Kubectl Context and Configuration

Set which Kubernetes cluster **kubectl** communicates with and modifies configuration information. See [Authenticating Across Clusters with kubeconfig](https://kubernetes.io/docs/tasks/access-application-cluster/configure-access-multiple-clusters/) documentation for detailed config file information.

**kubectl config view *# Show Merged kubeconfig settings.***

***# use multiple kubeconfig files at the same time and view merged config***

**KUBECONFIG=~/.kube/config:~/.kube/kubconfig2 kubectl config view**

***# get the password for the e2e user***

**kubectl config view -o jsonpath='{.users[?(@.name == "e2e")].user.password}'**

**kubectl config view -o jsonpath='{.users[].name}' *# get a list of users***

**kubectl config current-context *# display the current-context***

**kubectl config use-context my-cluster-name *# set the default context to my-cluster-name***

***# add a new cluster to your kubeconf that supports basic auth***

**kubectl config set-credentials kubeuser/foo.kubernetes.com --username=kubeuser --password=kubepassword**

***# set a context utilizing a specific username and namespace.***

**kubectl config set-context gce --user=cluster-admin --namespace=foo \**

**&& kubectl config use-context gce**

**kubectl config unset users.foo *# delete user foo***

## Apply

**apply** manages applications through files defining Kubernetes resources. It creates and updates resources in a cluster through running **kubectl apply**. This is the recommended way of managing Kubernetes applications on production. See [Kubectl Book](https://kubectl.docs.kubernetes.io/" \t "_blank).

## Creating Objects

Kubernetes manifests can be defined in json or yaml. The file extension **.yaml**, **.yml**, and **.json** can be used.

**kubectl apply -f ./my-manifest.yaml *# create resource(s)***

**kubectl apply -f ./my1.yaml -f ./my2.yaml *# create from multiple files***

**kubectl apply -f ./dir *# create resource(s) in all manifest files in dir***

**kubectl apply -f https://git.io/vPieo *# create resource(s) from url***

**kubectl create deployment nginx --image=nginx *# start a single instance of nginx***

**kubectl explain pods,svc *# get the documentation for pod and svc manifests***

***# Create multiple YAML objects from stdin***

**cat <<EOF | kubectl apply -f -**

**apiVersion: v1**

**kind: Pod**

**metadata:**

**name: busybox-sleep**

**spec:**

**containers:**

**- name: busybox**

**image: busybox**

**args:**

**- sleep**

**- "1000000"**

**---**

**apiVersion: v1**

**kind: Pod**

**metadata:**

**name: busybox-sleep-less**

**spec:**

**containers:**

**- name: busybox**

**image: busybox**

**args:**

**- sleep**

**- "1000"**

**EOF**

***# Create a secret with several keys***

**cat <<EOF | kubectl apply -f -**

**apiVersion: v1**

**kind: Secret**

**metadata:**

**name: mysecret**

**type: Opaque**

**data:**

**password: $(echo -n "s33msi4" | base64 -w0)**

**username: $(echo -n "jane" | base64 -w0)**

**EOF**

## Viewing, Finding Resources

***# Get commands with basic output***

**kubectl get services *# List all services in the namespace***

**kubectl get pods --all-namespaces *# List all pods in all namespaces***

**kubectl get pods -o wide *# List all pods in the namespace, with more details***

**kubectl get deployment my-dep *# List a particular deployment***

**kubectl get pods --include-uninitialized *# List all pods in the namespace, including uninitialized ones***

***# Describe commands with verbose output***

**kubectl describe nodes my-node**

**kubectl describe pods my-pod**

**kubectl get services --sort-by=.metadata.name *# List Services Sorted by Name***

***# List pods Sorted by Restart Count***

**kubectl get pods --sort-by='.status.containerStatuses[0].restartCount'**

***# Get the version label of all pods with label app=cassandra***

**kubectl get pods --selector=app=cassandra rc -o \**

**jsonpath='{.items[\*].metadata.labels.version}'**

***# Get all worker nodes (use a selector to exclude results that have a label***

***# named 'node-role.kubernetes.io/master')***

**kubectl get node --selector='!node-role.kubernetes.io/master'**

***# Get all running pods in the namespace***

**kubectl get pods --field-selector=status.phase=Running**

***# Get ExternalIPs of all nodes***

**kubectl get nodes -o jsonpath='{.items[\*].status.addresses[?(@.type=="ExternalIP")].address}'**

***# List Names of Pods that belong to Particular RC***

***# "jq" command useful for transformations that are too complex for jsonpath, it can be found at https://stedolan.github.io/jq/***

