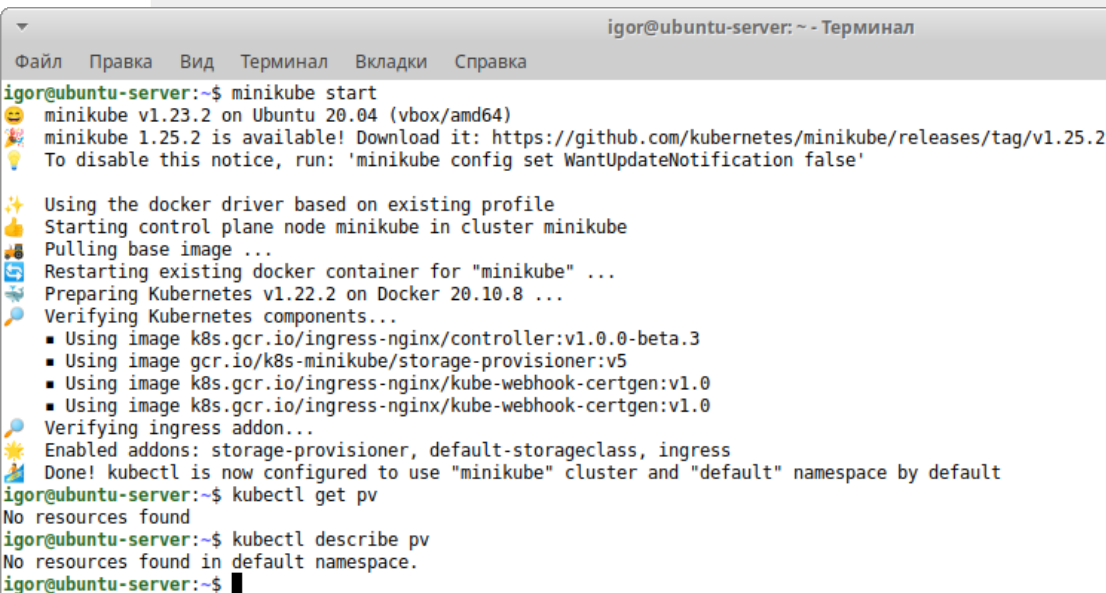


```
minikube start
```

```
kubectl get pv
```

```
kubectl describe pv
```



The screenshot shows a terminal window titled "igor@ubuntu-server: ~ - Терминал". The terminal output is as follows:

```
igor@ubuntu-server:~$ minikube start
minikube v1.23.2 on Ubuntu 20.04 (vbox/amd64)
minikube 1.25.2 is available! Download it: https://github.com/kubernetes/minikube/releases/tag/v1.25.2
To disable this notice, run: 'minikube config set WantUpdateNotification false'

Using the docker driver based on existing profile
Starting control plane node minikube in cluster minikube
Pulling base image ...
Restarting existing docker container for "minikube" ...
Preparing Kubernetes v1.22.2 on Docker 20.10.8 ...
Verifying Kubernetes components...
  ■ Using image k8s.gcr.io/ingress-nginx/controller:v1.0.0-beta.3
  ■ Using image gcr.io/k8s-minikube/storage-provisioner:v5
  ■ Using image k8s.gcr.io/ingress-nginx/kube-webhook-certgen:v1.0
  ■ Using image k8s.gcr.io/ingress-nginx/kube-webhook-certgen:v1.0
Verifying ingress addon...
Enabled addons: storage-provisioner, default-storageclass, ingress
Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
igor@ubuntu-server:~$ kubectl get pv
No resources found
igor@ubuntu-server:~$ kubectl describe pv
No resources found in default namespace.
igor@ubuntu-server:~$
```

```
kubectl describe pvc
```

```
kubectl get pvc
```

