

Practice1: Simple pods operations

1 .Login to Azure and connect to your AKS cluster

```
PS /home/andrej> az account set --subscription 6e58e49b-f4f5-4019-9ff0-b815383a0405
PS /home/andrej> az aks get-credentials --resource-group andrejRSG1 --name andrejKC1
Merged "andrejKC1" as current context in /home/andrej/.kube/config
PS /home/andrej> █
```

2. Check how many pods run under the default namespace

```
PS /home/andrej> kubectl get pods
No resources found in default namespace.
PS /home/andrej> █
```

3. You should not see any pod under the default namespace. Now check all namespaces

```
PS /home/andrej> kubectl get pods --all-namespaces
```

NAMESPACE	NAME	READY	STATUS	RESTARTS	AGE
kube-system	ama-logs-6jp6w	2/2	Running	0	10m
kube-system	ama-logs-flvpk	2/2	Running	0	11m
kube-system	ama-logs-rs-575ffbcd66-h8pbw	1/1	Running	0	11m
kube-system	ama-logs-zcjn8	2/2	Running	0	11m
kube-system	azure-ip-masq-agent-c9w72	1/1	Running	0	11m
kube-system	azure-ip-masq-agent-fn8x8	1/1	Running	0	11m
kube-system	azure-ip-masq-agent-nz92v	1/1	Running	0	10m
kube-system	cloud-node-manager-kqnjx	1/1	Running	0	11m
kube-system	cloud-node-manager-mphrd	1/1	Running	0	10m
kube-system	cloud-node-manager-r8qnf	1/1	Running	0	11m
kube-system	coredns-59b6bf8b4f-kzwjg	1/1	Running	0	11m
kube-system	coredns-59b6bf8b4f-mw2rg	1/1	Running	0	10m
kube-system	coredns-autoscaler-64b6477b8b-xgf9w	1/1	Running	0	11m
kube-system	csi-azuredisk-node-56xpm	3/3	Running	0	11m
kube-system	csi-azuredisk-node-gpmg5	3/3	Running	0	10m
kube-system	csi-azuredisk-node-jmnlx	3/3	Running	0	11m
kube-system	csi-azurefile-node-5bt4b	3/3	Running	0	10m
kube-system	csi-azurefile-node-c8lw8	3/3	Running	0	11m
kube-system	csi-azurefile-node-gv6ng	3/3	Running	0	11m
kube-system	konnectivity-agent-689ddbbf4f-hqqhn	1/1	Running	0	11m
kube-system	konnectivity-agent-689ddbbf4f-prjxq	1/1	Running	0	11m
kube-system	kube-proxy-25cdz	1/1	Running	0	11m
kube-system	kube-proxy-459v1	1/1	Running	0	11m

4. How many pods do you see? Who deployed these pods? Why are they deployed?

- The kube-system namespace in Kubernetes is reserved for managing essential system components like the API server, etcd, kube-proxy, CoreDNS, and controller manager. It is automatically created and managed by the Kubernetes control plane or the tools used for cluster setup.

5. Now deploy your first pod using the imperative approach.

```
PS /home/andrej> kubectl run nginx --image=nginx
pod/nginx created
PS /home/andrej>
```

6. Validate if the pods has been created. What is the status of your pod?

```
PS /home/andrej> kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
nginx     1/1     Running   0           84s
PS /home/andrej>
```

7. Check the logs coming out of your pod.

```
PS /home/andrej> kubectl logs nginx
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2023/04/09 16:20:20 [notice] 1#1: using the "epoll" event method
2023/04/09 16:20:20 [notice] 1#1: nginx/1.23.4
2023/04/09 16:20:20 [notice] 1#1: built by gcc 10.2.1 20210110 (Debian 10.2.1-6)
2023/04/09 16:20:20 [notice] 1#1: OS: Linux 5.4.0-1104-azure
2023/04/09 16:20:20 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2023/04/09 16:20:20 [notice] 1#1: start worker processes
2023/04/09 16:20:20 [notice] 1#1: start worker process 28
2023/04/09 16:20:20 [notice] 1#1: start worker process 29
PS /home/andrej>
```

