Lab 6 Knative

1. Setup

Start kn quickstart using minikube.


```
✳Creating Minikube cluster...

Using the standard minikube driver for your system
If you wish to use a different driver, please configure minikube using
    minikube config set driver <your-driver>

😊  [knative] minikube v1.35.0 on Fedora 41
✨  Automatically selected the docker driver. Other choices: qemu2, ssh
🐳  For improved Docker performance, enable the overlay Linux kernel module using 'modprobe overlay'
📌  Using Docker driver with root privileges
❗  For an improved experience it's recommended to use Docker Engine instead of Docker Desktop.
Docker Engine installation instructions: https://docs.docker.com/engine/install/#server
👍  Starting "knative" primary control-plane node in "knative" cluster
🚜  Pulling base image v0.0.46 ...
🔥  Creating docker container (CPUs=3, Memory=3072MB) ...
🐳  Preparing Kubernetes v1.30.0 on Docker 27.4.1 ...
    ▪ Generating certificates and keys ...
    ▪ Booting up control plane ...
    ▪ Configuring RBAC rules ...
🔗  Configuring bridge CNI (Container Networking Interface) ...
🔎  Verifying Kubernetes components...
    ▪ Using image gcr.io/k8s-minikube/storage-provisioner:v5

    Registry addon with docker driver uses port 45479 please use that instead of default port 5000

🔵  For more information see: https://minikube.sigs.k8s.io/docs/drivers/docker
    ▪ Using image gcr.io/k8s-minikube/kube-registry-proxy:0.0.8
    ▪ Using image docker.io/registry:2.8.3
🔎  Verifying registry addon...
🌟  Enabled addons: storage-provisioner, default-storageclass, registry
E0414 14:41:19.745624    7666 pod_ready.go:67] WaitExtra: waitPodCondition: error getting pod "coredns-7db6d8ff4d-
kvpk6" in "kube-system" namespace (skipping!): pods "coredns-7db6d8ff4d-kvpk6" not found
🏄  Done! kubectl is now configured to use "knative" cluster and "default" namespace by default


To finish setting up networking for minikube, run the following command in a separate terminal window:
    minikube tunnel --profile knative
The tunnel command must be running in a terminal window any time when using the knative quickstart environment.

Press the Enter key to continue
```

```
🐢 Installing Knative Serving v1.17.0 ...
   CRDs installed...
   Core installed...
   Finished installing Knative Serving
🌼 Installing Kourier networking layer v1.17.0 ...
   Kourier installed...
   Ingress patched...
   Finished installing Kourier Networking layer
🌼 Configuring Kourier for Minikube...
   Domain DNS set up...
   Finished configuring Kourier
🔥 Installing Knative Eventing v1.17.0 ...
   CRDs installed...
   Core installed...
   In-memory channel installed...
   Mt-channel broker installed...
   Example broker installed...
   Finished installing Knative Eventing
🏃 Knative install took: 5m7s
🎉 Now have some fun with Serverless and Event Driven Apps!
gabor@fedora:~$ minikube profile list
|----------|-----------|---------|--------------|------|---------|---------|-------|----------------|------------
-------|
| Profile  | VM Driver | Runtime |      IP      | Port | Version | Status  | Nodes | Active Profile | Active Kubec
ontext |
|----------|-----------|---------|--------------|------|---------|---------|-------|----------------|------------
-------|
| knative  | docker    | docker  | 192.168.58.2 | 8443 | v1.30.0 | OK      |     1 |                | *
       |
| minikube | docker    | docker  | 192.168.49.2 | 8443 | v1.32.0 | Stopped |     1 | *              |
       |
|----------|-----------|---------|--------------|------|---------|---------|-------|----------------|------------
-------|
```

2. Knative Function

Create a knative function.

```
gabor@fedora:~$ kn func create -l go hello
Created go function in /home/gabor/hello
```

Run the function.

```
gabor@fedora:~/hello$ kn func run --registry localhost:40307
Building function image
Still building
Still building
Yes, still building
Don't give up on me
Still building
🙌 Function built: localhost:40307/hello:latest
Initializing HTTP function
listening on http port 8080
Running on host port 8080
```