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка

igor@ubuntu-server:~$ kubectl describe pvc
Name:          data-database-0
Namespace:     default
StorageClass:  csi-ceph-hdd-dp1
Status:        Pending
Volume:
Labels:        app=database
Annotations:    <none>
Finalizers:    [kubernetes.io/pvc-protection]
Capacity:
Access Modes:
VolumeMode:    Filesystem
Used By:       database-0
Events:
  Type      Reason             Age              From              Message
  ----      -
Warning    ProvisioningFailed  22h (x321 over 23h) persistentvolume-controller storageclass.storage.k8s.io "csi-ceph-hdd-dp1" not found
Warning    ProvisioningFailed  3m5s (x42 over 13m) persistentvolume-controller storageclass.storage.k8s.io "csi-ceph-hdd-dp1" not found

Name:          data-prometheus-0
Namespace:     default
StorageClass:  csi-ceph-hdd-dp1
Status:        Pending
Volume:
Labels:        app=prometheus
Annotations:    <none>
Finalizers:    [kubernetes.io/pvc-protection]
Capacity:
Access Modes:
VolumeMode:    Filesystem
Used By:       prometheus-0
Events:
  Type      Reason             Age              From              Message
  ----      -
Warning    ProvisioningFailed  22h (x321 over 23h) persistentvolume-controller storageclass.storage.k8s.io "csi-ceph-hdd-dp1" not found
Warning    ProvisioningFailed  3m5s (x42 over 13m) persistentvolume-controller storageclass.storage.k8s.io "csi-ceph-hdd-dp1" not found

igor@ubuntu-server:~$ kubectl get pv
No resources found

igor@ubuntu-server:~$ kubectl get pvc
NAME              STATUS    VOLUME    CAPACITY    ACCESS MODES    STORAGECLASS    AGE
data-database-0   Pending             csi-ceph-hdd-dp1  129d
data-prometheus-0 Pending             csi-ceph-hdd-dp1  134d

igor@ubuntu-server:~$
```

kubectl describe pvc data-database-0

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка

igor@ubuntu-server:~$ kubectl describe pvc data-database-0
Name:          data-database-0
Namespace:     default
StorageClass:  csi-ceph-hdd-dp1
Status:        Pending
Volume:
Labels:        app=database
Annotations:    <none>
Finalizers:    [kubernetes.io/pvc-protection]
Capacity:
Access Modes:
VolumeMode:    Filesystem
Used By:       database-0
Events:
  Type      Reason             Age              From              Message
  ----      -
Warning    ProvisioningFailed  22h (x321 over 23h) persistentvolume-controller storageclass.storage.k8s.io "csi-ceph-hdd-dp1" not found
Warning    ProvisioningFailed  4m11s (x161 over 44m) persistentvolume-controller storageclass.storage.k8s.io "csi-ceph-hdd-dp1" not found

igor@ubuntu-server:~$
```

kubectl get pods

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка

igor@ubuntu-server:~$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
database-0                          0/1     Pending   0           129d
geekbrains-55df48c88d-klqx7         1/1     Running   9 (22h ago) 129d
geekbrains-55df48c88d-rz2qz         1/1     Running   9 (22h ago) 129d
gitlab-runner-7467648488-jmlsl      0/1     Running   120 (5m28s ago) 130d
my-deployment-76499ffb7-5cj6v       1/1     Running   1 (22h ago) 22h
my-deployment-76499ffb7-5jcmc       1/1     Running   1 (22h ago) 22h
my-replicaset-47chw                 1/1     Running   1 (22h ago) 23h
my-replicaset-rcb4c                 1/1     Running   1 (22h ago) 23h
my-replicaset-xqjt7                 1/1     Running   1 (22h ago) 23h
node-exporter-n5xqk                 1/1     Running   12 (22h ago) 133d
prometheus-0                        0/1     Pending   0           134d
igor@ubuntu-server:~$
```