**sel=${$(kubectl get rc my-rc --output=json | jq -j '.spec.selector | to\_entries | .[] | "\(.key)=\(.value),"')%?}**

**echo $(kubectl get pods --selector=$sel --output=jsonpath={.items..metadata.name})**

***# Show labels for all pods (or any other Kubernetes object that supports labelling)***

***# Also uses "jq"***

**for item in $( kubectl get pod --output=name); do printf "Labels for %s\n" "$item" | grep --color -E '[^/]+$' && kubectl get "$item" --output=json | jq -r -S '.metadata.labels | to\_entries | .[] | " \(.key)=\(.value)"' 2>/dev/null; printf "\n"; done**

***# Check which nodes are ready***

**JSONPATH='{range .items[\*]}{@.metadata.name}:{range @.status.conditions[\*]}{@.type}={@.status};{end}{end}' \**

**&& kubectl get nodes -o jsonpath="$JSONPATH" | grep "Ready=True"**

***# List all Secrets currently in use by a pod***

**kubectl get pods -o json | jq '.items[].spec.containers[].env[]?.valueFrom.secretKeyRef.name' | grep -v null | sort | uniq**

***# List Events sorted by timestamp***

**kubectl get events --sort-by=.metadata.creationTimestamp**

## Updating Resources

As of version 1.11 **rolling-update** have been deprecated (see [CHANGELOG-1.11.md](https://github.com/kubernetes/kubernetes/blob/master/CHANGELOG-1.11.md)), use **rollout**instead.

**kubectl set image deployment/frontend www=image:v2 *# Rolling update "www" containers of "frontend" deployment, updating the image***

**kubectl rollout undo deployment/frontend *# Rollback to the previous deployment***

**kubectl rollout status -w deployment/frontend *# Watch rolling update status of "frontend" deployment until completion***

***# deprecated starting version 1.11***

**kubectl rolling-update frontend-v1 -f frontend-v2.json *# (deprecated) Rolling update pods of frontend-v1***

**kubectl rolling-update frontend-v1 frontend-v2 --image=image:v2 *# (deprecated) Change the name of the resource and update the image***

**kubectl rolling-update frontend --image=image:v2 *# (deprecated) Update the pods image of frontend***

**kubectl rolling-update frontend-v1 frontend-v2 --rollback *# (deprecated) Abort existing rollout in progress***

**cat pod.json | kubectl replace -f - *# Replace a pod based on the JSON passed into std***

***# Force replace, delete and then re-create the resource. Will cause a service outage.***

**kubectl replace --force -f ./pod.json**

***# Create a service for a replicated nginx, which serves on port 80 and connects to the containers on port 8000***

**kubectl expose rc nginx --port=80 --target-port=8000**

***# Update a single-container pod's image version (tag) to v4***

**kubectl get pod mypod -o yaml | sed 's/\(image: myimage\):.\*$/\1:v4/' | kubectl replace -f -**

**kubectl label pods my-pod new-label=awesome *# Add a Label***

**kubectl annotate pods my-pod icon-url=http://goo.gl/XXBTWq *# Add an annotation***

**kubectl autoscale deployment foo --min=2 --max=10 *# Auto scale a deployment "foo"***

## Patching Resources

**kubectl patch node k8s-node-1 -p '{"spec":{"unschedulable":true}}' *# Partially update a node***

***# Update a container's image; spec.containers[\*].name is required because it's a merge key***

**kubectl patch pod valid-pod -p '{"spec":{"containers":[{"name":"kubernetes-serve-hostname","image":"new image"}]}}'**

***# Update a container's image using a json patch with positional arrays***

**kubectl patch pod valid-pod --type='json' -p='[{"op": "replace", "path": "/spec/containers/0/image", "value":"new image"}]'**

***# Disable a deployment livenessProbe using a json patch with positional arrays***

**kubectl patch deployment valid-deployment --type json -p='[{"op": "remove", "path": "/spec/template/spec/containers/0/livenessProbe"}]'**

***# Add a new element to a positional array***

**kubectl patch sa default --type='json' -p='[{"op": "add", "path": "/secrets/1", "value": {"name": "whatever" } }]'**

## Editing Resources

The edit any API resource in an editor.

**kubectl edit svc/docker-registry *# Edit the service named docker-registry***

**KUBE\_EDITOR="nano" kubectl edit svc/docker-registry *# Use an alternative editor***

## Scaling Resources

**kubectl scale --replicas=3 rs/foo *# Scale a replicaset named 'foo' to 3***

**kubectl scale --replicas=3 -f foo.yaml *# Scale a resource specified in "foo.yaml" to 3***

**kubectl scale --current-replicas=2 --replicas=3 deployment/mysql *# If the deployment named mysql's current size is 2, scale mysql to 3***

**kubectl scale --replicas=5 rc/foo rc/bar rc/baz *# Scale multiple replication controllers***

## Deleting Resources

**kubectl delete -f ./pod.json *# Delete a pod using the type and name specified in pod.json***

**kubectl delete pod,service baz foo *# Delete pods and services with same names "baz" and "foo"***

**kubectl delete pods,services -l name=myLabel *# Delete pods and services with label name=myLabel***

**kubectl delete pods,services -l name=myLabel --include-uninitialized *# Delete pods and services, including uninitialized ones, with label name=myLabel***

