

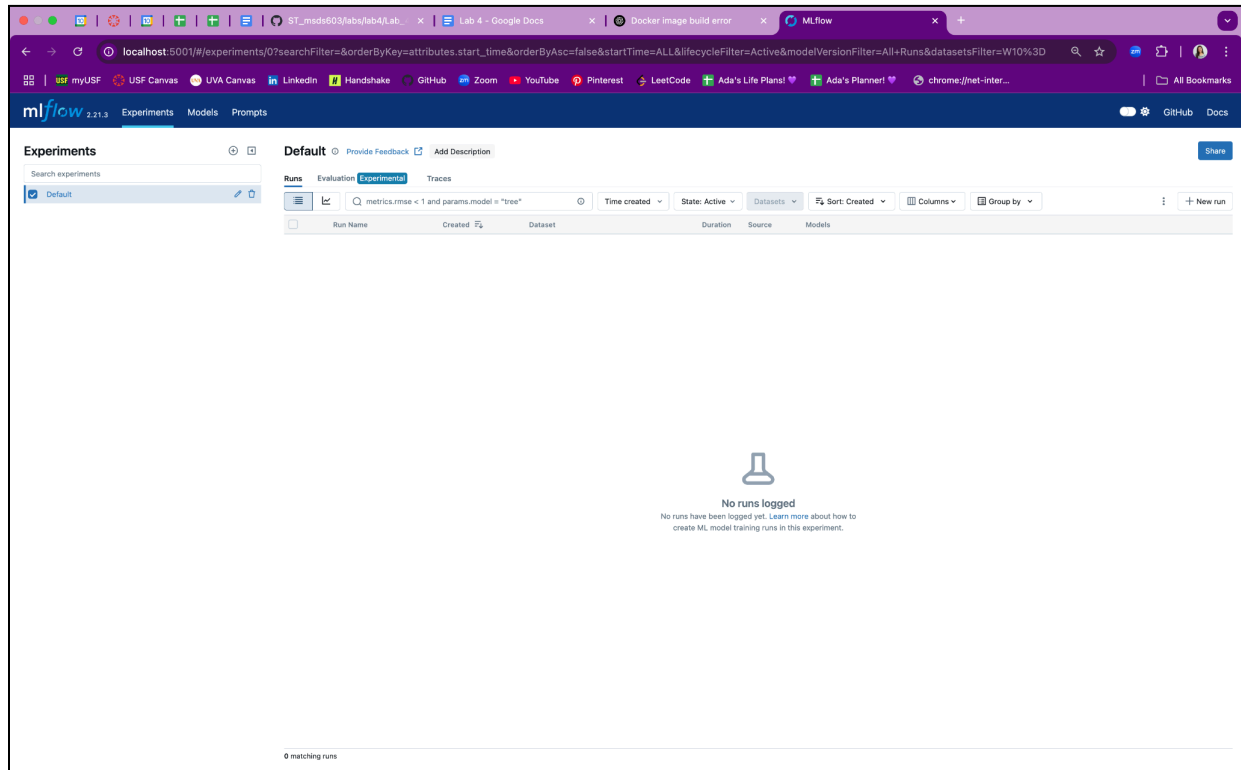
Build the image and **take a snapshot of the output in the terminal.**

```
mlflow_test — -zsh — 111x42
...03/labs/lab4 — kubectl • minikube dashboard
...g2/ST_msds603/labs/lab4 — kubectl proxy
...T_msds603/labs/lab4/mlflow_test — -zsh
+

[(mlops) adazhang@mac lab4 % mkdir mlflow_test
[(mlops) adazhang@mac lab4 % cd mlflow_test
[(mlops) adazhang@mac mlflow_test % touch Dockerfile
[(mlops) adazhang@mac mlflow_test % open Dockerfile
[(mlops) adazhang@mac mlflow_test % docker build -t mlflow_server .
[+] Building 66.3s (7/7) FINISHED                                docker:desktop-linux
=> [internal] load build definition from Dockerfile                0.0s
=> => transferring dockerfile: 425B                                0.0s
=> [internal] load metadata for docker.io/library/python:3.9      1.2s
=> [auth] library/python:pull token for registry-1.docker.io      0.0s
=> [internal] load .dockerignore                                    0.0s
=> => transferring context: 2B                                       0.0s
=> [1/2] FROM docker.io/library/python:3.9@sha256:a847112640804ed2d03bb774d46bb1619bd37862fb2b7e48eebe4 18.3s
=> => resolve docker.io/library/python:3.9@sha256:a847112640804ed2d03bb774d46bb1619bd37862fb2b7e48eebe4 0.0s
=> => sha256:c36034055aed6cbdd57ce45158b02229b6434c8a555017ad25128e0ab2ec5fb5 250B / 250B      0.1s
=> => sha256:23e63110048c540a329c6246692f2e25d3ace6164bb6a78284e46aa39eea023e 19.28MB / 19.28MB 2.6s
=> => sha256:74cdcd61ff8011b09b30e9731170ad1f86a3d11655c3635d2f9d58e49130df58 6.24MB / 6.24MB 1.7s
=> => sha256:002e18bd5659ca9d155e99922678788bec836a3ac4964d8a9567ce59e2154de9 202.74MB / 202.74MB 15.9s
=> => sha256:ebf144460616b42eb1462fd80a5e1909e578b1e1f7285b185e468ba2b01308b9 64.36MB / 64.36MB 6.3s
