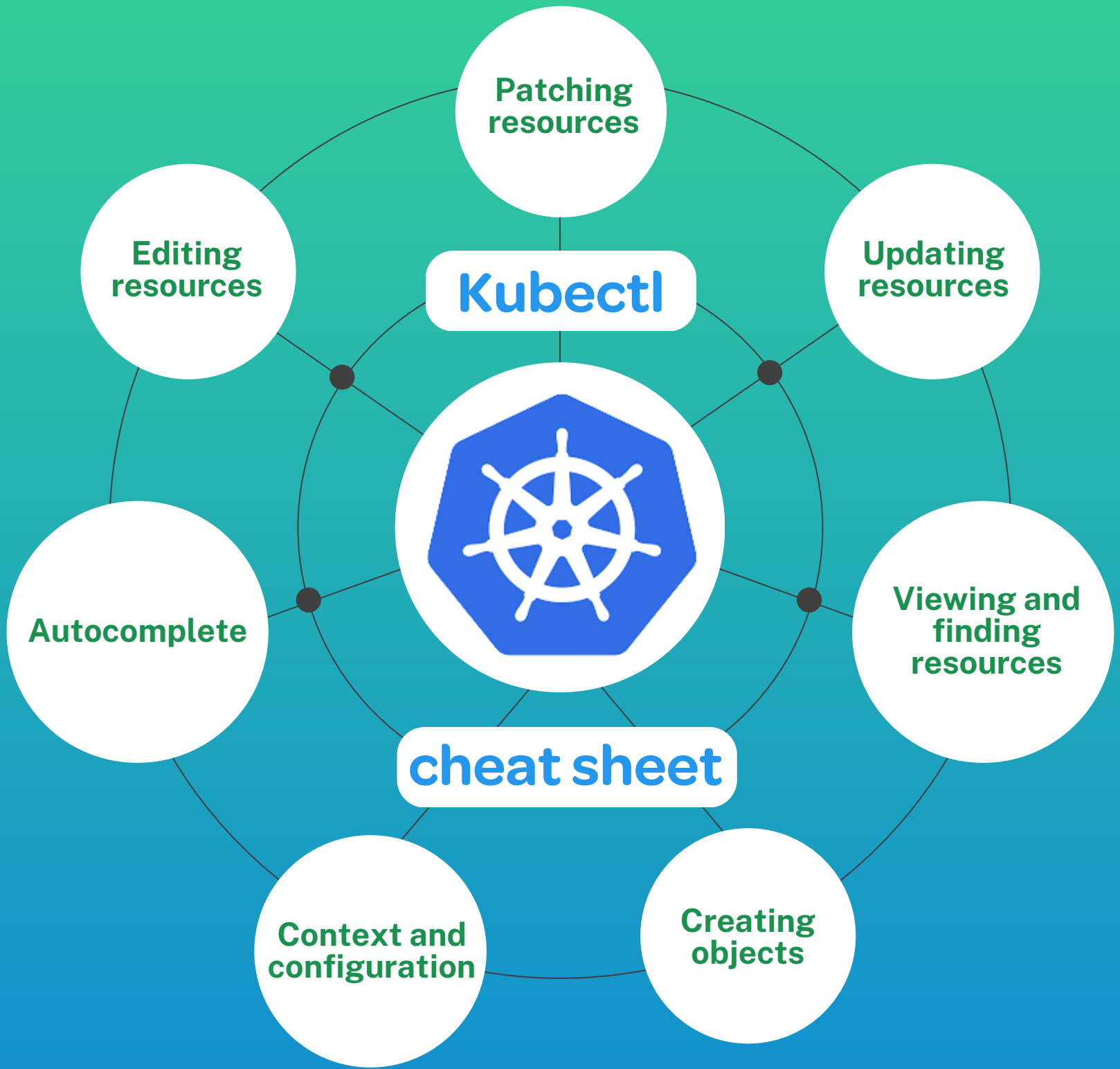
200Lab

Kubectl cheat sheet



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Kubectl autocomplete

BASH

```
source <(kubectl completion bash) # set up autocomplete in bash into the current shell, bash-completion package should be installed first.
echo "source <(kubectl completion bash)" >> ~/.bashrc # add autocomplete permanently to your bash shell.
```

