# 1 Kubectl Kubernetes CheatSheet KUBERNETES

- PDF Link: cheatsheet-kubernetes-A4.pdf, Category: kubernetes
- Blog URL: `https://cheatsheet.dennyzhang.com/cheatsheet-kubernetes-A4`

## 1.1 Common Commands

| Name | Command |
|---|---|
| List everything | `kubectl get all --all-namespaces` |
| List pods with nodes info | `kubectl get pod -o wide` |
| Validate yaml file with dry run | `kubectl create --dry-run --validate -f pod-dummy.yaml` |
| Start a temporary pod for testing | `kubectl run --rm -i -t --image=alpine test-$RANDOM -- sh` |
| Run wget test temporarily | `kubectl run --rm mytest --image=busybox -it` |
| Run curl test temporarily | `kubectl run --rm mytest --image=yauritux/busybox-curl -it` |
| kubectl run shell command | `kubectl exec -it mytest -- ls -l /etc/hosts` |
| Get system conf via configmap | `kubectl -n kube-system get cm kubeadm-config -o yaml` |
| kubectl run instance with replicas | `kubectl run my-nginx --image=nginx --replicas=2 --port=80` |
| Explain resource | `kubectl explain pods`, `kubectl explain svc` |
| Get all services | `kubectl get service --all-namespaces` |
| Query healthcheck endpoint | `curl -L http://127.0.0.1:10250/healthz` |
| Open a bash terminal in a pod | `kubectl exec -it storage sh` |
| Check pod environment variables | `kubectl exec redis-master-ft9ex env` |
| Enable kubectl shell autocompletion | `echo "source <(kubectl completion bash)" » ~/.bashrc`, then reconnect |
| Use minikube dockerd in your laptop | `eval $(minikube docker-env)`, No need to docker push any more |
| Get services sorted by name | kubectl get services –sort-by=.metadata.name |
| Get pods sorted by restart count | kubectl get pods –sort-by='.status.containerStatuses[0].restartCount' |
| Minikube | minikube cheatsheet |
| Docker | docker cheatsheet |

## 1.2 Check Performance

| Name | Command |
|---|---|
| Get node resource usage | `kubectl top node` |
| Get pod resource usage | `kubectl top pod` |
| Get resource usage for a given pod | `kubectl top <podname> --containers` |
| List resource utilization for all containers | `kubectl top pod --all-namespaces --containers=true` |

## 1.3 Resources Deletion

| Name | Command |
|---|---|
| Delete pod | `kubectl delete pod/<pod-name> -n <my-namespace>` |
| Delete pods by labels | `kubectl delete pod -l env=test` |
| Delete deployments by labels | `kubectl delete deployment -l app=wordpress` |
| Delete persist volumes by labels | `kubectl delete pvc -l app=wordpress` |
| Delete statefulset only (not pods) | `kubectl delete sts/<stateful_set_name> --cascade=false` |

## 1.4 Pod

| Name | Command |
|---|---|
| List all pods | `kubectl get pods` |
| List pods and containers | kubectl get pods -o='custom-columns=PODS:.metadata.name,CONTAINERS:.spec.container |
| List pods, containers and images | kubectl get pods -o='custom-columns=PODS:.metadata.name,CONTAINERS:.spec.container |
| List pods for all namespace | `kubectl get pods -all-namespaces` |
| List all critical pods | `kubectl get -n kube-system pods -a` |
| List pods with more info | `kubectl get pod -o wide`, `kubectl get pod/<pod-name> -o yaml` |
| Get pod info | `kubectl describe pod/srv-mysql-server` |
| List all pods with labels | `kubectl get pods --show-labels` |
| Get Pod initContainer status | `kubectl get pod --template '{{.status.initContainerStatuses}}' <pod-name>` |
| kubectl run command | kubectl exec -it -n "$ns" "$podname" – sh -c "echo $msg »/dev/err.log" |
| Get pod by selector | podname=$(kubectl get pods -n $namespace –selector="app=syslog" -o jsonpath='{.items[*] |
| List pods and containers | kubectl get pods -o='custom-columns=PODS:.metadata.name,CONTAINERS:.spec.container |
| List pods, containers and images | kubectl get pods -o='custom-columns=PODS:.metadata.name,CONTAINERS:.spec.container |
| Kubernetes Yaml Examples | link: kubernetes yaml templates |

## 1.5 Label & Annontation

| Name | Command |
|---|---|
| Filter pods by label | `kubectl get pods -l owner=denny` |
| Manually add label to a pod | `kubectl label pods dummy-input owner=denny` |
| Remove label | `kubectl label pods dummy-input owner-` |
| Manually add annonation to a pod | `kubectl annotate pods dummy-input my-url=https://www.dennyzhang.com` |

