

# Livia Ellen

## Testing part 1

### Building Docker Image Local

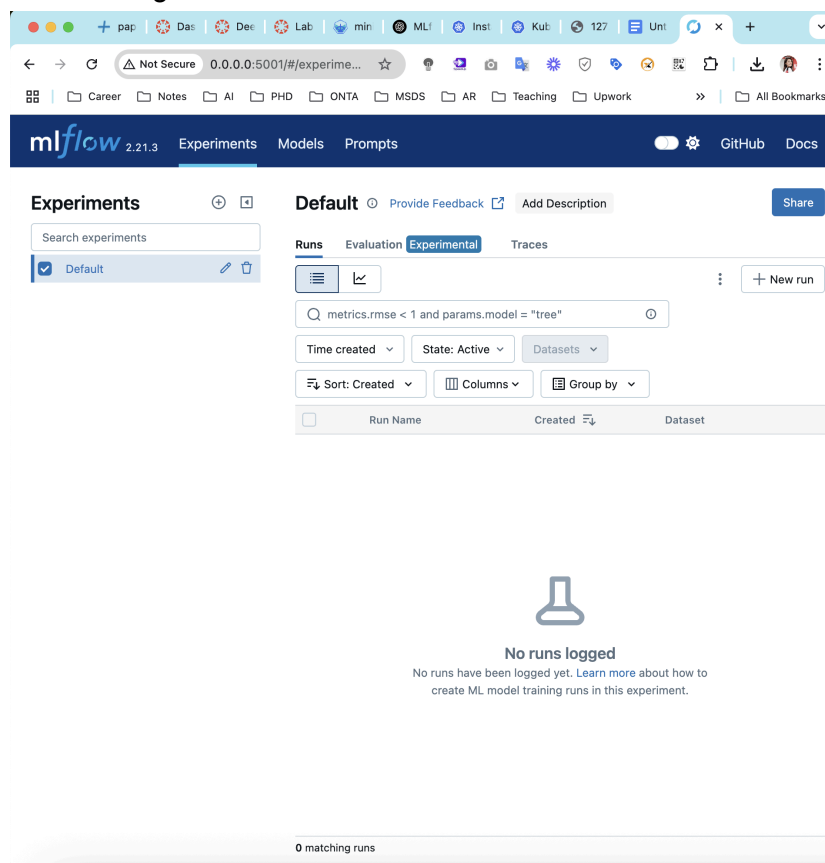
```
mlflow_test git:(master) x touch Dockerfile
mlflow_test git:(master) x docker build -t mlflow-local .

[+] Building 78.0s (7/7) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 237B
=> [internal] load metadata for docker.io/library/python:3.10-slim
=> [auth] library/python:pull token for registry-1.docker.io
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [1/2] FROM docker.io/library/python:3.10-slim@sha256:65c843653048a3ba22c8d5083a022f44aef774974f0f7f70cbf8cee4e931ac96
=> resolve docker.io/library/python:3.10-slim@sha256:65c843653048a3ba22c8d5083a022f44aef774974f0f7f70cbf8cee4e931ac96
=> sha256:38013e09717a8dc4f351a257ea288ea53b24f381309e946ee9f0dfa479a477c6 250B / 250B
=> sha256:b78494172b43bdd9ef3a8840decc959ae877d8469d52cfe51e53dbffde08ed9 15.56MB / 15.56MB
=> sha256:a7d9a0ac6293889b2e134861072f9099a06d78ca983d7172d7bb8b236008c7c3 3.33MB / 3.33MB
=> sha256:16c9c4a8e9eef856231273efbb42a473740e8d50d74d35e6aedd04ff69fe161f 28.07MB / 28.07MB
=> extracting sha256:16c9c4a8e9eef856231273efbb42a473740e8d50d74d35e6aedd04ff69fe161f
=> extracting sha256:a7d9a0ac6293889b2e134861072f9099a06d78ca983d7172d7bb8b236008c7c3
=> extracting sha256:b78494172b43bdd9ef3a8840decc959ae877d8469d52cfe51e53dbffde08ed9
=> extracting sha256:38013e09717a8dc4f351a257ea288ea53b24f381309e946ee9f0dfa479a477c6
=> [2/2] RUN pip install mlflow
=> exporting to image
=> exporting layers
=> exporting manifest sha256:e97b66579b67aceccfcbcb330049225b48b901b4c11a1fd2d6b171dc9754ad9
=> exporting config sha256:12c018e18107b5b52f3d4986036d87055fbd4cf4d413f4b189cf6a27a9919803
=> exporting attestation manifest sha256:12a0a700a215c6e59b50acc6d6a5fbc8bd1edd2b0be352b14cf1f05695b3642
=> exporting manifest list sha256:8c2b419718b2093014c8a3c7380d6e439f92a2881d8bf25204659739b26ee2e6
=> naming to docker.io/library/mlflow-local:latest
=> unpacking to docker.io/library/mlflow-local:latest

View build details: docker-desktop://dashboard/build/desktop-linux/desktop-linux/szc6g6883kf2qctrjj3ut93f5

What's next:
View a summary of image vulnerabilities and recommendations → docker scout quickview
mlflow_test git:(master) x
```