BASH

```
alias k=kubectl
complete -o default -F __start_kubectl k
```

ZSH

```
# set up autocomplete in zsh into the current shell
source <(kubectl completion zsh)

# add autocomplete permanently to your zsh shell
echo '[[ $commands[kubectl] ]] && source <(kubectl completion zsh)' >> ~/.zshrc
```

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Kubectl context and configuration

Kubectl context and configuration

```
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}'    # display the first user
kubectl config view -o jsonpath='{.users[*].name}'   # get a list of users
kubectl config get-contexts                          # display list of contexts
kubectl config current-context                       # display the current-context
kubectl config use-context my-cluster-name       # set the default context to my-cluster-name
kubectl config set-cluster my-cluster-name       # set a cluster entry in the kubeconfig
```

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Kubectl context and configuration

Kubectl context and configuration 2

```
# configure the URL to a proxy server to use for requests made by this client in the
kubeconfig
kubectl config set-cluster my-cluster-name --proxy-url=my-proxy-url

# add a new user to your kubeconf that supports basic auth
kubectl config set-credentials kubeuser/foo.kubernetes.com --username=kubeuser --
password=kubepassword

# permanently save the namespace for all subsequent kubectl commands in that context.
kubectl config set-context --current --namespace=ggckad-s2
```

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Kubectl context and configuration

Kubectl context and configuration 3

```
# 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

# short alias to set/show context/namespace (only works for bash and bash-compatible shells,
current context to be set before using kn to set namespace)
alias kx='f() { [ "$1" ] && kubectl config use-context $1 || kubectl config current-context ;
} ; f'
alias kn='f() { [ "$1" ] && kubectl config set-context --current --namespace $1 || kubectl
config view --minify | grep namespace | cut -d" " -f6 ; } ; f'
```

Creating objects

Creating objects

```
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
```

Creating objects 1

```
# create a Job which prints "Hello World"
kubectl create job hello --image=busybox:1.28 -- echo "Hello World"
# create a CronJob that prints "Hello World" every minute
kubectl create cronjob hello --image=busybox:1.28   --schedule="*/1 * * * *" -- echo "Hello
World"

kubectl explain pods                             # get the documentation for pod manifests
```

Creating objects

Creating objects 2

```
# 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:1.28
    args:
    - sleep
    - "1000000"
---
apiVersion: v1
kind: Pod
metadata:
  name: busybox-sleep-less
spec:
  containers:
  - name: busybox
    image: busybox:1.28
    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
```

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Viewing and finding resources

Viewing and 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 current namespace, with more details
kubectl get deployment my-dep                 # List a particular deployment
kubectl get pods                              # List all pods in the namespace
kubectl get pod my-pod -o yaml                # Get a pod's YAML

# Describe commands with verbose output
kubectl describe nodes my-node
kubectl describe pods my-pod
```

Viewing and finding resources 1

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

# List pods Sorted by Restart Count
kubectl get pods --sort-by='.status.containerStatuses[0].restartCount'

# List PersistentVolumes sorted by capacity
kubectl get pv --sort-by=.spec.capacity.storage
```

Viewing and finding resources

Viewing and finding resources 2

```
# Get the version label of all pods with label app=cassandra
kubectl get pods --selector=app=cassandra -o \
  jsonpath='{.items[*].metadata.labels.version}'

# Retrieve the value of a key with dots, e.g. 'ca.crt'
kubectl get configmap myconfig \
  -o jsonpath='{.data.ca\.crt}'

# Retrieve a base64 encoded value with dashes instead of underscores.
kubectl get secret my-secret --template='{{index .data "key-name-with-dashes"}}'
```

Viewing and finding resources 3

```
# Get all worker nodes (use a selector to exclude results that have a label
# named 'node-role.kubernetes.io/control-plane')
kubectl get node --selector='!node-role.kubernetes.io/control-plane'

# 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}'
```

Viewing and finding resources

Viewing and finding resources 4

```
# 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)
kubectl get pods --show-labels

# 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"

# Output decoded secrets without external tools
kubectl get secret my-secret -o go-template='{{range $k,$v := .data}}{{"### "}}{{$k}}{{"\n"}}
{{$v|base64decode}}{{"\n\n"}}{{end}}'

# 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
```