8. Run following command to check current resource consumption of your pod: **kubectl top pod nginx**.

```
PS /home/andrej> kubectl top pod nginx
NAME      CPU(cores)   MEMORY(bytes)
nginx     0m           3Mi
PS /home/andrej> █
```

9. Check on which Node your pods has been scheduled.

```
PS /home/andrej> kubectl get pods -o wide
NAME    READY   STATUS    RESTARTS   AGE   IP        NODE                                     NOMINATED NODE   READINESS GATES
nginx   1/1     Running   0          7m3s  10.244.0.5 aks-agentpool-37021570-vmss000002    <none>           <none>
PS /home/andrej> █
```

10. Try to find the same information but this time running **kubectl describe pod nginx**.

```
PS /home/andrej> kubectl describe pod nginx
Name:      nginx
Namespace: default
Priority:   0
Service Account: default
Node:      aks-agentpool-37021570-vmss000002/10.224.0.6
Start Time: Sun, 09 Apr 2023 16:20:17 +0000
Labels:    run=nginx
Annotations: <none>
Status:    Running
IP:        10.244.0.5
IPs:
  IP: 10.244.0.5
```

Terminal container button

11. Delete your pod using **kubectl delete pod nginx**

```
PS /home/andrej> kubectl delete pod nginx
pod "nginx" deleted
PS /home/andrej>
```

12. Let's find the image used on one of the **coredns** pods under the **kube-system** namespace.

```
PS /home/andrej> kubectl get pods --all-namespaces
NAMESPACE   NAME                                     READY   STATUS    RESTARTS   AGE
kube-system  ama-logs-rs-575ffbcd66-75z2q           1/1     Running   0           7m6s
kube-system  ama-logs-zcjn8                         2/2     Running   0           35m
kube-system  azure-ip-masq-agent-fn8x8             1/1     Running   0           35m
kube-system  cloud-node-manager-r8qnf               1/1     Running   0           35m
kube-system  coredns-59b6bf8b4f-t8nxs               1/1     Running   0           7m7s
kube-system  coredns-59b6bf8b4f-gfdhd              1/1     Running   0           6m57s
kube-system  coredns-autoscaler-64b6477b8b-h8n7c    1/1     Running   0           7m6s
kube-system  csi-azuredisk-node-jmxxl               3/3     Running   0           35m
kube-system  csi-azurefile-node-gv6ng               3/3     Running   0           35m
kube-system  konnectivity-agent-689ddbbf4f-4rjm5    1/1     Running   0           6m57s
kube-system  konnectivity-agent-689ddbbf4f-7xk6p    1/1     Running   0           7m7s
kube-system  kube-proxy-459vl                       1/1     Running   0           35m
kube-system  metrics-server-7dd74d8758-7s62d        2/2     Running   0           4m18s
kube-system  metrics-server-7dd74d8758-8jfl5        2/2     Running   0           4m18s
```

14. Note one of the **coredns** pods. Now run **kubectl describe pod -n kube-system**.

```
PS /home/andrej> kubectl describe pod coredns-59b6bf8b4f-f8nxs -n kube-system
Name: coredns-59b6bf8b4f-f8nxs
Namespace: kube-system
Priority: 2000001000
Priority Class Name: system-node-critical
Service Account: coredns
Node: aks-agentpool-37021570-vmss000002/10.244.0.6
Start Time: Sun, 09 Apr 2023 16:25:58 +0000
Labels: k8s-app=kube-dns
        kubernetes.io/cluster-service=true
        pod-template-hash=59b6bf8b4f
        version=v20
Annotations: prometheus.io/port: 9153
Status: Running
IP: 10.244.0.6
IPs:
  IP: 10.244.0.6
Controlled By: ReplicaSet/coredns-59b6bf8b4f
Containers:
  coredns:
    Container ID: containerd://2c0592fecfebea285d6550178438edb5df92728844486c5306f22dbd45414312
    Image: mcr.microsoft.com/oss/kubernetes/coredns:v1.9.3
    Image ID: sha256:c38f956b642366c8eeb0babfda6b0bb2aa92f27a968589804cadb445f6df72d6
    Ports: 53/UDP, 53/TCP, 9153/TCP
    Host Ports: 0/UDP, 0/TCP, 0/TCP
```