## MLFlow Page



## Doing The Lab

### Building mlflow-minikube docker

```
[+] Building 44.9s (7/7) FINISHED                                docker:default
=> [internal] load build definition from Dockerfile                0.0s
=> => transferring dockerfile: 237B                               0.0s
=> [internal] load metadata for docker.io/library/python:3.10-slim 1.3s
=> [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:3.10-slim@sha256:65c8436530 3.8s
=> => resolve docker.io/library/python:3.10-slim@sha256:65c8436530 0.0s
=> => sha256:65c843653048a3ba22c8d5083a022f44aef77 9.13kB / 9.13kB 0.0s
=> => sha256:a9bc37fa702940246619c7b6f6309c8c73396 1.75kB / 1.75kB 0.0s
=> => sha256:d17a2e30e3177adc53097a3ff245f44642263 5.32kB / 5.32kB 0.0s
=> => sha256:16c9c4a8e9eef856231273efbb42a473740 28.07MB / 28.07MB 1.8s
=> => sha256:a7d9a0ac6293889b2e134861072f9099a06d7 3.33MB / 3.33MB 0.9s
=> => sha256:bf8494172b43bdd9ef3a8840deecc959ae8 15.56MB / 15.56MB 2.1s
=> => sha256:38013e09717a8dc4f351a257ea288ea53b24f3813 250B / 250B 1.1s
=> => extracting sha256:16c9c4a8e9eef856231273efbb42a473740e8d50d7 1.1s
=> => extracting sha256:a7d9a0ac6293889b2e134861072f9099a06d78ca98 0.1s
=> => extracting sha256:bf8494172b43bdd9ef3a8840deecc959ae877d8469 0.6s
=> => extracting sha256:38013e09717a8dc4f351a257ea288ea53b24f38130 0.0s
=> [2/2] RUN pip install mlflow                                37.4s
=> exporting to image                                           2.3s
=> => exporting layers                                           2.3s
=> => writing image sha256:d1dbcc836120cfebe4afa612e0fbf42e66ded68 0.0s
=> => naming to docker.io/library/mlflow-minikube                0.0s
```

View build details: [docker-desktop://dashboard/build/default/default/vjppj923wpcpvadkup60y6zszi](https://docker-desktop://dashboard/build/default/default/vjppj923wpcpvadkup60y6zszi)

### Running mlflow in kubectl

```
mlflow_test git:(master) x [mlops]
# Apply deployment and service
kubectl apply -f mlflow-deployment.yaml
kubectl apply -f mlflow-service.yaml

# Open MLflow in browser
minikube service mlflow-service
deployment.apps/mlflow-deployment unchanged
service/mlflow-service unchanged
```

