Task2.1

Kube-system пространство имен для объектов компонентов control plane, созданных системой Kubernetes (Minikube). Следит за всем control manager. Используются для запуска контроллеров kubernetes и управления кластером. Им предоставляются значительные права для управления nod-ами. Эти компоненты реализуют функционал kubernetes:

- Управляют и запускают контейнеры
- Балансируют сетевой трафик между узлами кластера kubernetes и количеством реплик контейнеров
- Осуществляют контроль состояния, автоматические развертывания и откаты реплик контейнеров внутри узлов кластера kubernetes
- Осуществляют распределение нагрузки между узлами кластера kubernetes
- Предоставляют автоматическое монтирование систем хранения для контейнеров
- Предоставляют декларативный API и CLI для управления

```
kubectl config set-context --current --namespace=kube-system
```

kubectl get all -n kube-system

```
NAME               TYPE        CLUSTER-IP    EXTERNAL-IP   PORT(S)                   AGE
service/kube-dns   ClusterIP   10.96.0.10    <none>        53/UDP,53/TCP,9153/TCP    11d

NAME                        DESIRED   CURRENT   READY   UP-TO-DATE   AVAILABLE   NODE SELECTOR            AGE
daemonset.apps/kube-proxy   1         1         1       1            1           kubernetes.io/os=linux   11d

NAME                      READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/coredns   1/1     1            1           11d

NAME                                DESIRED   CURRENT   READY   AGE
replicaset.apps/coredns-64897985d   1         1         1       11d
```

kubectl get po (добавить – o wide)

```
NAME                               READY   STATUS    RESTARTS   AGE
coredns-64897985d-h7444            1/1     Running   0          11d
etcd-minikube                      1/1     Running   0          11d
kube-apiserver-minikube            1/1     Running   0          11d
kube-controller-manager-minikube   1/1     Running   0          11d
kube-proxy-nd8jw                   1/1     Running   0          11d
kube-scheduler-minikube            1/1     Running   0          11d
storage-provisioner                1/1     Running   0          11d
```

Используем команду kubectl describe pod <name>

coredns-64897985d-h7444
Controlled By: ReplicaSet/coredns-64897985d

etcd-minikube
Controlled By: Node/minikube

kube-apiserver-minikube
Controlled By: Node/minikube

kube-controller-manager-minikube
Controlled By: Node/minikube

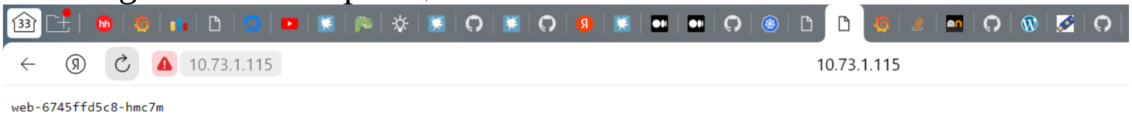
kube-proxy-nd8jw
Controlled By: DaemonSet/kube-proxy

kube-scheduler-minikube
Controlled By: Node/minikube

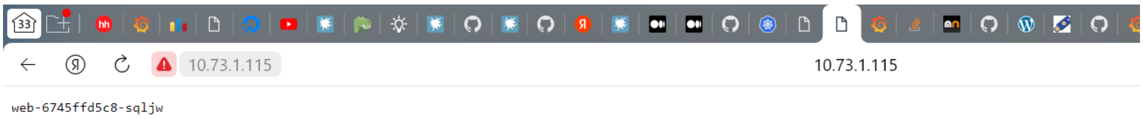
storage-provisioner
Controlled By: Node/minikube

Kubelet работает на каждом узле в кластере. Он следит за тем, чтобы контейнеры были запущены в поде. Утилита kubelet принимает набор PodSpecs, и гарантирует работоспособность и исправность определённых в них контейнеров. Для запуска контейнеров используется Docker.