3. Deploying Knative Service

Create the service and deploy it.

```
gabor@fedora:~/hello$ kn service create hello \
--image ghcr.io/knative/helloworld-go:latest \
--port 8080 \
--env TARGET=World
Warning: Kubernetes default value is insecure, Knative may default this to secure in a future release: spec.templa
te.spec.containers[0].securityContext.allowPrivilegeEscalation, spec.template.spec.containers[0].securityContext.c
apabilities, spec.template.spec.containers[0].securityContext.runAsNonRoot, spec.template.spec.containers[0].secur
ityContext.seccompProfile
Creating service 'hello' in namespace 'default':

  0.070s The Route is still working to reflect the latest desired specification.
  0.082s ...
  0.112s Configuration "hello" is waiting for a Revision to become ready.
  8.802s ...
  8.848s Ingress has not yet been reconciled.
  8.945s Waiting for load balancer to be ready
  9.159s Ready to serve.

Service 'hello' created to latest revision 'hello-00001' is available at URL:
http://hello.default.127.0.0.1.sslip.io
```

Test out autoscaling by waiting and then retesting the page.

```
gabor@fedora:~/hello$ kn service list
NAME    URL                                        LATEST        AGE     CONDITIONS    READY    REASON
hello   http://hello.default.127.0.0.1.sslip.io    hello-00001   2m8s    3 OK / 3      True
gabor@fedora:~/hello$ echo "Accessing URL $(kn service describe hello -o url)"
curl "$(kn service describe hello -o url)"
Accessing URL http://hello.default.127.0.0.1.sslip.io
Hello World!
gabor@fedora:~/hello$ kubectl get pod -l serving.knative.dev/service=hello -w
NAME                                      READY   STATUS            RESTARTS   AGE
hello-00001-deployment-6cc6c87946-qcfc4   2/2     Running   0                  11s
hello-00001-deployment-6cc6c87946-qcfc4   2/2     Terminating   0              63s
hello-00001-deployment-6cc6c87946-qcfc4   1/2     Terminating   0              91s
hello-00001-deployment-6cc6c87946-qcfc4   0/2     Terminating   0              93s
hello-00001-deployment-6cc6c87946-qcfc4   0/2     Terminating   0              93s
hello-00001-deployment-6cc6c87946-qcfc4   0/2     Terminating   0              93s
hello-00001-deployment-6cc6c87946-qcfc4   0/2     Terminating   0              93s
hello-00001-deployment-6cc6c87946-7bh67   0/2     Pending   0                  0s
hello-00001-deployment-6cc6c87946-7bh67   0/2     Pending   0                  0s
hello-00001-deployment-6cc6c87946-7bh67   0/2     ContainerCreating   0        0s
hello-00001-deployment-6cc6c87946-7bh67   1/2     Running   0                  2s
hello-00001-deployment-6cc6c87946-7bh67   2/2     Running   0                  2s
```