## 1.6 Deployment & Scale

| Name | Command |
|---|---|
| Scale out | `kubectl scale --replicas=3 deployment/nginx-app` |
| online rolling upgrade | `kubectl rollout app-v1 app-v2 --image=img:v2` |
| Roll backup | `kubectl rollout app-v1 app-v2 --rollback` |
| List rollout | `kubectl get rs` |
| Check update status | `kubectl rollout status deployment/nginx-app` |
| Check update history | `kubectl rollout history deployment/nginx-app` |
| Pause/Resume | `kubectl rollout pause deployment/nginx-deployment`, `resume` |
| Rollback to previous version | `kubectl rollout undo deployment/nginx-deployment` |
| Kubernetes Yaml Examples | link: kubernetes yaml templates, link: Pausing and Resuming a Deployment |

## 1.7 Quota & Limits & Resource

| Name | Command |
|---|---|
| List Resource Quota | `kubectl get resourcequota` |
| List Limit Range | `kubectl get limitrange` |
| Customize resource definition | `kubectl set resources deployment nginx -c=nginx --limits=cpu=200m,memory=512Mi` |
| Kubernetes Yaml Examples | link: kubernetes yaml templates |

## 1.8 Service

| Name | Command |
|---|---|
| List all services | `kubectl get services` |
| List service endpoints | `kubectl get endpoints` |
| Get service detail | `kubectl get service nginx-service -o yaml` |
| Get service cluster ip | kubectl get service nginx-service -o go-template='{{.spec.clusterIP}}' |
| Get service cluster port | kubectl get service nginx-service -o go-template='{{(index .spec.ports 0).port}}' |
| Expose deployment as lb service | `kubectl expose deployment/my-app --type=LoadBalancer --name=my-service` |
| Expose service as lb service | `kubectl expose service/wordpress-1-svc --type=LoadBalancer --name=wordpress-lb` |
| Kubernetes Yaml Examples | link: kubernetes yaml templates |

## 1.9 StatefulSet

| Name | Command |
|---|---|
| List statefulset | `kubectl get sts` |
| Delete statefulset only (not pods) | `kubectl delete sts/<stateful_set_name> --cascade=false` |
| Scale statefulset | `kubectl scale sts/<stateful_set_name> --replicas=5` |
| Kubernetes Yaml Examples | link: kubernetes yaml templates |

## 1.10 Volumes & Volume Claims

| Name | Command |
|---|---|
| Check the mounted volumes | `kubectl exec storage ls /data` |
| Check persist volume | `kubectl describe pv/pv0001` |
| List storage class | `kubectl get storageclass` |
| Copy files | `kubectl cp /tmp/foo <namespace1>/<pod1>:/tmp/bar` |
| Kubernetes Yaml Examples | link: kubernetes yaml templates |

## 1.11 Security

| Name | Command |
|---|---|
| List certificates | `kubectl get csr` |
| Kubernetes Yaml Examples | link: kubernetes yaml templates |

## 1.12 Extenstions

| Name | Summary |
|---|---|
| List api group | `kubectl api-versions` |
| List all CRD | `kubectl get crd` |

## 1.13 Components & Services

- Services on Master Nodes

| Name | Summary |
|---|---|
| kube-apiserver | exposes the Kubernetes API from master nodes |
| etcd | reliable data store for all k8s cluster data |
| kube-scheduler | schedule pods to run on selected nodes |
| kube-controller-manager | node controller, replication controller, endpoints controller, and service account & token controllers |

- Services on Worker Nodes

| Name | Summary |
|---|---|
| kubelet | makes sure that containers are running in a pod |
| kube-proxy | perform connection forwarding |
| Container Runtime | Kubernetes supported runtimes: Docker, rkt, runc and any OCI runtime-spec implementation. |

- Addons: pods and services that implement cluster features

| Name | Summary |
|---|---|
| DNS | serves DNS records for Kubernetes services |
| Web UI | a general purpose, web-based UI for Kubernetes clusters |
| Container Resource Monitoring | collect, store and serve container metrics |
| Cluster-level Logging | save container logs to a central log store with search/browsing interface |

- Tools

| Name | Summary |
|---|---|
| kubectl | the command line util to talk to k8s cluster |
| kubeadm | the command to bootstrap the cluster |
| kubefed | the command line to control a Kubernetes Cluster Federation |
| Kubernetes Components | link: Kubernetes Components |

## 1.14 Other Components

### 1.14.1 Log files

| Name | Command |
|---|---|
| API Server.log= in master node | `/var.log=/kube-apiserver.log` |
| Scheduler.log= in master node | `/var.log=/kube-scheduler.log` |
| Controller.log= in master node | `/var.log=/kube-controller-manager.log` |
| Kubelet.log= in worker node | `/var.log=/kubelet.log` |
| Kube Proxy.log= in worker node | `/var.log=/kubelet-proxy.log` |

