

KUBERNETES FROM ZERO · FOUNDATIONS 2 OF 12 · LESSON 2 · LESSON KIT · HOMEWORK

Kubernetes from Zero, part 2: a tour of the control plane and the nodes

Exercises drawn only from the lesson: recall, run this and explain, predict the outcome.

Ran every command on kind v0.33.0, Kubernetes v1.37.0 node, kubectl v1.37.2, 10 Nov 2026. Cluster: k8s-from-zero.

Use the kind cluster `k8s-from-zero` from the lesson. Names with random suffixes and port numbers will differ on yours. Answers are in the separate answer key.

Recall

Answer from memory, then check the lesson.

1. Name the four core control-plane components, and the one optional one.

2. Which component is the only one that reads and writes etcd? How do the other components learn about changes?

3. What does every node run? Which node component is optional?

4. The kubelet talks to the container runtime through an interface. What is it called, what kind of API is it, and why does it matter?

5. What is a static Pod? Which folder holds the static Pod files on a kubeadm node?

6. Which field does kube-scheduler write into a Pod? Does the scheduler start the container?

SCAN FOR THE LESSON

Lesson: **Kubernetes from Zero, part 2: a tour of the control plane and the nodes**

https://aitamer.news/posts/k8s-from-zero-02-architecture-tour/?utm_source=lessonkit&utm_medium=pdf&utm_campaign=k8s-02&utm_content=homework

NEXT IN THE SERIES **Next: Lesson 3, your local lab**. Install kubectl and kind properly, compare them with minikube, k3d and Docker Desktop, and learn how kubeconfig and contexts decide which cluster you are talking to. Lesson page

Free to share with credit: © aitamer.news

7 Name the add-ons in a kind cluster. How do they run?

Run this and explain

Run each command on your cluster, then answer.

8 Run `kubectl get nodes -o wide`. Which column names the container runtime, and what does it say?

9 Run `kubectl get pods -n kube-system -o wide`. Which Pod names end in the node name, and why?

10 Run `docker exec k8s-from-zero-control-plane ls /etc/kubernetes/manifests` and `docker exec k8s-from-zero-control-plane systemctl is-active kubelet containerd`. What do you see, and what does it tell you about how the node is built?

11 Run `docker exec k8s-from-zero-control-plane crictl ps`. What is `crictl`, and what do the rows show?

12 Run `kubectl get leases -n kube-system`. Which two components hold a Lease, and why do they need one?

13 Start the event watch in a second terminal, then run `kubectl apply -f web.yaml -v=6 2>&1 | grep 'verb='`. In the kubectl output, why is there a `404 Not Found` before the `201 Created`?

14 From the same run, list the event sources (`FROM` column) in the order they appear, and say what each one did.

Free to share with credit: © aitamer.news

15 Run the commands from step 9 of the lesson. What three lines come back from the two jsonpath commands, and which component wrote the first one?

16 Run the `etcdctl ... get /registry/deployments/default/web --keys-only` command from step 10. What comes back, and which component wrote it?

Predict the outcome

Write your prediction first. Then run it, or check the answer key.

17 You move `kube-scheduler.yaml` out of `/etc/kubernetes/manifests` and run `kubectl scale deployment web --replicas=4`. Predict the `STATUS` of all four `web` Pods, and what `kubectl describe` shows on a new one.

18 You then move `kube-scheduler.yaml` back into `/etc/kubernetes/manifests`. What happens to the two `Pending` Pods?

19 You stop the kubelet with `docker exec k8s-from-zero-control-plane systemctl stop kubelet`. Predict the node's `STATUS` after a short wait, what its conditions say, and whether running containers stop.

20 You run `kubectl delete -f web.yaml`. What happens to the ReplicaSet and the Pods, and what makes that happen?

21 New Pods stay `Pending` and show no events. Which component do you suspect, and which command checks it?

22 kubectl prints `The connection to the server ... was refused`. Give the two likely causes from the lesson.

Free to share with credit: © aitamer.news