644df-
production-app-669d8644df-
production-app-669d8644df-
ptashko@MacBook-Air--Artem
pod "production-app-669d8644df-
ptashko@MacBook-Air--Artem
ptashko@MacBook-Air--Artem
deployment.apps/production-app
ptashko@MacBook-Air--Artem K8S % kubectl set image deployment/production-app nginx-container=n/nginx:2.44
deployment.apps/production-app image updated
ptashko@MacBook-Air--Artem K8S % kubectl rollout undo deployment/production-app
deployment.apps/production-app rolled back
ptashko@MacBook-Air--Artem K8S % kubectl rollout undo deployment/production-app --to-revision=1
deployment.apps/production-app rolled back
ptashko@MacBook-Air--Artem K8S % kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
production-app-669d8644df-vmrvx     1/1     Running   0           5m50s
production-app-669d8644df-xfnn7     1/1     Running   0           7m50s
production-app-669d8644df-z4xnl     1/1     Running   0           11m
ptashko@MacBook-Air--Artem K8S %
```

```
kubectl
production-app-658fc74d94-qxdfv 0/1 ContainerStatusUnknown 0 46
production-app-658fc74d94-qxdfv 0/1 ContainerStatusUnknown 0 46
production-app-7b6b4bfc6c-rzzm7 0/1 ErrImagePull 0 4s
production-app-7b6b4bfc6c-rzzm7 0/1 ImagePullBackOff 0 17
production-app-7b6b4bfc6c-rzzm7 0/1 ErrImagePull 0 36
production-app-7b6b4bfc6c-rzzm7 0/1 ImagePullBackOff 0 47
production-app-7b6b4bfc6c-rzzm7 0/1 Terminating 0 48
production-app-7b6b4bfc6c-rzzm7 0/1 Terminating 0 51
production-app-7b6b4bfc6c-rzzm7 0/1 Terminating 0 51
production-app-7b6b4bfc6c-rzzm7 0/1 ContainerStatusUnknown 0 52
production-app-7b6b4bfc6c-rzzm7 0/1 ContainerStatusUnknown 0 52
production-app-7b6b4bfc6c-rzzm7 0/1 ContainerStatusUnknown 0 52
```

Ответы на вопросы:

Сколько времени заняло автоматическое восстановление Pod'а?

Ответ: 2s

Какое состояние у Pod'ов при проблемном обновлении?

Ответ:

ContainerStatusUnknown

ErrImagePull

ImagePullBackOff

Terminating

Как Deployment обрабатывает ошибки обновления образов?

Ответ: trying and failing to pull image

Какие события отображаются в describe при ошибках?

Ответ: события изменений - попытка спуллить новый образ

Задание 5.

Ответы на вопросы:

Сколько ревизий хранится в истории Deployment?

Ответ: 2

Какие команды вызывали изменения в Deployment?

Ответ: `kubectl set image deployment/production-app nginx-container=nenginx:2.44`

Есть ли предупреждения или ошибки в событиях?

Ответ: да, есть предупреждение о несуществовании образа

Какое потребление ресурсов у Pod'ов Deployment?

Ответ:

memory - 64 Mi

CPU - 250m