```
kubectl describe pods my-deployment-76499ffb7-5cj6v
```

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка
igor@ubuntu-server:~$ kubectl describe pods my-deployment-76499ffb7-5cj6v
Name:          my-deployment-76499ffb7-5cj6v
Namespace:     default
Priority:       0
Node:          minikube/192.168.49.2
Start Time:    Fri, 25 Mar 2022 19:32:18 +0000
Labels:        app=my-app
               pod-template-hash=76499ffb7
Annotations:   <none>
Status:        Running
IP:            172.17.0.12
IPs:
  IP:          172.17.0.12
Controlled By: ReplicaSet/my-deployment-76499ffb7
Containers:
  nginx:
    Container ID:  docker://0e8bed52bbd69a18a8e67067eeac784143a8369265f0e87cc887fe1de76973e7
    Image:         nginx:1.12
    Image ID:      docker-pullable://nginx@sha256:72daaf46f11cc753c4eab981cbf869919bd1fee3d2170a2adeac12400f494728
    Port:         80/TCP
    Host Port:    0/TCP
    State:        Running
      Started:    Sat, 26 Mar 2022 17:43:42 +0000
    Last State:   Terminated
      Reason:     Completed
      Exit Code:  0
      Started:    Fri, 25 Mar 2022 19:32:19 +0000
      Finished:   Fri, 25 Mar 2022 19:59:15 +0000
    Ready:        True
    Restart Count: 1
    Environment:  <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-7cwxn (ro)
Conditions:
  Type              Status
  Initialized        True
  Ready              True
  ContainersReady    True
  PodScheduled       True
Volumes:
  kube-api-access-7cwxn:
    Type:          Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds: 3607
    ConfigMapName:  kube-root-ca.crt
    ConfigMapOptional: <nil>
    DownwardAPI:    true
QoS Class:         BestEffort
Node-Selectors:    <none>
Tolerations:       node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                   node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type     Reason          Age   From          Message
  ----     -
  Normal   Scheduled       23h   default-scheduler   Successfully assigned default/my-deployment-76499ffb7-5cj6v to minikube
  Normal   Pulled          23h   kubelet        Container image "nginx:1.12" already present on machine
  Normal   Created         23h   kubelet        Created container nginx
  Normal   Started         23h   kubelet        Started container nginx
  Normal   SandboxChanged  49m   kubelet        Pod sandbox changed, it will be killed and re-created.
  Normal   Pulled          49m   kubelet        Container image "nginx:1.12" already present on machine
  Normal   Created         49m   kubelet        Created container nginx
  Normal   Started         49m   kubelet        Started container nginx
igor@ubuntu-server:~$
```

Весь процесс с начала, создаем PV из локальной директории и затем PVC

ls

less pv.yaml

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка

apiVersion: v1
kind: PersistentVolume
metadata:
  name: pv
spec:
  capacity:
    storage: 2Gi
  accessModes:
    - ReadWriteOnce
  hostPath:
    path: /data
  storageClassName: local
~
(END)
```

du -fs

```
igor@ubuntu-server:~$ vi pv.yaml
igor@ubuntu-server:~$ du -fs
du: invalid option -- 'f'
Try 'du --help' for more information.
igor@ubuntu-server:~$
```

du

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка

8      ./geekbrains/homework/7.advanced-abstractions
8      ./geekbrains/homework/8.ci-cd
80     ./geekbrains/homework
1652   ./geekbrains
16     ./app/kube/postgres
32     ./app/kube
8      ./app/config
8      ./app/model
12     ./app/handler
8      ./app/app
108    ./app
1154508 .
igor@ubuntu-server:~$
igor@ubuntu-server:~$
```

df

mkdir /pv_1

sudo mkdir /pv_1

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка

igor@ubuntu-server:~$ df
Filesystem                1K-blocks    Used Available Use% Mounted on
udev                     1967956      0   1967956   0% /dev
tmpfs                     402588    1196    401392   1% /run
/dev/mapper/ubuntu--vg-ubuntu--lv 25155844 17972052  5882904  76% /
tmpfs                     2012940      0   2012940   0% /dev/shm
tmpfs                      5120        0     5120   0% /run/lock
tmpfs                     2012940      0   2012940   0% /sys/fs/cgroup
/dev/loop2                63488    63488      0 100% /snap/core20/1361
/dev/loop1                56960    56960      0 100% /snap/core18/2344
/dev/loop3                63488    63488      0 100% /snap/core20/1376
/dev/sda2                 999320    211100   719408  23% /boot
/dev/loop4                69632    69632      0 100% /snap/lxd/22526
/dev/loop0                56960    56960      0 100% /snap/core18/2284
/dev/loop6                44672    44672      0 100% /snap/snapd/14978
/dev/loop5                69504    69504      0 100% /snap/lxd/22753
/dev/loop7                44800    44800      0 100% /snap/snapd/15177
tmpfs                     402588      0   402588   0% /run/user/1000