Test out traffic splitting by creating a new service and chranging the traffic flow amount.

```
gabor@fedora:~/hello$ kn service update hello \
--env TARGET=Knative
Warning: Kubernetes default value is insecure, Knative may default this to secure in a future release: spec.templa
te.spec.containers[0].securityContext.allowPrivilegeEscalation, spec.template.spec.containers[0].securityContext.c
apabilities, spec.template.spec.containers[0].securityContext.runAsNonRoot, spec.template.spec.containers[0].secur
ityContext.seccompProfile
Updating Service 'hello' in namespace 'default':

  0.029s The Configuration is still working to reflect the latest desired specification.
  2.005s Traffic is not yet migrated to the latest revision.
  2.055s Ingress has not yet been reconciled.
  2.094s Waiting for load balancer to be ready
  2.263s Ready to serve.

Service 'hello' updated to latest revision 'hello-00002' is available at URL:
http://hello.default.127.0.0.1.sslip.io
gabor@fedora:~/hello$ echo "Accessing URL $(kn service describe hello -o url)"
curl "$(kn service describe hello -o url)"
Accessing URL http://hello.default.127.0.0.1.sslip.io
Hello Knative!
gabor@fedora:~/hello$ kn revisions list
NAME            SERVICE   TRAFFIC   TAGS   GENERATION   AGE       CONDITIONS   READY    REASON
hello-00002     hello     100%             2            42s       4 OK / 4     True
hello-00001     hello                      1            6m45s     3 OK / 4     True
gabor@fedora:~/hello$ kn service update hello \
--traffic hello-00001=50 \
--traffic @latest=50
Warning: Kubernetes default value is insecure, Knative may default this to secure in a future release: spec.templa
te.spec.containers[0].securityContext.allowPrivilegeEscalation, spec.template.spec.containers[0].securityContext.c
apabilities, spec.template.spec.containers[0].securityContext.runAsNonRoot, spec.template.spec.containers[0].secur
ityContext.seccompProfile
Updating Service 'hello' in namespace 'default':

  0.044s The Route is still working to reflect the latest desired specification.
  0.092s Ingress has not yet been reconciled.
  0.112s Waiting for load balancer to be ready
  0.296s Ready to serve.

Service 'hello' with latest revision 'hello-00002' (unchanged) is available at URL:
http://hello.default.127.0.0.1.sslip.io
gabor@fedora:~/hello$ kn revisions list
NAME            SERVICE   TRAFFIC   TAGS   GENERATION   AGE       CONDITIONS   READY    REASON
hello-00002     hello     50%              2            67s       4 OK / 4     True
hello-00001     hello     50%              1            7m10s     3 OK / 4     True
```

```
gabor@fedora:~/hello$ curl "$(kn service describe hello -o url)"
Hello Knative!
gabor@fedora:~/hello$ curl "$(kn service describe hello -o url)"
Hello World!
```

4. Knative Eventing

First create a Broker and UI.

```
gabor@fedora:~/hello$ kn broker list
NAME              URL                                                                          AGE    CONDITION
S   READY   REASON
example-broker   http://broker-ingress.knative-eventing.svc.cluster.local/default/example-broker   32m   7 OK / 7
     True
gabor@fedora:~/hello$ kn service create cloudevents-player \
--image quay.io/ruben/cloudevents-player:latest
Warning: Kubernetes default value is insecure, Knative may default this to secure in a future release: spec.templa
te.spec.containers[0].securityContext.allowPrivilegeEscalation, spec.template.spec.containers[0].securityContext.c
apabilities, spec.template.spec.containers[0].securityContext.runAsNonRoot, spec.template.spec.containers[0].secur
ityContext.seccompProfile
Creating service 'cloudevents-player' in namespace 'default':

  0.042s The Route is still working to reflect the latest desired specification.
  0.074s ...
  0.094s Configuration "cloudevents-player" is waiting for a Revision to become ready.
 12.634s ...
 12.690s Ingress has not yet been reconciled.
 12.742s Waiting for load balancer to be ready
 12.929s Ready to serve.

Service 'cloudevents-player' created to latest revision 'cloudevents-player-00001' is available at URL:
http://cloudevents-player.default.127.0.0.1.sslip.io
gabor@fedora:~/hello$ kn source binding create ce-player-binding --subject "Service:serving.knative.dev/v1:cloudev
ents-player" --sink broker:example-broker
Sink binding 'ce-player-binding' created in namespace 'default'.
```

Next create a Trigger for the CloudEvents Player, and test it out by sending another event and receiving it.

```
gabor@fedora:~/hello$ kn trigger create cloudevents-trigger --sink cloudevents-player  --broker example-broker
Trigger 'cloudevents-trigger' successfully created in namespace 'default'.
```

CloudEvents player

Create event

Event ID *
2

Event Type *
dev.knative.docs

Event Subject
getting-started

Event Source *
player-ui

Specversion
1.0

Message *
{
  "message": "Hello CloudEvents!"
}

ADD EXTENSION ATTRIBUTE   SEND EVENT

Activity

ID	Type	Subject	Source	Status	Local Time	Message
2	dev.knative.docs	getting-started	player-ui	➤	14/4/2025 15:13:02	✉
2	dev.knative.docs	getting-started	player-ui	✓	14/4/2025 15:13:02	✉
1	dev.knative.docs	getting-started	player-ui	➤	14/4/2025 15:10:05	✉