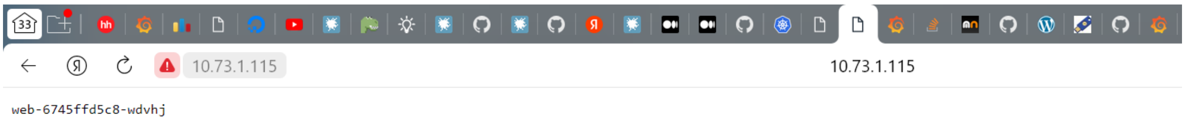
Part2 Ingress Балансировщик



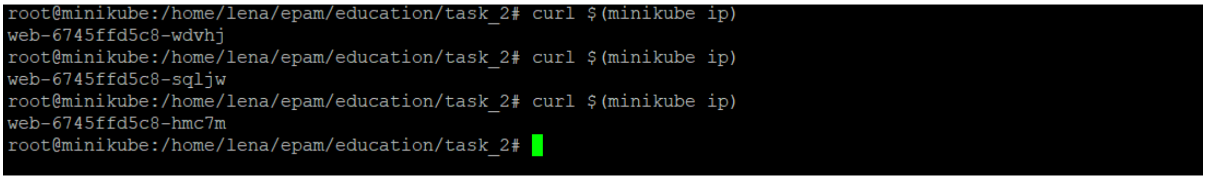
```
web-6745ffd5c8-hmc7m
```



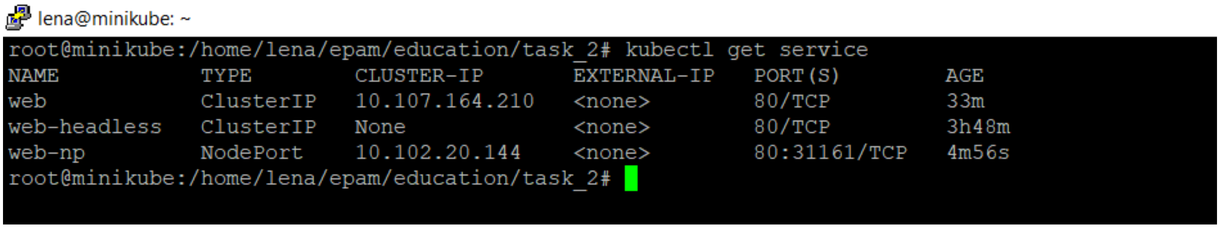
```
web-6745ffd5c8-sqljw
```



```
web-6745ffd5c8-wdvhj
```



```
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-wdvhj
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-sqljw
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-hmc7m
root@minikube:/home/lena/epam/education/task_2#
```

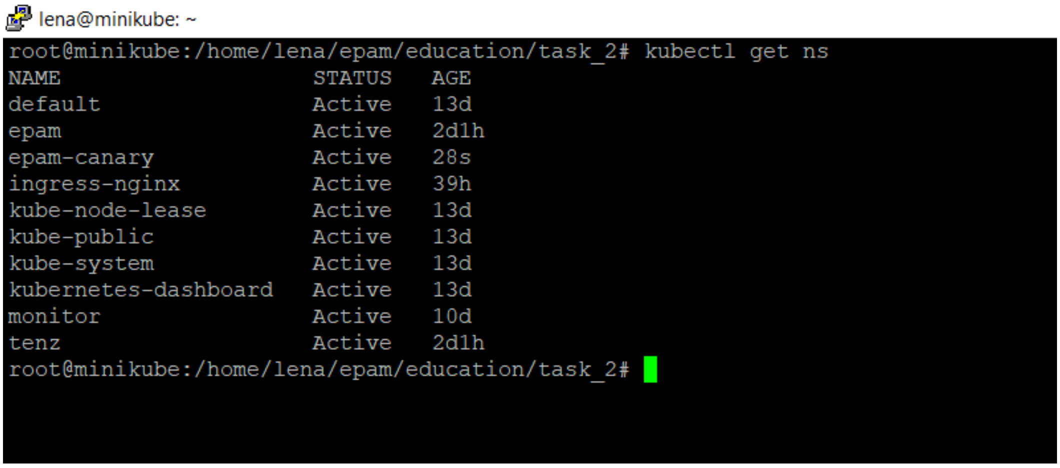


```
root@minikube:/home/lena/epam/education/task_2# kubectl get service
NAME           TYPE        CLUSTER-IP       EXTERNAL-IP   PORT(S)        AGE
web            ClusterIP   10.107.164.210   <none>        80/TCP         33m
web-headless   ClusterIP   None             <none>        80/TCP         3h48m
web-np         NodePort    10.102.20.144    <none>        80:31161/TCP   4m56s
root@minikube:/home/lena/epam/education/task_2#
```