NAMESPACE	NAME	TARGET PORT	URL
default	mlflow-service	5000	http://192.168.49.2:30000

```
Starting tunnel for service mlflow-service.
```

NAMESPACE	NAME	TARGET PORT	URL
default	mlflow-service		http://127.0.0.1:50969

```
Opening service default/mlflow-service in default browser...
! Because you are using a Docker driver on darwin, the terminal needs to
be open to run it.
```

127.0.0.1:50969/#/experiments/0?s... ☆

mlflow 2.21.3 Experiments Models Prompts GitHub Docs

### Experiments

Search experiments

☒ Default

### Default

Provide Feedback Add Description Share

Runs Evaluation **Experimental** Traces

metrics.rmse < 1 and params.model = "tree"

Time created State: Active Datasets

Sort: Created Columns Group by

Run Name	Created	Dataset
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**No runs logged**

No runs have been logged yet. Learn more about how to create ML model training runs in this experiment.

## Kubernetes Dashboard

kubernetes All namespaces Search

### Workloads

Workloads Cron Jobs Daemon Sets Deployments Jobs Pods Replica Sets Replication Controllers Stateful Sets Service Ingresses Ingress Classes Services Config and Storage Config Maps Persistent Volume Claims Secrets Storage Classes Cluster Cluster Role Bindings Cluster Roles Events Namespaces Network Policies Nodes Persistent Volumes Role Bindings

#### Workload Status

Running: 1 Daemon Sets Running: 5 Deployments Running: 12 Pods Running: 6 Replica Sets

#### Daemon Sets

Name	Namespace	Images	Labels	Pods	Created
kube-proxy	kube-system	registry.k8s.io/kube-proxy:v1.32.0	k8s-app: kube-proxy	1 / 1	33 minutes ago

#### Deployments

Name	Namespace	Images	Labels	Pods	Created
mlflow-deployment	default	mlflow-minikube	-	1 / 1	22 minutes ago
kubernetes-bootcamp	default	gcr.io/google-samples/kubernetes-bootcamp:v1	app: kubernetes-bootcamp	2 / 2	30 minutes ago
dashboard-metrics-scraper	kubernetes-dashboard	docker.io/kubernetes/metrics-scraper:v1.0.8@sha256:76049887707a0476dc93efc2d356b9b529bf982b22d29f356092ce206e98765c	addonmanager.kubernetes.io/mode: Reconcile k8s-app: dashboard-metrics-scraper kubernetes.io/minikube-addons: dashboard	1 / 1	31 minutes ago
kubernetes-dashboard	kubernetes-dashboard	docker.io/kubernetes/dashboard-v2.7.0@sha256:2e500d29e9d5f4a086b908eb8df7eacac57d72ah0d6k6h7d4f588h1d4d498d1ef93	addonmanager.kubernetes.io/mode: Reconcile k8s-app: kubernetes-dashboard	1 / 1	31 minutes ago

# Deployment, Pods, Service (Before Scaling)

kubernetes

default

Search

Workloads > Deployments

Workloads

Cron Jobs

Daemon Sets

Deployments

Jobs

Pods

Replica Sets

Replication Controllers

Stateful Sets

Service

Ingresses

Ingress Classes

Services

Deployments

Name	Images	Labels	Pods	Created
miflow-deployment	miflow-minikube		1 / 1	23 minutes ago
kubernetes-bootcamp	gcr.io/google-samples/kubernetes-bootcamp:v1	app: kubernetes-bootcamp	2 / 2	31 minutes ago

