

## Exercise 4.3: Resource Limits for a Namespace

The previous steps set limits for that particular deployment. You can also set limits on an entire namespace. We will create a new namespace and configure another hog deployment to run within. When set hog should not be able to use the previous amount of resources.

1. Begin by creating a new namespace called `low-usage-limit` and verify it exists.

```
student@cp:~$ kubectl create namespace low-usage-limit
```

```
namespace/low-usage-limit created
```

```
student@cp:~$ kubectl get namespace
```

NAME	STATUS	AGE
default	Active	1h
kube-node-lease	Active	1h
kube-public	Active	1h
kube-system	Active	1h
low-usage-limit	Active	42s

2. Create a YAML file which limits CPU and memory usage. The kind to use is `LimitRange`. Remember the file may be found in the example tarball.

```
student@cp:~$ cp /home/student/LFS258/SOLUTIONS/s_04/low-resource-range.yaml .
```

```
student@cp:~$ vim low-resource-range.yaml
```

YAML

low-resource-range.yaml

```
1 apiVersion: v1
2 kind: LimitRange
3 metadata:
4   name: low-resource-range
5 spec:
6   limits:
7   - default:
8       cpu: 1
9       memory: 500Mi
10     defaultRequest:
11         cpu: 0.5
12         memory: 100Mi
13     type: Container
```

3. Create the `LimitRange` object and assign it to the newly created namespace `low-usage-limit`. You can use `--namespace` or `-n` to declare the namespace.

```
student@cp:~$ kubectl create -f low-resource-range.yaml -n low-usage-limit
```

```
limitrange/low-resource-range created
```

4. Verify it works. Remember that every command needs a namespace and context to work. Defaults are used if not provided.

```
student@cp:~$ kubectl get LimitRange
```

```
No resources found in default namespace.
```

```
student@cp:~$ kubectl get LimitRange --all-namespaces
```

NAMESPACE	NAME	CREATED AT
low-usage-limit	low-resource-range	2024-06-23T10:23:57Z

5. Create a new deployment in the namespace.

```
student@cp:~$ kubectl -n low-usage-limit \
  create deployment limited-hog --image vish/stress
```

```
deployment.apps/limited-hog created
```

6. List the current deployments. Note hog continues to run in the default namespace. If you chose to use the **Cilium** network policy you may see a couple more than what is listed below.

```
student@cp:~$ kubectl get deployments --all-namespaces
```

NAMESPACE	NAME	READY	UP-TO-DATE	AVAILABLE	AGE
default	hog	1/1	1	1	7m57s
kube-system	cilium-operator	1/1	1	1	2d10h
kube-system	coredns	2/2	2	2	2d10h
low-usage-limit	limited-hog	1/1	1	1	9s

7. View all pods within the namespace. Remember you can use the **tab** key to complete the namespace. You may want to type the namespace first so that tab-completion is appropriate to that namespace instead of the default namespace.

```
student@cp:~$ kubectl -n low-usage-limit get pods
```

NAME	READY	STATUS	RESTARTS	AGE
limited-hog-2556092078-wnpnv	1/1	Running	0	2m11s

8. Look at the details of the pod. You will note it has the settings inherited from the entire namespace. The use of shell completion should work if you declare the namespace first.

```
student@cp:~$ kubectl -n low-usage-limit \
  get pod limited-hog-2556092078-wnpnv -o yaml
```

```
<output_omitted>
spec:
  containers:
  - image: vish/stress
    imagePullPolicy: Always
    name: stress
  resources:
    limits:
```

```

    cpu: "1"
    memory: 500Mi
  requests:
    cpu: 500m
    memory: 100Mi
  terminationMessagePath: /dev/termination-log
<output_omitted>

```

9. Copy and edit the config file for the original `hog` file. Add the `namespace:` line so that a new deployment would be in the `low-usage-limit` namespace. Delete the `selflink` line, if it exists.

```
student@cp:~$ cp hog.yaml hog2.yaml
```

```
student@cp:~$ vim hog2.yaml
```

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hog2.yaml

```

1  ....
2  labels:
3    app: hog
4  name: hog
5  namespace: low-usage-limit    #<<--- Add this line, delete following
6  selfLink: /apis/apps/v1/namespaces/default/deployments/hog
7  spec:
8  ....
9

```

10. Open up extra terminal sessions so you can have **top** running in each. When the new deployment is created it will probably be scheduled on the node not yet under any stress. Create the deployment.

```
student@cp:~$ kubectl create -f hog2.yaml
```

```
deployment.apps/hog created
```

11. View the deployments. Note there are two with the same name, `hog` but in different namespaces. You may also find the `cilium` deployment has no pods, nor has any requested. Our small cluster does not need to add **Cilium** pods via this autoscaler.

```
student@cp:~$ kubectl get deployments --all-namespaces
```

NAMESPACE	NAME	READY	UP-TO-DATE	AVAILABLE	AGE
default	hog	1/1	1	1	24m
kube-system	cilium-operator	1/1	0	0	4h
kube-system	coredns	2/2	2	2	4h
low-usage-limit	hog	1/1	1	1	26s
low-usage-limit	limited-hog	1/1	1	1	5m11s

12. Look at the **top** output running in other terminals. You should find that both `hog` deployments are using about the same amount of resources, once the memory is fully allocated. Per-deployment settings override the global namespace settings. You should see something like the following lines one from each node, which indicates use of one processor and about 12 percent of your memory, were you on a system with 8G total.

```

25128 root    20   0  958532 954672   3180 R 100.0 11.7   0:52.27 stress
24875 root    20   0  958532 954800   3180 R 100.3 11.7  41:04.97 stress

```

13. Delete the `hog` deployments to recover system resources.

```
student@cp:~$ kubectl -n low-usage-limit delete deployment hog limited-hog
```

```
deployment.apps "hog" deleted  
deployment.apps "limited-hog" deleted
```

```
student@cp:~$ kubectl delete deployment hog
```

```
deployment.apps "hog" deleted
```