**kubectl -n my-ns delete po,svc --all *# Delete all pods and services, including uninitialized ones, in namespace my-ns,***

## Interacting with running Pods

**kubectl logs my-pod *# dump pod logs (stdout)***

**kubectl logs my-pod --previous *# dump pod logs (stdout) for a previous instantiation of a container***

**kubectl logs my-pod -c my-container *# dump pod container logs (stdout, multi-container case)***

**kubectl logs my-pod -c my-container --previous *# dump pod container logs (stdout, multi-container case) for a previous instantiation of a container***

**kubectl logs -f my-pod *# stream pod logs (stdout)***

**kubectl logs -f my-pod -c my-container *# stream pod container logs (stdout, multi-container case)***

**kubectl run -i --tty busybox --image=busybox -- sh *# Run pod as interactive shell***

**kubectl attach my-pod -i *# Attach to Running Container***

**kubectl port-forward my-pod 5000:6000 *# Listen on port 5000 on the local machine and forward to port 6000 on my-pod***

**kubectl exec my-pod -- ls / *# Run command in existing pod (1 container case)***

**kubectl exec my-pod -c my-container -- ls / *# Run command in existing pod (multi-container case)***

**kubectl top pod POD\_NAME --containers *# Show metrics for a given pod and its containers***

## Interacting with Nodes and Cluster

**kubectl cordon my-node *# Mark my-node as unschedulable***

**kubectl drain my-node *# Drain my-node in preparation for maintenance***

**kubectl uncordon my-node *# Mark my-node as schedulable***

**kubectl top node my-node *# Show metrics for a given node***

**kubectl cluster-info *# Display addresses of the master and services***

**kubectl cluster-info dump *# Dump current cluster state to stdout***

**kubectl cluster-info dump --output-directory=/path/to/cluster-state *# Dump current cluster state to /path/to/cluster-state***

***# If a taint with that key and effect already exists, its value is replaced as specified.***

**kubectl taint nodes foo dedicated=special-user:NoSchedule**

### **Resource types**

List all supported resource types along with their shortnames, [API group](https://kubernetes.io/docs/concepts/overview/kubernetes-api/#api-groups), whether they are [namespaced](https://kubernetes.io/docs/concepts/overview/working-with-objects/namespaces), and [Kind](https://kubernetes.io/docs/concepts/overview/working-with-objects/kubernetes-objects):

**kubectl api-resources**

Other operations for exploring API resources:

**kubectl api-resources --namespaced=true *# All namespaced resources***

**kubectl api-resources --namespaced=false *# All non-namespaced resources***

**kubectl api-resources -o name *# All resources with simple output (just the resource name)***

**kubectl api-resources -o wide *# All resources with expanded (aka "wide") output***

**kubectl api-resources --verbs=list,get *# All resources that support the "list" and "get" request verbs***

**kubectl api-resources --api-group=extensions *# All resources in the "extensions" API group***

### **Formatting output**

To output details to your terminal window in a specific format, you can add either the **-o** or **--output**flags to a supported **kubectl** command.

| Output format | Description |
| --- | --- |
| **-o=custom-columns=<spec>** | Print a table using a comma separated list of custom columns |
| **-o=custom-columns-file=<filename>** | Print a table using the custom columns template in the **<filename>** file |
| **-o=json** | Output a JSON formatted API object |
| **-o=jsonpath=<template>** | Print the fields defined in a [jsonpath](https://kubernetes.io/docs/reference/kubectl/jsonpath) expression |
| **-o=jsonpath-file=<filename>** | Print the fields defined by the [jsonpath](https://kubernetes.io/docs/reference/kubectl/jsonpath) expression in the **<filename>** file |
| **-o=name** | Print only the resource name and nothing else |
| **-o=wide** | Output in the plain-text format with any additional information, and for pods, the node name is included |
| **-o=yaml** | Output a YAML formatted API object |

### **Kubectl output verbosity and debugging**

Kubectl verbosity is controlled with the **-v** or **--v** flags followed by an integer representing the log level. General Kubernetes logging conventions and the associated log levels are described [here](https://github.com/kubernetes/community/blob/master/contributors/devel/logging.md).

| Verbosity | Description |
| --- | --- |
| **--v=0** | Generally useful for this to ALWAYS be visible to an operator. |
| **--v=1** | A reasonable default log level if you don’t want verbosity. |
| **--v=2** | Useful steady state information about the service and important log messages that may correlate to significant changes in the system. This is the recommended default log level for most systems. |
| **--v=3** | Extended information about changes. |
| **--v=4** | Debug level verbosity. |
| **--v=6** | Display requested resources. |
| **--v=7** | Display HTTP request headers. |
| **--v=8** | Display HTTP request contents. |
| **--v=9** | Display HTTP request contents without truncation of contents. |