igor@ubuntu-server:~$ mkdir /pv_1
mkdir: cannot create directory '/pv_1': File exists
igor@ubuntu-server:~$ sudo mkdir /pv_1
[sudo] password for igor:
mkdir: cannot create directory '/pv_1': File exists
igor@ubuntu-server:~$ sudo su mkdir /pv_1
su: user mkdir does not exist
igor@ubuntu-server:~$
```

vi pv2.yaml

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка

apiVersion: v1
kind: PersistentVolume
metadata:
  name: pv2
spec:
  capacity:
    storage: 5Gi
  accessModes:
    - ReadWriteOnce
  hostPath:
    path: /pv_1
  storageClassName: local
~
~
:~
```

kubectl create -f pv2.yaml

error: unable to recognize "pv2.yaml": no matches for kind "PersistentVolume" in version "v1"

kubectl get pv

No resources found

kubectl describe pv2

error: the server doesn't have a resource type "pv2"

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка
igor@ubuntu-server:~$ kubectl create -f pv2.yaml
error: unable to recognize "pv2.yaml": no matches for kind "PersistenVolume" in version "v1"
igor@ubuntu-server:~$ kubectl get pv
No resources found
igor@ubuntu-server:~$ kubectl describe pv2
error: the server doesn't have a resource type "pv2"
igor@ubuntu-server:~$
```

kubectl describe pv pv2

Error from server (NotFound): persistentvolumes "pv2" not found

vi pod_pv_deployment.yaml

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка
apiVersion: apps/v1
kind: Deployment
metadata:
  name: web
spec:
  replicas: 2
  selector:
    matchLabels:
      app: web
  strategy:
    rollingUpdate:
      maxSurge: 1
      maxUnavailable: 1
    type: RollingUpdate
  template:
    metadata:
      labels:
        app: web
    spec:
      initContainers:
        - image: busybox
          name: mount-permissions-fix
          command: ["sh", "-c", "chmod 777 /data"]
          volumeMounts:
            - name: data
              mountPath: /data
      containers:
        - image: nginx:1.14
          name: nginx
          ports:
            - containerPort: 80
          resources:
            requests:
              cpu: 100m
              memory: 100Mi
            limits:
              cpu: 100m
              memory: 100Mi
          volumeMounts:
            - name: config
              mountPath: /etc/nginx/conf.d
            - name: data
              mountPath: /data
      volumes:
        - name: config
          configMap:
            name: web
        - name: data
          persistentVolumeClaim:
            claimName: webclaim
            claimName: webclaim
:wq
```

vi conf_map_pv.yaml

apiVersion: v1

kind: ConfigMap

metadata:

name: web

data:

default.conf: |

server {

listen 80 default_server;

server_name _;

default_type text/plain;

location / {

alias /data;

autoindex on;

client_body_temp_path /tmp;

dav_methods PUT DELETE MKCOL COPY MOVE;

create_full_put_path on;

dav_access user:rw all:r;

}

}


```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка

---
apiVersion: v1
kind: ConfigMap
metadata:
  name: web
data:
  default.conf: |
    server {
      listen      80 default_server;
      server_name _;
      default_type text/plain;
      location / {
        alias /data;
        autoindex on;
        client_body_temp_path /tmp;
        dav_methods PUT DELETE MKCOL COPY MOVE;
        create_full_put_path on;
        dav_access user:rw all:r;
      }
    }
~
```

vi pvc_2.yaml

```
---

kind: PersistentVolumeClaim

apiVersion: v1

metadata:

  name: webclaim

spec:

  accessModes:

    - ReadWriteOnce

  resources:

    requests:

      storage: 5Gi

  storageClassName: local
```

