

KUBERNETES FROM ZERO · FOUNDATIONS 3 OF 12 · LESSON 3 · LESSON KIT · ANSWER KEY

Kubernetes from Zero, part 3: your local lab with kind, kubectl and kubeconfig

The answers to the homework sheet, matched by exercise number. Every answer comes from the lesson. Names with random suffixes will differ on your cluster.

Installed and checksummed kubectl v1.37.2 and kind v0.33.0; ran 1- and 3-node clusters, 10 Nov 2026. Cluster: first and lab.

Recall

1. In one sentence each, how do kind, minikube, k3d and Docker Desktop run a learning cluster?

   kind runs each node as a container and bootstraps it with kubeadm. minikube runs a cluster in a VM, a container, or on the host, depending on the driver. k3d runs k3s in Docker. Docker Desktop has a kubeadm mode (one node) and a kind mode (several nodes).

2. What does the version skew policy say about kubectl and the API server? Which servers does kubectl 1.37 work with?

   kubectl is supported within one minor version, older or newer, of the API server. kubectl 1.37 works with API servers 1.36, 1.37 and 1.38.

3. Name the three lists and the one pointer in a kubeconfig file.

   `clusters` (name, server, certificate authority), `users` (name and credentials), `contexts` (one cluster, one user, optional namespace), and `current-context`.

4. In what order does kubectl pick its configuration file?

   The `--kubeconfig` flag if you pass one, otherwise the files listed in `KUBECONFIG`, otherwise `$HOME/.kube/config`. When files are merged, the first file to set a value wins.

5. Give the two safety notes the lesson gives for a kubeconfig file.

   A kubeconfig is a credential: anyone with your kind file is admin on that cluster, so keep it private (`chmod 600`). Use kubeconfig files only from trusted sources, because a crafted file can run code on your machine.

Run this and explain

6. After the checksum commands, what does `kubectl: OK` mean, and what should you do if you see `FAILED`?

   `OK` means the binary matches the published checksum. If you see `FAILED`, download both files again.

SCAN FOR THE LESSON

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https://aitamer.news/posts/k8s-from-zero-03-your-local-lab/?utm_source=lessonkit&utm_medium=pdf&utm_campaign=k8s-03&utm_content=answer-key

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7 Create `first` and run `kubectl get nodes` at once. Why might STATUS be `NotReady`, and what is the context name?

> `NotReady` right after creation is normal: the network plugin is still starting. A few seconds later the node is `Ready`. The context is `kind-first`, because kind prefixes the cluster name with `kind-`.

8 Create `lab` from `kind-lab.yaml` and run `docker ps`. Which containers publish a port, and which port is it?

> Only the control-plane containers publish a port: the API server's 6443, mapped to a random port on `127.0.0.1`. The lesson's output shows that for `lab-control-plane` and `first-control-plane`.

9 Run `kubectl config get-contexts`, then `kubectl config use-context kind-first`, then `kubectl get nodes --context kind-lab`. What does the star mean, and which command changes the file?

> The star marks the current context. `use-context` changes the kubeconfig file. `--context` targets one command and leaves `current-context` as it was.

10 Run `kubectl config view --minify`. What does `--minify` leave out, and what would `--raw` add?

> `--minify` shows only what the current context uses. Certificate data is `DATA+OMITTED`. `--raw` would print the keys, so the lesson says the command without `--raw` is safe to paste into a ticket.

11 Point the current context at `kube-system`, list Pods, then set the namespace back to `default`. What changes?

> Commands without `-n` go to the context's namespace. With `kube-system`, `kubectl get pods` lists that namespace (CoreDNS, the scheduler, and the rest). Set back to `default`, the lesson prints `No resources found in default namespace`.

12 Write each cluster's kubeconfig to its own file and run `KUBECONFIG=first.kubeconfig:lab.kubeconfig kubectl config get-contexts`. Which context is current, and why?

> The first file set `current-context`, so it wins. In the lesson that is `kind-first`.

Predict the outcome

13 You run `kubectl` against the saved `lab.kubeconfig` after `kind delete cluster --name lab`. The error names `127.0.0.1:46163`. What does the lesson say that means?

> kubectl points at a cluster that is not running, usually a kubeconfig file or context that outlived its cluster. Check `kubectl config current-context`, then switch context or recreate the cluster.

14 After both clusters are deleted, kubectl says `The connection to the server localhost:8080 was refused`. Why port 8080?

> kubectl found no current context at all, so it fell back to `localhost:8080`. `kubectl config current-context` says `error: current-context is not set`. Create a cluster, or run `kubectl config use-context <name>`.

15 A three-node create stops at `Preparing nodes` and mentions `could not find a log line that matches "Reached target .*Multi-User System.*|detected cgroup v1"`. What limit is too low, and which commands does the lesson show?

> Linux limits on inotify instances and watches. On Ubuntu the defaults are 128 and 8192. The lesson raises them with `sudo sysctl fs.inotify.max_user_instances=512` and `sudo sysctl fs.inotify.max_user_watches=524288`, then you create the cluster again.

16 `kubectl version` shows a client more than one minor version away from the server. What does the lesson say to do?

> Some commands may misbehave. Install a kubectl that matches, per the version skew policy.

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