Viewing and finding resources

Viewing and finding resources 5

```
# List all containerIDs of initContainer of all pods
# Helpful when cleaning up stopped containers, while avoiding removal of initContainers.
kubectl get pods --all-namespaces -o jsonpath='{range
.items[*].status.initContainerStatuses[*]}{.containerID}{"\n"}{end}' | cut -d/ -f3

# List Events sorted by timestamp
kubectl get events --sort-by=.metadata.creationTimestamp

# List all warning events
kubectl events --types=Warning

# Compares the current state of the cluster against the state that the cluster would be in if
the manifest was applied.
kubectl diff -f ./my-manifest.yaml
```

Viewing and finding resources

Viewing and finding resources 6

```
# Produce a period-delimited tree of all keys returned for nodes
# Helpful when locating a key within a complex nested JSON structure
kubectl get nodes -o json | jq -c 'paths|join(".")'

# Produce a period-delimited tree of all keys returned for pods, etc
kubectl get pods -o json | jq -c 'paths|join(".")'

# Produce ENV for all pods, assuming you have a default container for the pods, default
namespace and the `env` command is supported.
# Helpful when running any supported command across all pods, not just `env`
for pod in $(kubectl get po --output=jsonpath={.items..metadata.name}); do echo $pod &&
kubectl exec -it $pod -- env; done

# Get a deployment's status subresource
kubectl get deployment nginx-deployment --subresource=status
```

Updating resources

Updating resources

```
# Rolling update "www" containers of "frontend" deployment, updating the image
kubectl set image deployment/frontend www=image:v2
# Check the history of deployments including the revision
kubectl rollout history deployment/frontend
# Rollback to the previous deployment
kubectl rollout undo deployment/frontend
# Rollback to a specific revision
kubectl rollout undo deployment/frontend --to-revision=2
# Watch rolling update status of "frontend" deployment until completion
kubectl rollout status -w deployment/frontend
# Rolling restart of the "frontend" deployment
kubectl rollout restart deployment/frontend
# Replace a pod based on the JSON passed into stdin
cat pod.json | kubectl replace -f -
```

Updating resources

Updating resources

```
# 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 label pods my-pod new-label-                              # Remove 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"
```

Updating resources

Updating resources 1

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

Patching resources

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

# 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" } }]'

# Update a deployment's replica count by patching its scale subresource
kubectl patch deployment nginx-deployment --subresource='scale' --type='merge' -p '{"spec":
{"replicas":2}}'
```

Editing resources

Editing resources

```
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

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

Deleting resources

```
# Delete a pod using the type and name specified in pod.json
kubectl delete -f ./pod.json
# Delete a pod with no grace period
kubectl delete pod unwanted --now
# Delete pods and services with same names "baz" and "foo"
kubectl delete pod,service baz foo
# Delete pods and services with label name=myLabel
kubectl delete pods,services -l name=myLabel
# Delete all pods and services in namespace my-ns,
kubectl -n my-ns delete pod,svc --all
# Delete all pods matching the awk pattern1 or pattern2
kubectl get pods  -n mynamespace --no-headers=true | awk '/pattern1|pattern2/{print $1}' |
xargs  kubectl delete -n mynamespace pod
```

Interacting with running Pods

Interacting with running Pods

```
kubectl logs my-pod                                 # dump pod logs (stdout)
kubectl logs -l name=myLabel                        # dump pod logs, with label name=myLabel
(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 -l name=myLabel -c my-container        # dump pod logs, with label name=myLabel
(stdout)
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 logs -f -l name=myLabel --all-containers    # stream all pods logs with label
name=myLabel (stdout)
kubectl run -i --tty busybox --image=busybox:1.28 -- sh  # Run pod as interactive shell
```

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Interacting with running Pods

Interacting with running Pods 1

```
kubectl run nginx --image=nginx -n mynamespace      # Start a single instance of nginx pod in the namespace of mynamespace
kubectl run nginx --image=nginx --dry-run=client -o yaml > pod.yaml
                                                    # Generate spec for running pod nginx and write it into a file called pod.yaml
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 --stdin --tty my-pod -- /bin/sh        # Interactive shell access to a running 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
kubectl top pod POD_NAME --sort-by=cpu              # Show metrics for a given pod and sort it by 'cpu' or 'memory'
```