Task2

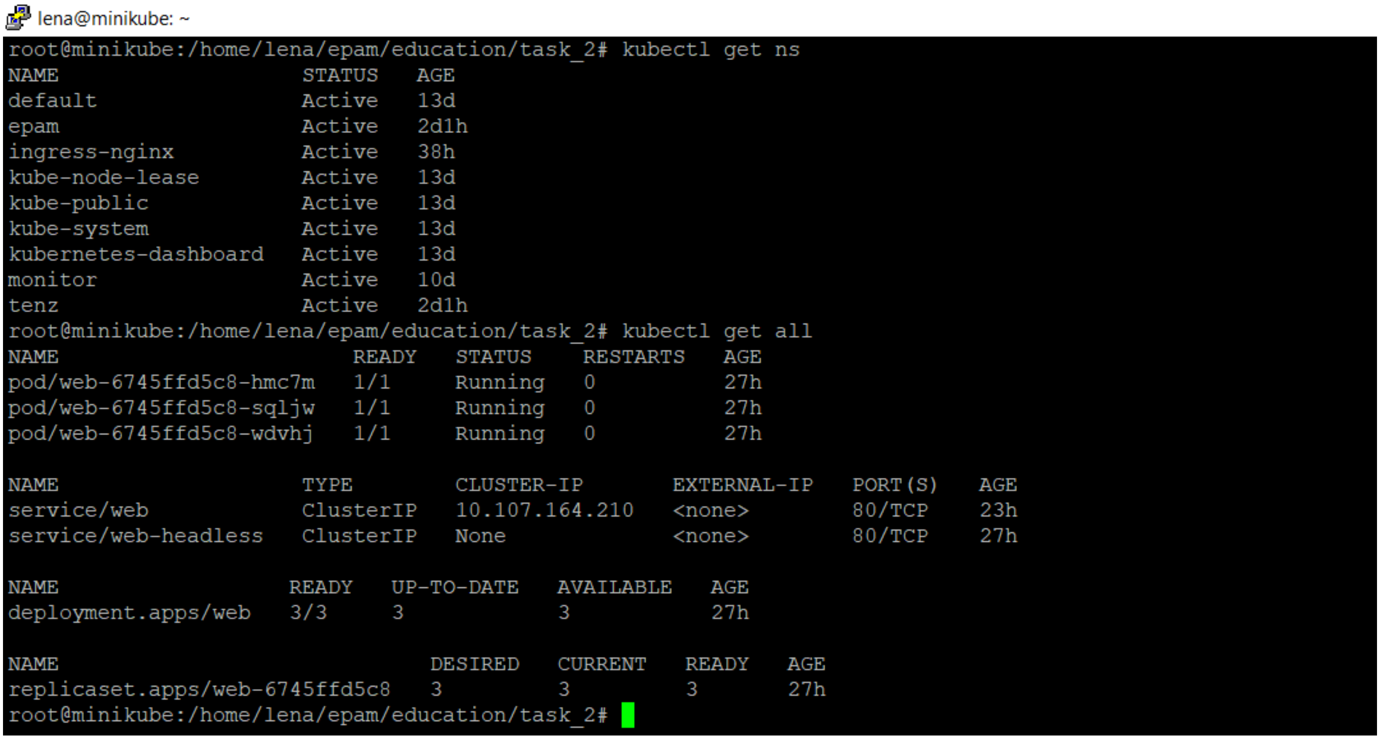
Implement Canary deployment of an application via Ingress. Traffic to canary deployment should be redirected if you add "canary:always" in the header, otherwise it should go to regular deployment. Set to redirect a percentage of traffic to canary deployment.

Организуем два namespaces epam и epam-canary



```
root@minikube:/home/lena/epam/education/task_2# kubectl get ns
NAME                   STATUS   AGE
default                Active   13d
epam                   Active   2d1h
epam-canary            Active   28s
ingress-nginx          Active   39h
kube-node-lease        Active   13d
kube-public            Active   13d
kube-system            Active   13d
kubernetes-dashboard   Active   13d
monitor                Active   10d
tenz                   Active   2d1h
root@minikube:/home/lena/epam/education/task_2# 
```

В namespace epam запущено:



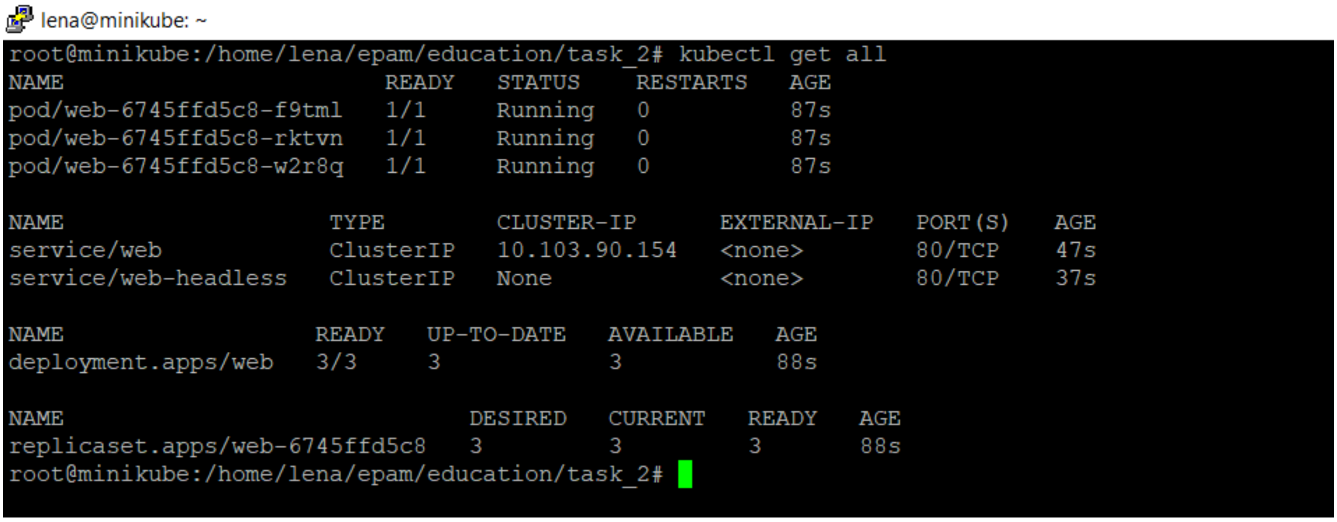
```
root@minikube:/home/lena/epam/education/task_2# kubectl get ns
NAME                   STATUS   AGE
default                Active   13d
epam                   Active   2d1h
ingress-nginx          Active   38h
kube-node-lease        Active   13d
kube-public            Active   13d
kube-system            Active   13d
kubernetes-dashboard   Active   13d
monitor                Active   10d
tenz                   Active   2d1h
root@minikube:/home/lena/epam/education/task_2# kubectl get all
NAME                      READY   STATUS    RESTARTS   AGE
pod/web-6745ffd5c8-hmc7m   1/1     Running   0          27h
pod/web-6745ffd5c8-sqljw   1/1     Running   0          27h
pod/web-6745ffd5c8-wdvhj   1/1     Running   0          27h

NAME                   TYPE        CLUSTER-IP       EXTERNAL-IP   PORT(S)   AGE
service/web            ClusterIP   10.107.164.210   <none>        80/TCP    23h
service/web-headless   ClusterIP   None             <none>        80/TCP    27h

NAME                  READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/web   3/3     3            3           27h

NAME                             DESIRED   CURRENT   READY   AGE
replicaset.apps/web-6745ffd5c8   3         3         3       27h
root@minikube:/home/lena/epam/education/task_2# 
```

Делаем enable ingress. Запускаем current ingress annotations:

    kubernetes.io/ingress.class: "nginx".