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка

---
kind: PersistentVolumeClaim
apiVersion: v1
metadata:
  name: webclaim
spec:
  accessModes:
    - ReadWriteOnce
  resources:
    requests:
      storage: 5Gi
  storageClassName: local
~
:wq
```

```
kubectl create -f conf_map_pv.yaml
```

```
kubectl create -f pvc_2.yaml
```

```
kubectl get pvc
```

```
kubectl get pv
```

```
No resources found
```

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка

igor@ubuntu-server:~$ kubectl create -f conf_map_pv.yaml
configmap/web created
igor@ubuntu-server:~$ kubectl create -f pvc_2.yaml
persistentvolumeclaim/webclaim created
igor@ubuntu-server:~$ kubectl get pvc
NAME                STATUS    VOLUME   CAPACITY   ACCESS MODES   STORAGECLASS   AGE
data-database-0     Pending              10Gi         CSI              csi-ceph-hdd-dp1  129d
data-prometheus-0   Pending              10Gi         CSI              csi-ceph-hdd-dp1  134d
webclaim            Pending              10Gi         CSI              csi-ceph-hdd-dp1  62s
igor@ubuntu-server:~$ kubectl get pv
No resources found
igor@ubuntu-server:~$
```

```
kubectl get pods
```

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка

igor@ubuntu-server:~$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
database-0                          0/1     Pending   0           129d
geekbrains-55df48c88d-klqx7         1/1     Running   9 (23h ago)  129d
geekbrains-55df48c88d-rz2qz         1/1     Running   9 (23h ago)  129d
gitlab-runner-7467648488-jmlsl      0/1     Running   130 (7m48s ago)  130d
my-deployment-76499ffb7-5cj6v       1/1     Running   1 (23h ago)   24h
my-deployment-76499ffb7-5jcmc       1/1     Running   1 (23h ago)   24h
my-replicaset-47chw                 1/1     Running   1 (23h ago)   24h
my-replicaset-rcb4c                 1/1     Running   1 (23h ago)   24h
my-replicaset-xqjt7                 1/1     Running   1 (23h ago)   24h
node-exporter-n5xqk                 1/1     Running   12 (23h ago)  134d
prometheus-0                        0/1     Pending   0           134d
igor@ubuntu-server:~$
```

```
kubectl apply -f pod_pv_deployment.yaml
```

```
error: error parsing pod_pv_deployment.yaml: error converting YAML to JSON:
yaml: line 9: did not find expected key
```

vi pod_pv_deployment.yaml

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка
apiVersion: apps/v1
kind: Deployment
metadata:
  name: web
spec:
  replicas: 2
  selector:
    matchLabels:
      app: web
  strategy:
    rollingUpdate:
      maxSurge: 1
      maxUnavailable: 1
    type: RollingUpdate
  template:
    metadata:
      labels:
        app: web
    spec:
      initContainers:
        - image: busybox
          name: mount-permissions-fix
          command: ["sh", "-c", "chmod 777 /data"]
          volumeMounts:
            - name: data
              mountPath: /data
      containers:
        - image: nginx:1.14
          name: nginx
          ports:
            - containerPort: 80
          resources:
            requests:
              cpu: 100m
              memory: 100Mi
            limits:
              cpu: 100Mi
              memory: 100Mi
          volumeMounts:
            - name: config
              mountPath: /etc/nginx/conf.d
            - name: data
              mountPath: /data
      volumes:
        - name: config
          configMap:
            name: web
        - name: data
          persistentVolumeClaim:
            claimName: webclaim
~
~
~
:wq
```

