

- PDF Link: [cheatsheet-kubernetes-A4.pdf](#)
- Blog URL: <https://cheatsheet.dennyzhang.com/cheatsheet-kubernetes>
- Category: kubernetes

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1.1 Common Usage

1.1.1 yaml templates

| Name | Summary |
|------------------------------|-------------------------------------------------------------|
| Pod yaml examples | pod-dummy.yaml, pod-nginx.yaml, pod-healthcheck-nginx.yaml |
| Pod yaml examples | pod-volume-redis.yaml, pod-gitclone.yaml, pod-handlers.yaml |
| Deployment yaml examples | deployment-nginx.yaml |
| Service yaml examples | service-clusterip-nginx.yaml |
| Volume yaml examples | pod-volume-empty-redis.yaml |
| Statefulset yaml examples | statefulset-nginx.yaml, statefulset-single-mysql |
| Statefulset yaml examples | statefulset-replicated-mysql |
| Serviceaccount yaml examples | serviceaccount-default.yaml |

1.1.2 Common Commands

| Name | Command |
|---------------------------------|------------------------------------------------------------------------|
| Validate yaml file with dry run | <code>kubect1 create --dry-run --validate -f pod-dummy.yaml</code> |
| Run wget test temporarily | <code>kubect1 run --rm mytest --image=busybox -it</code> |
| Run curl test temporarily | <code>kubect1 run --rm mytest --image=yauritux/busybox-curl -it</code> |
| Open a bash terminal in a pod | <code>kubect1 exec -it storage sh</code> |
| Check pod environment variables | <code>kubect1 exec redis-master-ft9ex env</code> |
| Get all services | <code>kubect1 get service --all-namespaces</code> |
| Get system conf via configmap | <code>kubect1 -n kube-system get cm kubeadm-config -o yaml</code> |
| Query healthcheck endpoint | <code>curl -L http://127.0.0.1:10250/healthz</code> |

1.2 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 |
|---------|-------------------------------------------------------------|
| kubect1 | 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 |

link: [Kubernetes Components](#)

1.2.1 Check Performance

| Name | Command |
|----------------------------------------------|-----------------------------------------------------------------|
| Get node resource usage | <code>kubectl top node</code> |
| Get node resource usage | <code>kubectl top pod</code> |
| List resource utilization for all containers | <code>kubectl top pod --all-namespaces --containers=true</code> |

1.3 Pod

| Name | Command |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List all pods | kubectl get pods |
| 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 -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> |
| Get pod by selector | podname=\$(kubectl get pods -n \$namespace --selector="app=syslog" -o jsonpath='{.items[*].metadata.name}') kubectl exec -it -n "\$namespace" "\$podname" - sh -c "echo \$msg »/dev/termination-log" |
| List pods with docker images | kubectl get pods -o=jsonpath='{range .items[*]}{.metadata.name}:{.spec.containers[0].name}{ " " }{.spec.containers[0].image}\n' |
| kubectl run command | kubectl exec -it -n "\$namespace" "\$podname" - sh -c "echo \$msg »/dev/termination-log" |

- Delete Pod

| Name | Command |
|---------------------|--------------------------------------------------------|
| Delete pod | <code>kubectl delete pod hello-node-95913-n63qs</code> |
| Delete pod by label | <code>kubectl delete pod -l env=test</code> |

1.4 Label & Annotation

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

1.5 Deployment & Scale

link: [Pausing and Resuming a Deployment](#)

| Name | Command |
|------------------------------|------------------------------------------------------------------------|
| Scale out | <code>kubectl scale --replicas=3 deployment/nginx-app</code> |
| online rolling upgrade | <code>kubectl rollout app-v1 app-v2 --image=img:v2</code> |
| Roll backup | <code>kubectl rollout app-v1 app-v2 --rollback</code> |
| List rollout | <code>kubectl get rs</code> |
| Check update status | <code>kubectl rollout status deployment/nginx-app</code> |
| Check update history | <code>kubectl rollout history deployment/nginx-app</code> |
| Pause/Resume | <code>kubectl rollout pause deployment/nginx-deployment, resume</code> |
| Rollback to previous version | <code>kubectl rollout undo deployment/nginx-deployment</code> |