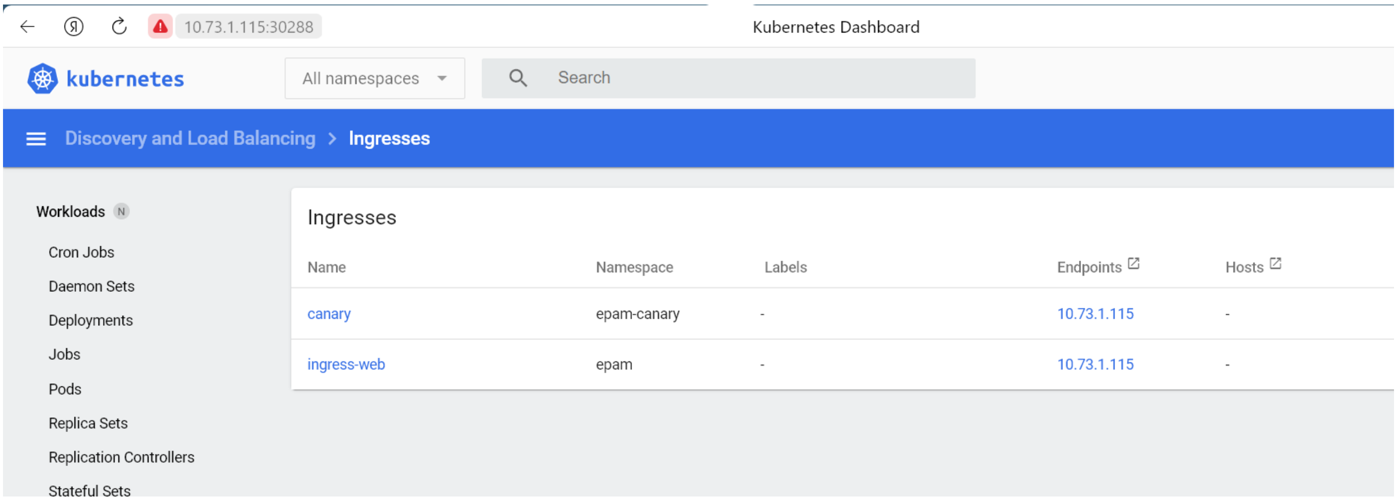
При повторных обращениях на внешний ip http://10.73.1.115 видим смену name pods – так указано в скрипте – отображать server_name

В namespace epam-canary создаем копию приложения (в реальности новую версию) и запускаем все параллельно. Только в этом случае ingress canary для тестового трафика в размере 30% от общего объема обращений.



```
root@minikube:/home/lena/epam/education/task_2# kubectl get all
NAME                        READY   STATUS    RESTARTS   AGE
pod/web-6745ffd5c8-f9tml    1/1     Running   0          87s
pod/web-6745ffd5c8-rktvn    1/1     Running   0          87s
pod/web-6745ffd5c8-w2r8q    1/1     Running   0          87s

NAME                   TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)   AGE
service/web            ClusterIP   10.103.90.154   <none>        80/TCP    47s
service/web-headless   ClusterIP   None            <none>        80/TCP    37s

NAME                  READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/web   3/3     3            3           88s

NAME                             DESIRED   CURRENT   READY   AGE
replicaset.apps/web-6745ffd5c8   3         3         3       88s
root@minikube:/home/lena/epam/education/task_2#
```