kubectl apply -f pod_pv_deployment.yaml

kubectl get pods

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка
igor@ubuntu-server:~$ kubectl apply -f pod_pv_deployment.yaml
deployment.apps/web created
igor@ubuntu-server:~$ kubectl get pods
NAME                                READY   STATUS              RESTARTS   AGE
database-0                          0/1     Pending             0           129d
geekbrains-55df48c88d-klqx7         1/1     Running             9 (24h ago) 129d
geekbrains-55df48c88d-rz2qz         1/1     Running             9 (24h ago) 129d
gitlab-runner-7467648488-jmlsl      0/1     CrashLoopBackOff    131 (2m25s ago) 130d
my-deployment-76499ffb7-5cj6v       1/1     Running             1 (24h ago) 24h
my-deployment-76499ffb7-5jcmc       1/1     Running             1 (24h ago) 24h
my-replicaset-47chw                 1/1     Running             1 (24h ago) 24h
my-replicaset-rcb4c                 1/1     Running             1 (24h ago) 24h
my-replicaset-xqjt7                 1/1     Running             1 (24h ago) 24h
node-exporter-n5xqk                 1/1     Running             12 (24h ago) 134d
prometheus-0                        0/1     Pending             0           134d
web-7695dfdcdbd-ftsdg               0/1     Pending             0           86s
web-7695dfdcdbd-mlnfd               0/1     Pending             0           86s
igor@ubuntu-server:~$ kubectl describe pod web-7695dfdcdbd-ftsdg
```

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка
igor@ubuntu-server:~$ kubectl describe pod web-7695dfdcdb-ftsdcg
Name: web-7695dfdcdb-ftsdcg
Namespace: default
Priority: 0
Node: <none>
Labels: app=web
        pod-template-hash=7695dfdcdb
Annotations: <none>
Status: Pending
IP: <none>
IPs: <none>
Controlled By: ReplicaSet/web-7695dfdcdb
Init Containers:
mount-permissions-fix:
  Image: busybox
  Port: <none>
  Host Port: <none>
  Command:
    sh
    -c
    chmod 777 /data
  Environment: <none>
  Mounts:
    /data from data (rw)
    /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-jbfd2 (ro)
Containers:
nginx:
  Image: nginx:1.14
  Port: 80/TCP
  Host Port: 0/TCP
  Limits:
    cpu: 100Mi
    memory: 100Mi
  Requests:
    cpu: 100m
    memory: 100Mi
  Environment: <none>
  Mounts:
    /data from data (rw)
    /etc/nginx/conf.d from config (rw)
    /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-jbfd2 (ro)
Conditions:
  Type          Status
PodScheduled    False
Volumes:
config:
  Type: ConfigMap (a volume populated by a ConfigMap)
  Name: web
  Optional: false
data:
  Type: PersistentVolumeClaim (a reference to a PersistentVolumeClaim in the same namespace)
  ClaimName: webclaim
  ReadOnly: false
kube-api-access-jbfd2:
  Type: Projected (a volume that contains injected data from multiple sources)
  TokenExpirationSeconds: 3607
  ConfigMapName: kube-root-ca.crt
  ConfigMapOptional: <nil>
  DownwardAPI: true
QoS Class: Burstable
Node-Selectors: <none>
Tolerations: node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
              node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type          Reason          Age          From          Message
  ----          -
Warning         FailedScheduling  3m44s        default-scheduler  0/1 nodes are available: 1 pod has unbound immediate PersistentVolumeClaims.
Warning         FailedScheduling  101s (x1 over 2m41s)  default-scheduler  0/1 nodes are available: 1 pod has unbound immediate PersistentVolumeClaims.
igor@ubuntu-server:~$
```

kubectl get pv

No resources found

kubectl get pvc

```
igor@ubuntu-server: ~ - Терминал
Файл  Правка  Вид  Терминал  Вкладки  Справка
igor@ubuntu-server:~$ kubectl get pv
No resources found
igor@ubuntu-server:~$ kubectl get pvc
NAME                STATUS    VOLUME   CAPACITY   ACCESS MODES   STORAGECLASS   AGE
data-database-0     Pending            1Gi        RWO        csi-ceph-hdd-dp1  csi-ceph-hdd-dp1  129d
data-prometheus-0   Pending            1Gi        RWO        csi-ceph-hdd-dp1  csi-ceph-hdd-dp1  134d
webclaim            Pending            1Gi        RWO        local              local              25m
igor@ubuntu-server:~$
```