Copying files and directories to and from containers

Copying files and directories to and from containers

```
# Copy /tmp/foo_dir local directory to /tmp/bar_dir in a remote pod in the current namespace
kubectl cp /tmp/foo_dir my-pod:/tmp/bar_dir
# Copy /tmp/foo local file to /tmp/bar in a remote pod in a specific container
kubectl cp /tmp/foo my-pod:/tmp/bar -c my-container
# Copy /tmp/foo local file to /tmp/bar in a remote pod in namespace my-namespace
kubectl cp /tmp/foo my-namespace/my-pod:/tmp/bar
# Copy /tmp/foo from a remote pod to /tmp/bar locally
kubectl cp my-namespace/my-pod:/tmp/foo /tmp/bar
# Copy /tmp/foo local file to /tmp/bar in a remote pod in namespace my-namespace
tar cf - /tmp/foo | kubectl exec -i -n my-namespace my-pod -- tar xf - -C /tmp/bar
# Copy /tmp/foo from a remote pod to /tmp/bar locally
kubectl exec -n my-namespace my-pod -- tar cf - /tmp/foo | tar xf - -C /tmp/bar
```

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Interacting with Deployments and Services

Interacting with Deployments and Services

```
# dump Pod logs for a Deployment (single-container case)
kubectl logs deploy/my-deployment
# dump Pod logs for a Deployment (multi-container case)
kubectl logs deploy/my-deployment -c my-container
# listen on local port 5000 and forward to port 5000 on Service backend
kubectl port-forward svc/my-service 5000
# listen on local port 5000 and forward to Service target port with name <my-service-port>
kubectl port-forward svc/my-service 5000:my-service-port
# listen on local port 5000 and forward to port 6000 on a Pod created by <my-deployment>
kubectl port-forward deploy/my-deployment 5000:6000
# run command in first Pod and first container in Deployment (single- or multi-container
cases)
kubectl exec deploy/my-deployment -- ls
```

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Interacting with Nodes and cluster

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

# View existing taints on which exist on current nodes.
kubectl get nodes -o='custom-
columns=NodeName:.metadata.name,TaintKey:.spec.taints[*].key,TaintValue:.spec.taints[*].value
,TaintEffect:.spec.taints[*].effect'

# If a taint with that key and effect already exists, its value is replaced as specified.
kubectl taint nodes foo dedicated=special-user:NoSchedule
```

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Interacting with Nodes and cluster

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

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,TaintEffect:.spec.taints[*].effect'

# If a taint with that key and effect already exists, its value is replaced as specified.
kubectl taint nodes foo dedicated=special-user:NoSchedule
```

Interacting with Nodes and cluster

Resource types

```
kubectl 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 (only 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
```

Interacting with Nodes and cluster

Formatting output

```
-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 expression
-o=jsonpath-file=<filename> #Print the fields defined by the 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
```

Interacting with Nodes and cluster

Formatting output 1

```
# All images running in a cluster
kubectl get pods -A -o=custom-columns='DATA:spec.containers[*].image'

# All images running in namespace: default, grouped by Pod
kubectl get pods --namespace default --output=custom-
columns="NAME:.metadata.name,IMAGE:.spec.containers[*].image"

 # All images excluding "registry.k8s.io/coredns:1.6.2"
kubectl get pods -A -o=custom-columns='DATA:spec.containers[?
(@.image!="registry.k8s.io/coredns:1.6.2")].image'

# All fields under metadata regardless of name
kubectl get pods -A -o=custom-columns='DATA:metadata.*'
```

Interacting with Nodes and cluster

Kubectl output verbosity and debugging

```
--v=0   #Generally useful for this to always be visible to a cluster 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=5   #Trace 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.
```

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DevOps
for BackEnd Developer

Topic 1: ĐỊNH HƯỚNG & CHIA SẺ VỀ DEVOPS

Topic 2: DOCKER CƠ BẢN ĐẾN NÂNG CAO

Topic 3: DOCKER COMPOSE

Topic 4: PROMETHEUS & GRAFANA

Topic 5: FLUENTD - LOG COLLECTOR

Topic 6: CI/CD - GITHUB ACTION

Topic 7: KUBERNESTES

Topic 8: KUBERNESTES ON AWS

Full lộ trình 20 buổi từ lý thuyết đến thực chiến

TÌM HIỂU NGAY