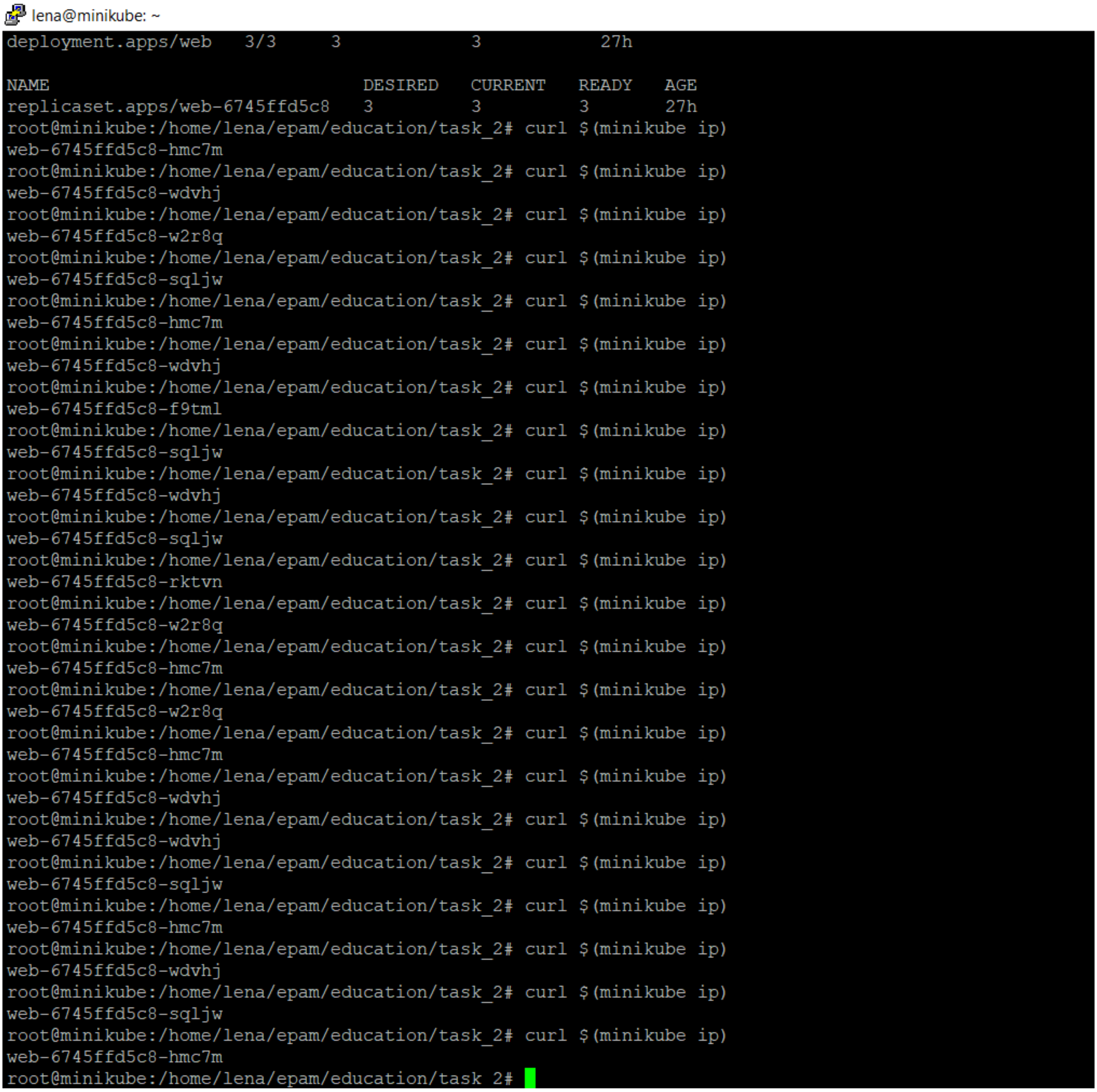
В dashboard видим два ingress-a



Ingresses

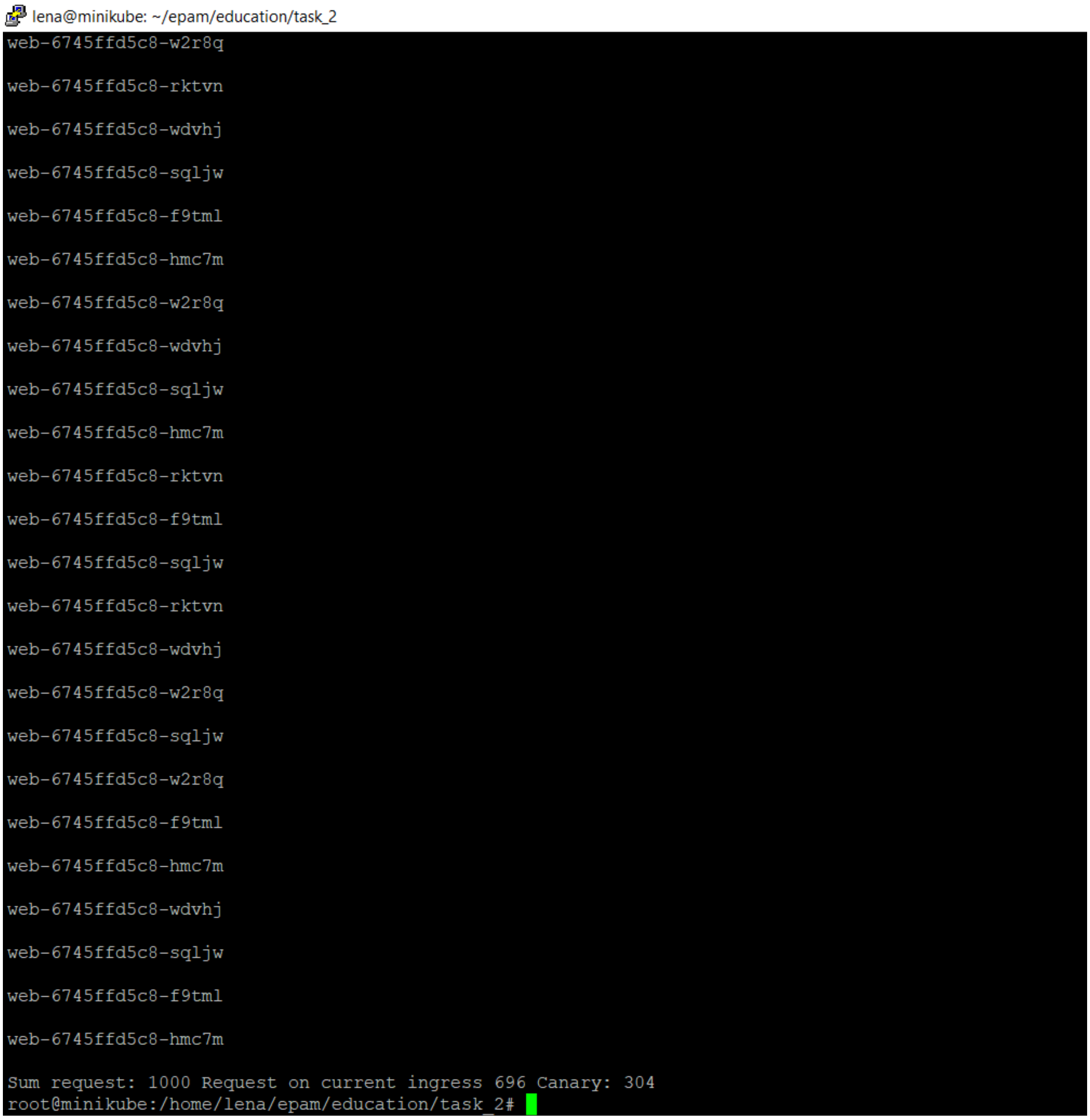
Name	Namespace	Labels	Endpoints	Hosts
canary	epam-canary	-	10.73.1.115	-
ingress-web	epam	-	10.73.1.115	-

В итоге будем наблюдать количество обращений по принадлежности pods namespace-ам. Из 22 обращений 5 приходятся на canary, остальные 17 на current ingress.



```
deployment.apps/web   3/3     3            3           27h

NAME                            DESIRED   CURRENT   READY   AGE
replicaset.apps/web-6745ffd5c8   3         3         3       27h
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-hmc7m
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-wdvhj
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-w2r8q
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-sqljw
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-hmc7m
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-wdvhj
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-f9tml
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-sqljw
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-wdvhj
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-sqljw
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-rktvn
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-w2r8q
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-hmc7m