=> => sha256:71daa2c787b0984bbf3b93b60686fc9fe305d28e833914019b2745ab9f36730e 48.33MB / 48.33MB 7.4s
=> => sha256:9d81c64672754c46e5d99e385c8f3283bec2060a79ad7dacdb2f5ce904caa401 23.54MB / 23.54MB 5.4s
=> => extracting sha256:71daa2c787b0984bbf3b93b60686fc9fe305d28e833914019b2745ab9f36730e 0.5s
=> => extracting sha256:9d81c64672754c46e5d99e385c8f3283bec2060a79ad7dacdb2f5ce904caa401 0.2s
=> => extracting sha256:ebf144460616b42eb1462fd80a5e1909e578b1e1f7285b185e468ba2b01308b9 0.7s
=> => extracting sha256:002e18bd5659ca9d155e99922678788bec836a3ac4964d8a9567ce59e2154de9 2.0s
=> => extracting sha256:74cdcd61ff8011b09b30e9731170ad1f86a3d11655c3635d2f9d58e49130df58 0.1s
=> => extracting sha256:23e63110048c540a329c6246692f2e25d3ace6164bb6a78284e46aa39eea023e 0.3s
=> => extracting sha256:c36034055aed6cbdd57ce45158b02229b6434c8a555017ad25128e0ab2ec5fb5 0.0s
=> [2/2] RUN pip install mlflow                                   27.3s
=> exporting to image                                             19.5s
=> => exporting layers                                             16.5s
=> => exporting manifest sha256:c3e43fe5d31f3edb51acb8a45fde79820e5f49c3cf3908eace60dfb676bfc5 0.0s
=> => exporting config sha256:005af1547fa9832fcd806f02d3886c73e99cfcecf40d5fdbb0b381ff04578507 0.0s
=> => exporting attestation manifest sha256:0f1635726e57fe3d5d14be2c6befe2d7db6f302018e61d73a790b330353 0.0s
=> => exporting manifest list sha256:af8ab3762a419c9944ca24246d319e0326da8bf80f5226f8b0e51a52e2326e74 0.0s
=> => naming to docker.io/library/mlflow_server:latest           0.0s
=> => unpacking to docker.io/library/mlflow_server:latest        2.9s

1 warning found (use docker --debug to expand):
- JSONArgsRecommended: JSON arguments recommended for CMD to prevent unintended behavior related to OS signals
(line 7)
[(mlops) adazhang@mac mlflow_test % ]
```