kubernetes

default

Search

Workloads > Pods

Workloads

Cron Jobs

Daemon Sets

Deployments

Jobs

Pods

Replica Sets

Replication Controllers

Stateful Sets

Service

Ingresses

Ingress Classes

Services

Config and Storage

Pods

Name	Images	Labels	Node	Status	Restarts	CPU Usage (cores)	Memory Usage (bytes)	Created
miflow-deployment-95bdb7458-w2ct4	miflow-minikube	app: miflow pod-template-hash: 95bdb7458	minikube	Running	0	-	-	21 minutes ago
kubernetes-bootcamp-9bc58d867-z7xkq	gcr.io/google-samples/kubernetes-bootcamp:v1	app: kubernetes-bootcamp pod-template-hash: 9bc58d867	minikube	Running	1	-	-	27 minutes ago
kubernetes-bootcamp-9bc58d867-j2h7z	gcr.io/google-samples/kubernetes-bootcamp:v1	app: kubernetes-bootcamp pod-template-hash: 9bc58d867	minikube	Running	1	-	-	31 minutes ago

kubernetes

default

Search

Service > Services

Workloads

Cron Jobs

Daemon Sets

Deployments

Jobs

Pods

Replica Sets

Replication Controllers

Stateful Sets

Service

Ingresses

Ingress Classes

Services

Config and Storage

Config Maps

Persistent Volume Claims

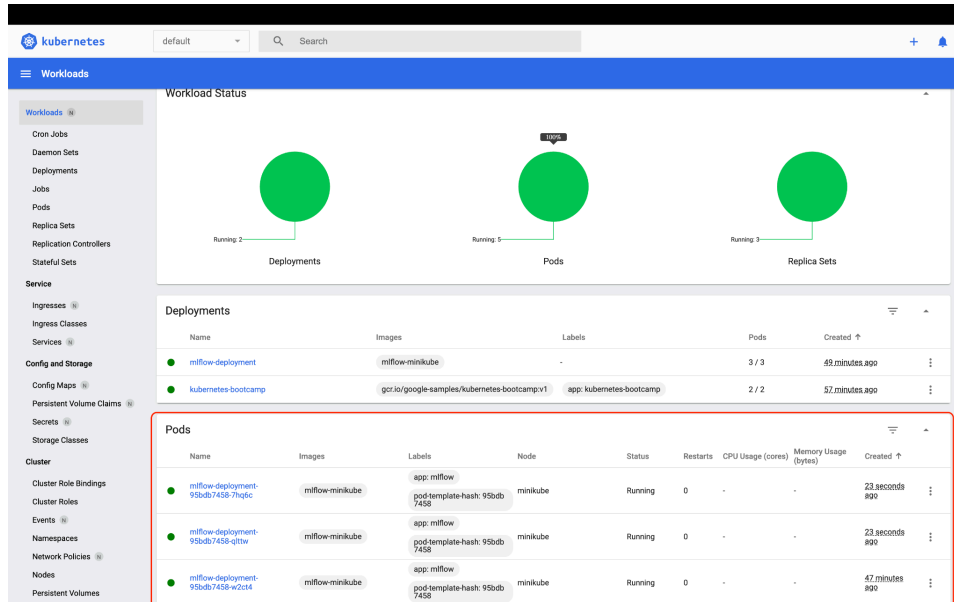
Secrets

Services

Name	Labels	Type	Cluster IP	Internal Endpoints	External Endpoints	Created
miflow-service		NodePort	10.105.138.251	miflow-service:5000 TCP miflow-service:30000 TCP	-	24 minutes ago
kubernetes-bootcamp	app: kubernetes-bootcamp	NodePort	10.100.178.249	kubernetes-bootcamp:8080 TCP kubernetes-bootcamp:31531 TCP	-	28 minutes ago
kubernetes	component: apiserver provider: kubernetes	ClusterIP	10.96.0.1	kubernetes:443 TCP kubernetes:0 TCP	-	34 minutes ago