1.6 Service

| Name | Command |
|--------------------------|------------------------------------------------------------------------------------------------|
| List all services | <code>kubectl get services</code> |
| Get service detail | <code>kubectl get service nginx-service -o yaml</code> |
| Get service cluster ip | <code>kubectl get service nginx-service -o go-template='{{.spec.clusterIP}}'</code> |
| Get service cluster port | <code>kubectl get service nginx-service -o go-template='{{(index .spec.ports 0).port}}'</code> |

1.7 StatefulSet

| Name | Command |
|------------------------------------|---------------------------------------------------------------------------|
| List statefulset | <code>kubectl get sts</code> |
| Scale statefulset | <code>kubectl scale sts <stateful_set_name> --replicas=5</code> |
| Delete statefulset only (not pods) | <code>kubectl delete sts <stateful_set_name> --cascade=false</code> |

1.8 Volumes & Volume Claims

| Name | Command |
|---------------------------|--------------------------------------------|
| Check the mounted volumes | <code>kubectl exec storage ls /data</code> |
| Check persist volume | <code>kubectl describe pv pv0001</code> |

1.9 Other Components

1.9.1 Log files

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

1.9.2 Events & Metrics

| Name | Command |
|-----------------|--------------------------------------------------|
| View all events | <code>kubectl get events --all-namespaces</code> |

1.9.3 Namespace & Security

| Name | Command |
|-----------------------------|--------------------------------------------------------------|
| List authenticated contexts | <code>kubectl config get-contexts</code> |
| List contexts | <code>kubectl config get-contexts</code> |
| Switch context | <code>kubectl config use-context <cluster-name></code> |
| List all namespaces defined | <code>kubectl get namespaces</code> |
| kubectl config file | <code>~/.kube/config</code> |

1.9.4 Network

| Name | Command |
|-----------------------------------|----------------------------------------------------|
| Temporarily add a port-forwarding | <code>kubectl port-forward redis-izl09 6379</code> |

1.9.5 Endpoint

| Name | Command |
|----------------|------------------------------------|
| List endpoints | <code>kubectl get endpoints</code> |

1.10 Basic

1.10.1 Key Concepts

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

1.10.2 Kubernetes Critical Files

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

1.10.3 Check status

| Name | Summary |
|----------------------------------------|---------------------------------------------------------|
| Start a service | <code>kubectl run hello --image=my_img --port=80</code> |
| Similar to <code>docker ps</code> | <code>kubectl get nodes</code> |
| Similar to <code>docker inspect</code> | <code>kubectl describe pod nginx-app-413181-cn</code> |
| Similar to <code>docker logs</code> | <code>kubectl logs</code> |
| Similar to <code>docker exec</code> | <code>kubectl exec</code> |
| Get deployment info | <code>kubectl get deploy</code> |
| Delete service | <code>kubectl delete service nginxservice</code> |
| Get kubectl version | <code>kubectl version</code> |
| Get cluster info | <code>kubectl cluster-info</code> |
| Get configuration | <code>kubectl config view</code> |
| Get component status | <code>kubectl get componentstatus</code> |
| Get node status | <code>kubectl describe node \$node_name</code> |
| Get services for current namespace | <code>kubectl get svc</code> |

1.10.4 Kubernetes Developer Resources

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

1.11 Minikube

[link: minikube in GitHub](#)

| Name | Command |
|---------------------|-------------------------------------------|
| Start minikube env | <code>minikube start</code> |
| minikube docker-env | <code>eval \$(minikube docker-env)</code> |
| Get dashboard | <code>minikube dashboard</code> |
| ssh to minikube vm | <code>minikube ssh</code> |
| Get ip | <code>minikube ip</code> |
| Get cluster info | <code>kubectl cluster-info</code> |
| List addons | <code>minikube addons list</code> |
| Get service info | <code>minikube service \$srv_name</code> |

TODO: rolling-update command is imperative, better use Deployments rollout. It's declarative.

1.12 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
```

1.13 More Resources

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- Useful links

- <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/>