Access the server at `http://localhost:5000` and take a snapshot of the mlflow server ui along with the address bar to show the URL.



## Take three snapshots of the minikube dashboard: (1) Deployments; (2) Pods; (3) Services

This screenshot shows the 'Deployments' section of the Kubernetes dashboard. The left sidebar lists various workload types, with 'Deployments' selected. The main panel displays a table of active deployments.

Name	Images	Labels	Pods	Created ↑
mlflow-server	mlflow-server	-	1 / 1	27 seconds ago
kubernetes-bootcamp	gcr.io/google-samples/kubernetes-bootcamp:v1	app: kubernetes-bootcamp	2 / 2	59 minutes ago

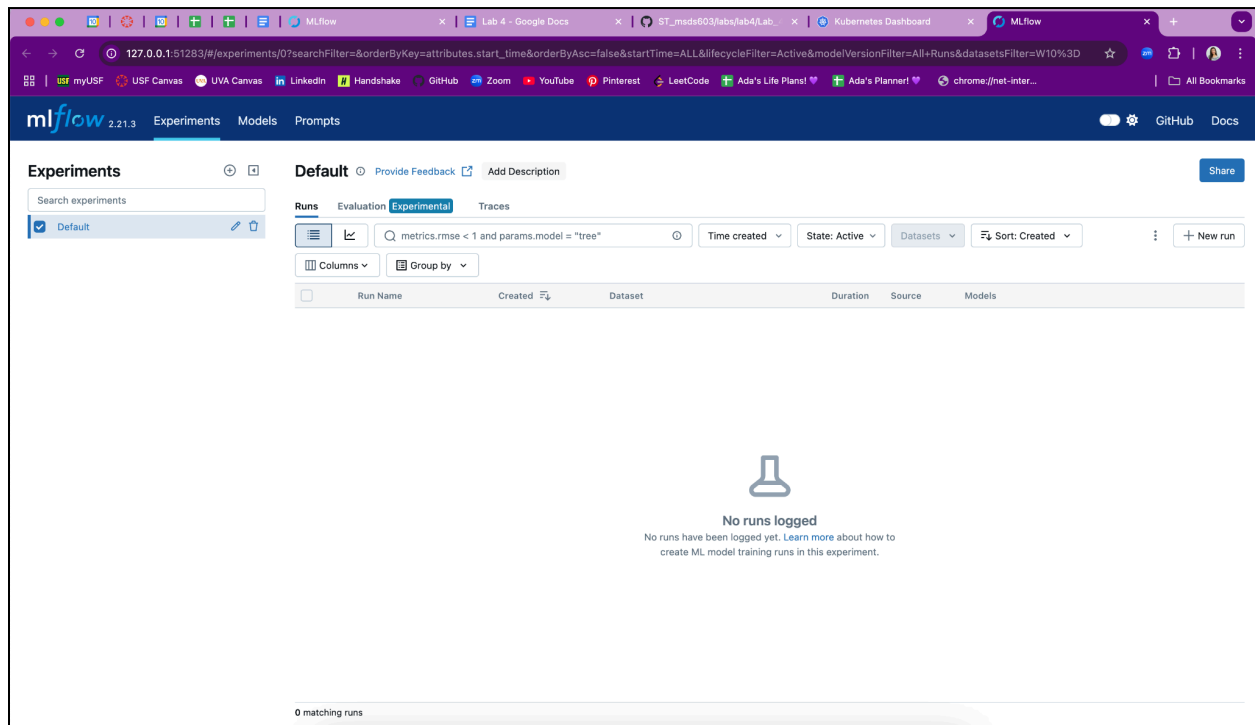
This screenshot shows the 'Pods' section of the Kubernetes dashboard. The left sidebar lists various workload types, with 'Pods' selected. The main panel displays a table of active pods.

Name	Images	Labels	Node	Status	Restarts	CPU Usage (cores)	Memory Usage (bytes)	Created ↑
mlflow-server-7d59bb677-58fs4	mlflow-server	app: mlflow-server pod-template-hash: 7d59bb677	minikube	Running	0	-	-	39 seconds ago
kubernetes-bootcamp-9bc58d867-xxffx	gcr.io/google-samples/kubernetes-bootcamp:v1	app: kubernetes-bootcamp pod-template-hash: 9bc58d867	minikube	Running	1	-	-	31 minutes ago
kubernetes-bootcamp-9bc58d867-6mdvl	gcr.io/google-samples/kubernetes-bootcamp:v1	app: kubernetes-bootcamp pod-template-hash: 9bc58d867	minikube	Running	1	-	-	an hour ago

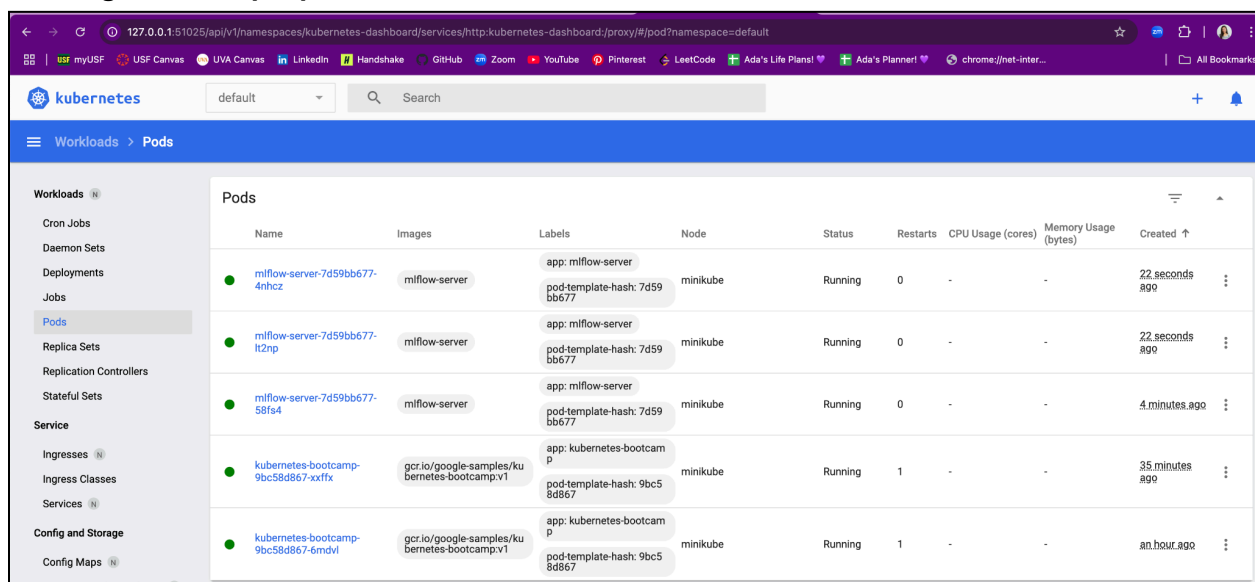
This screenshot shows the 'Services' section of the Kubernetes dashboard. The left sidebar lists various workload types, with 'Services' selected. The main panel displays a table of active services.