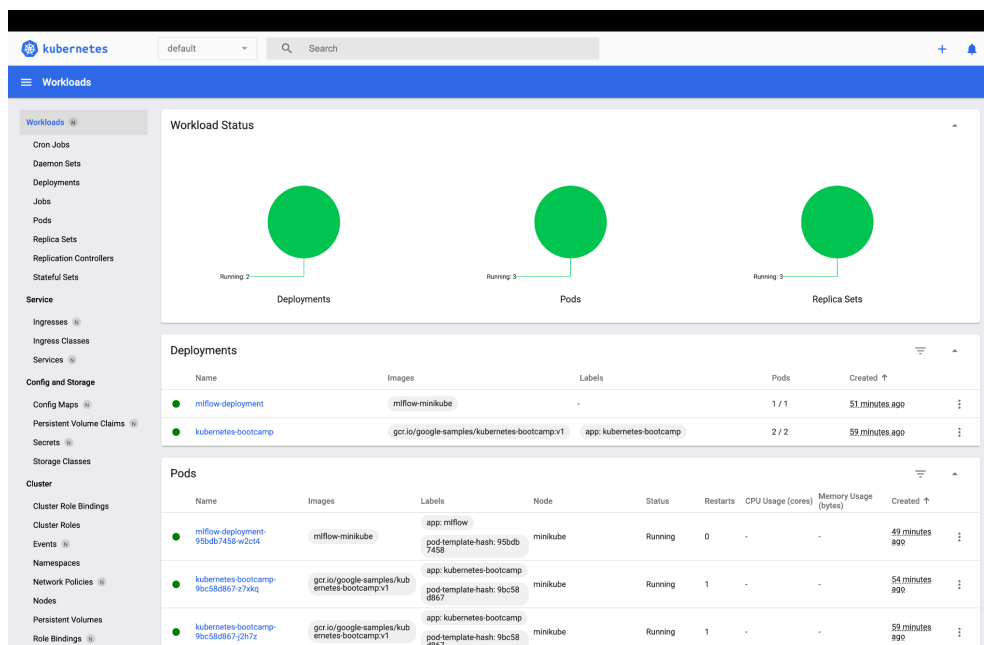
## Scaling to 3 pods

```
mlops git:(master) x kubectl scale deployment mlflow-deployment --replicas=3  
deployment.apps/mlflow-deployment scaled
```



## Scaling down to 1 pod

```
mlops git:(master) x kubectl scale deployment mlflow-deployment --replicas=1  
deployment.apps/mlflow-deployment scaled
```



Running in notebook 2

127.0.0.1:5000/#/experiments/670543690765222598?searchFilter=&orderByKey=attributes.start\_time&orderByAsc=false&startTime=ALL&lifecycleFilter=...

CareerNotesAIPHDOntaMSDSARTeachingUpworkCARIQFunSt

Search experiments

lab4-experiment

RunsEvaluationExperimentalTraces

metrics.rmse < 1 and params.model = "tree"

Time createdState: ActiveDatasetsSort: Created

ColumnsGroup by

Run Name	Created	Dataset	Duration	Source	Models
nimble-calf-800	37 seconds ago	-	48ms	ipykern...	-

127.0.0.1:5000/#/experiments/6705...

CareerNotesAIPHDOntaMSDSARTeachingUpworkAll Bookmarks

mlflow 2.21.3ExperimentsModelsPrompts

lab4-experiment

Experiments

lab4-experiment

RunsEvaluationExperimentalTraces

metrics.rmse < 1 and params.model = "tree"

Time createdState: ActiveDatasets

Sort: CreatedColumnsGroup by

Run Name	Created	Dataset
amazing-auk-252	2 seconds ago	-
delicate-midge-167	3 seconds ago	-
rare-skunk-235	13 seconds ago	dataset (0f2e38b2) Train
trusting-midge-460	14 seconds ago	-
handsome-sheep-240	15 seconds ago	-
rumbling-donkey-72	17 seconds ago	-
flawless-rook-878	18 seconds ago	-
luxuriant-fox-399	20 seconds ago	-
vaunted-fly-477	20 seconds ago	-
monumental-bass-989	21 seconds ago	-
skittish-hog-965	21 seconds ago	-
judicious-fowl-776	23 seconds ago	-
clumsy-perch-895	23 seconds ago	-