15. Inspect the output and locate the image information.

```
PS /home/andrej> kubectl describe pod coredns-59b6bf8b4f-f8nxs -n kube-system
Name: coredns-59b6bf8b4f-f8nxs
Namespace: kube-system
Priority: 2000001000
Priority Class Name: system-node-critical
Service Account: coredns
Node: aks-agentpool1-37021570-vmss000002/10.244.0.6
Start Time: Sun, 09 Apr 2023 16:25:58 +0000
Labels: k8s-app=kube-dns
        kubernetes.io/cluster-service=true
        pod-template-hash=59b6bf8b4f
        version=v20
Annotations: prometheus.io/port: 9153
Status: Running
IP: 10.244.0.6
IPs:
  IP: 10.244.0.6
Controlled By: ReplicaSet/coredns-59b6bf8b4f
Containers:
  coredns:
    Container ID: containerd://2c0592fecfebea285d6550178438edb5df92728844486c5306f22dbd45414312
    Image: mcr.microsoft.com/oss/kubernetes/coredns:v1.9.3
    Image ID: sha256:c38f956b642366c8eeb0babfda6b0bb2aa92f27a968589804cadb445f6df72d6
    Ports: 53/UDP, 53/TCP, 9153/TCP
    Host Ports: 0/UDP, 0/TCP, 0/TCP
    Args:
      -conf
      /etc/coredns/Corefile
    State: Running
      Started: Sun, 09 Apr 2023 16:25:59 +0000
    Ready: True
    Restart Count: 0
    Limits:
```

16. Now let us check the logs of the metrics-server pod. Run the same command as in step 7

```
PS /home/andrej> kubectl logs metrics-server-7dd74d8758-7s62d -n kube-system -c metrics-server
I0409 16:28:57.819164 1 serving.go:342] Generated self-signed cert (/tmp/apiserver.crt, /tmp/apiserver.key)
I0409 16:29:14.157955 1 requestheader_controller.go:169] Starting RequestHeaderAuthRequestController
I0409 16:29:14.157979 1 shared_informer.go:240] Waiting for caches to sync for RequestHeaderAuthRequestController
I0409 16:29:14.158030 1 configmap_cafile_content.go:201] "Starting controller" name="client-ca:kube-system:extension-apiserver-authentication::client-ca-file"
I0409 16:29:14.158060 1 shared_informer.go:240] Waiting for caches to sync for client-ca:kube-system:extension-apiserver-authentication::client-ca-file
I0409 16:29:14.158086 1 configmap_cafile_content.go:201] "Starting controller" name="client-ca:kube-system:extension-apiserver-authentication::requestheader-client-ca-file"
I0409 16:29:14.158097 1 shared_informer.go:240] Waiting for caches to sync for client-ca:kube-system:extension-apiserver-authentication::requestheader-client-ca-file
I0409 16:29:14.158517 1 secure_serving.go:266] Serving securely on [::]:4443
I0409 16:29:14.158557 1 dynamic_serving_content.go:131] "Starting controller" name="serving-cert:/tmp/apiserver.crt:/tmp/apiserver.key"
I0409 16:29:14.158741 1 tlsconfig.go:240] "Starting DynamicServingCertificateController"
W0409 16:29:14.217557 1 shared_informer.go:372] The sharedIndexInformer has started, run more than once is not allowed
I0409 16:29:14.317600 1 shared_informer.go:247] Caches are synced for client-ca:kube-system:extension-apiserver-authentication::requestheader-client-ca-file
I0409 16:29:14.317717 1 shared_informer.go:247] Caches are synced for RequestHeaderAuthRequestController
I0409 16:29:14.317759 1 shared_informer.go:247] Caches are synced for client-ca:kube-system:extension-apiserver-authentication::client-ca-file
PS /home/andrej>
```