Name	Labels	Type	Cluster IP	Internal Endpoints	External Endpoints	Created ↑
mlflow-service	-	ClusterIP	10.108.205.117	mlflow-service:5000 TCP mlflow-service:0 TCP	-	a minute ago
kubernetes-bootcamp	app: kubernetes-bootcamp	NodePort	10.108.241.108	kubernetes-bootcamp:8080 TCP kubernetes-bootcamp:31143 TCP	-	49 minutes ago
kubernetes	component: apiserver provider: kubernetes	ClusterIP	10.96.0.1	kubernetes:443 TCP kubernetes:0 TCP	-	an hour ago

This should open up the mlflow server in a browser. **Take a snapshot of the UI with the address bar to show the URL.**



Scale up by increasing the number of replicas, **take a snapshot of the dashboard Pods page showing that multiple pods were created, then scale back down.**



Take a snapshot of the mlflow server UI and the address bar to show that the experiment was logged in the minikube mlflow server.

127.0.0.1:51283/#/experiments/711433393472018108?searchFilter=&orderByKey=&orderByDesc=&orderByTime=ALL&lifecycleFilter=Active&modelVersionFilter=All+Runs&dataset=...

mlflow 2.21.3 Experiments Models Prompts

Experiments

Search experiments

- ☐ Default
- ☐ demo-experiment2
- ☐ demo-experiment
- ☒ lab2

lab2 Provide Feedback Add Description Share

Runs Evaluation Experimental Traces

metrics.rmse < 1 and params.model = "tree" Time created State: Active Datasets Sort: Created New run

Columns Group by

<input type="checkbox"/>	Run Name	Created	Dataset	Duration	Source	Models
<input type="checkbox"/>	nervous-pug-253	4 minutes ago	-	1.3s	ipykern...	sklearn
<input type="checkbox"/>	learned-mole-844	4 minutes ago	-	1.1s	ipykern...	sklearn
<input type="checkbox"/>	smiling-bee-816	4 minutes ago	-	1.5s	ipykern...	sklearn
<input type="checkbox"/>	hilarious-flea-801	4 minutes ago	-	1.5s	ipykern...	sklearn
<input type="checkbox"/>	adaptable-turtle-837	4 minutes ago	-	1.5s	ipykern...	sklearn
<input type="checkbox"/>	worried-rook-604	4 minutes ago	-	1.4s	ipykern...	sklearn
<input type="checkbox"/>	luminous-bat-223	4 minutes ago	-	1.4s	ipykern...	sklearn
<input type="checkbox"/>	stately-slug-788	4 minutes ago	-	1.4s	ipykern...	sklearn
<input type="checkbox"/>	shivering-hare-549	4 minutes ago	-	1.5s	ipykern...	sklearn
<input type="checkbox"/>	clumsy-cow-525	4 minutes ago	-	1.4s	ipykern...	sklearn
<input type="checkbox"/>	unleashed-pug-633	4 minutes ago	-	1.2s	ipykern...	sklearn
<input type="checkbox"/>	bald-gnat-94	4 minutes ago	-	1.5s	ipykern...	sklearn
<input type="checkbox"/>	hilarious-sloth-199	4 minutes ago	-	1.4s	ipykern...	sklearn
<input type="checkbox"/>	serious-shoot-148	4 minutes ago	-	1.4s	ipykern...	sklearn
<input type="checkbox"/>	entertaining-cod-783	4 minutes ago	-	1.3s	ipykern...	sklearn
<input type="checkbox"/>	bouncy-gull-638	4 minutes ago	-	1.5s	ipykern...	sklearn
<input type="checkbox"/>	youthful-mare-814	4 minutes ago	-	1.2s	ipykern...	sklearn

Show more columns (15 total)