### 1.14.2 Events & Metrics

| Name | Command |
|---|---|
| View all events | `kubectl get events --all-namespaces` |

### 1.14.3 Namespace & Security

| Name | Command |
|---|---|
| List authenticated contexts | `kubectl config get-contexts` |
| Switch context | `kubectl config use-context <cluster-name>` |
| Delete the specified context | `kubectl delete use-context <cluster-name>` |
| List all namespaces defined | `kubectl get namespaces` |
| kubectl config file | `~/.kube/config` |
| Kubernetes Yaml Examples | link: kubernetes yaml templates |

### 1.14.4 Network

| Name | Command |
|---|---|
| Temporarily add a port-forwarding | `kubectl port-forward redis-izl09 6379` |
| Add port-forwaring for deployment | `kubectl port-forward deployment/redis-master 6379:6379` |
| Add port-forwaring for replicaset | `kubectl port-forward rs/redis-master 6379:6379` |
| Add port-forwaring for service | `kubectl port-forward svc/redis-master 6379:6379` |
| Get network policy | `kubectl get NetworkPolicy` |

## 1.15 Basic

### 1.15.1 Key Concepts

| Name | Summary |
|---|---|
| CNCF | Cloud Native Computing Foundation |
| CRI | Container Runtime Interface |
| CNI | Container Network Interface |
| CSI | Container Storage Interface |

### 1.15.2 Kubernets Critical Files

| Name | Comment |
|---|---|
| Config folder | `/etc/kubernetes/` |
| Certificate files | `/etc/kubernetes/pki/` |
| Credentials to API server | `/etc/kubernetes/kubelet.conf` |
| Superuser credentials | `/etc/kubernetes/admin.conf` |
| Kubernets working dir | `/var/lib/kubelet/` |
| Docker working dir | `/var/lib/docker/` |
| Etcd working dir | `/var/lib/etcd/` |
| Network cni | `/etc/cni/net.d/` |
| Docker container log | `/var/log/containers/` |
| Log files | `/var/log/pods/` |
| Env | `export KUBECONFIG=/etc/kubernetes/admin.conf` |
| Env | `/etc/systemd/system/kubelet.service.d/10-kubeadm.conf` |

#### 1.15.3 Check status

| Name | Summary |
|---|---|
| List everything | `kubectl get all --all-namespaces` |
| Get cluster info | `kubectl cluster-info` |
| Get configuration | `kubectl config view` |
| Get kubectl version | `kubectl version` |
| Get component status | `kubectl get componentstatus` |
| Similar to `docker ps` | `kubectl get nodes` |
| Similar to `docker inspect` | `kubectl describe pod/nginx-app-413181-cn` |
| Similar to `docker logs` | `kubectl logs` |
| Similar to `docker exec` | `kubectl exec` |
| Get services for current namespace | `kubectl get svc` |
| Get node status | `kubectl describe node/<node_name>` |

#### 1.15.4 Kubernetes Developer Resources

| Name | Summary |
|---|---|
| API Conventions | link: API Conventions |

### 1.16 Misc scripts

- Tail pod log by label

```
namespace="mynamespace"
mylabel="app=mylabel"
kubectl get pod -l "$mylabel" -n "$namespace" | tail -n1 \
    | awk -F' ' '{print $1}' | xargs -I{} \
      kubectl logs -n "$namespace" -f {}
```

- Get node hardware resource utilization

```
kubectl get nodes --no-headers \
     | awk '{print $1}' | xargs -I {} \
     sh -c 'echo {}; kubectl describe node {} | grep Allocated -A 5'

kubectl get nodes --no-headers | awk '{print $1}' | xargs -I {} \
    sh -c 'echo {}; kubectl describe node {} | grep Allocated -A 5 \
     | grep -ve Event -ve Allocated -ve percent -ve -- ; echo'
```

- Apply the configuration in manifest.yaml and delete all the other configmaps that are not in the file.

```
kaubectl apply --prune -f manifest.yaml --all --prune-whitelist=core/v1/ConfigMap
```

### 1.17 More Resources



`https://kubernetes.io/docs/reference/kubectl/cheatsheet/`
`https://github.com/kubecamp/kubernetes_in_2_days`
`https://marc.xn--wckerlin-0za.ch/computer/kubernetes-on-ubuntu-16-04`
`https://codefresh.io/kubernetes-guides/kubernetes-cheat-sheet/`
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- Check kubernetes cheatsheet: `https://cheatsheet.dennyzhang.com/cheatsheet-minikube-A4`
- Yaml Templates: `https://cheatsheet.dennyzhang.com/cheatsheet-kubernetes-yaml`