52 matching runs

Extras:

Ask Gordon BETA

Containers

Images

Volumes

Builds

Docker Hub

Docker Scout

Extensions

Containers Give feedback

View all your running containers and applications. [Learn more](#)

Container CPU usage

16.10% / 1200% (12 CPUs available)

Container memory usage

1.71GB / 7.47GB

[Show charts](#)

Q Search

Only show running containers

<input type="checkbox"/>	Name	Container ID	Image	Port(s)	CPU (%)	Last started	Actions
<input type="checkbox"/>	<input type="radio"/> relaxed_wiles	20aa5cb6307c	<a href="#">getting-started</a>	3000:3000	0%	7 days ago	<a href="#">▶</a> <a href="#">⋮</a> <a href="#">🗑</a>
<input type="checkbox"/>	<input type="radio"/> exciting_hermann	ccd1fd2c0492	<a href="#">docker/getting-started</a>	80:80	0%	7 days ago	<a href="#">▶</a> <a href="#">⋮</a> <a href="#">🗑</a>
<input type="checkbox"/>	<input type="radio"/> blissful_maxwell	4b53b874c88b	<a href="#">getting-started</a>	3000:3000	0%		<a href="#">▶</a> <a href="#">⋮</a> <a href="#">🗑</a>
<input type="checkbox"/>	<input type="radio"/> boring_tu	b3f53c988e3b	<a href="#">getting-started</a>	3000:3000	0%		<a href="#">▶</a> <a href="#">⋮</a> <a href="#">🗑</a>
<input type="checkbox"/>	<input type="radio"/> brave_albattani	f4d32c37b112	<a href="#">ubuntu</a>		0%	7 days ago	<a href="#">▶</a> <a href="#">⋮</a> <a href="#">🗑</a>
<input type="checkbox"/>	<input type="radio"/> suspicious_chaplygin	1dd7047706e3	<a href="#">my-streamlit-aq</a>	8501:8501	0%	5 months ago	<a href="#">▶</a> <a href="#">⋮</a> <a href="#">🗑</a>
<input type="checkbox"/>	<input type="radio"/> modest_meninsky	96a39cb6a590	<a href="#">ds-data-13/cario_plot</a>	8501:8501	0%	5 months ago	<a href="#">▶</a> <a href="#">⋮</a> <a href="#">🗑</a>
<input type="checkbox"/>	<input type="radio"/> elastic_elgammal	363a30b50426	<a href="#">ds-data-13/cario_plot</a>	8501:8501	0%		<a href="#">▶</a> <a href="#">⋮</a> <a href="#">🗑</a>
<input type="checkbox"/>	<input type="radio"/> nervous_snyder	d71bf7b19e7c	<a href="#">my-streamlit-aq</a>	8501:8501	0%	5 months ago	<a href="#">▶</a> <a href="#">⋮</a> <a href="#">🗑</a>
<input type="checkbox"/>	<input type="radio"/> focused_mahavira	e60692912641	<a href="#">my-streamlit-aq</a>	8501:8501	0%	5 months ago	<a href="#">▶</a> <a href="#">⋮</a> <a href="#">🗑</a>
<input type="checkbox"/>	<input type="radio"/> nice_mcnulty	9a8e46151dcd	<a href="#">my-streamlit-aq</a>	8501:8501	0%		<a href="#">▶</a> <a href="#">⋮</a> <a href="#">🗑</a>
<input type="checkbox"/>	<input checked="" type="radio"/> minikube	5d3c385f97f9	<a href="#">k8s-minikube/kicbase:v0.0.46</a>	<a href="#">50196.22</a> <a href="#">🔗</a> <a href="#">Show all ports (5)</a>	14.03%	1 hour ago	<a href="#">▶</a> <a href="#">⋮</a> <a href="#">🗑</a>