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-w2r8q
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-hmc7m
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-wdvhj
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-wdvhj
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-sqljw
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-hmc7m
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-wdvhj
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-sqljw
root@minikube:/home/lena/epam/education/task_2# curl $(minikube ip)
web-6745ffd5c8-hmc7m
root@minikube:/home/lena/epam/education/task_2#
```

Можно реализовать скрипт на python, который нам все посчитает.



```
web-6745ffd5c8-w2r8q

web-6745ffd5c8-rktvn

web-6745ffd5c8-wdvhj

web-6745ffd5c8-sqljw

web-6745ffd5c8-f9tml

web-6745ffd5c8-hmc7m

web-6745ffd5c8-w2r8q

web-6745ffd5c8-wdvhj

web-6745ffd5c8-sqljw

web-6745ffd5c8-hmc7m

web-6745ffd5c8-rktvn

web-6745ffd5c8-f9tml

web-6745ffd5c8-sqljw

web-6745ffd5c8-rktvn

web-6745ffd5c8-wdvhj

web-6745ffd5c8-w2r8q

web-6745ffd5c8-sqljw

web-6745ffd5c8-w2r8q

web-6745ffd5c8-f9tml

web-6745ffd5c8-hmc7m

web-6745ffd5c8-wdvhj

web-6745ffd5c8-sqljw

web-6745ffd5c8-f9tml

web-6745ffd5c8-hmc7m

Sum request: 1000 Request on current ingress 696 Canary: 304
root@minikube:/home/lena/epam/education/task_2#
```