



FaaS on Kubernetes using Knative

Juan Carlos Gallegos Dupuis

Supervisors: Belmiro Moreira, Ricardo Rocha

Key Terms

Kubernetes orchestrates app deployment on containers

Knative brings serverless computing patterns to Kubernetes

Serverless Computing means services aren't tied to servers

Function-as-a-Service (FaaS) is the unit of serverless computing

Motivations for FaaS

Increase resource utilization...

- Prevent wasting resources on inactive services

...without sacrificing scalability

- Services must still be able to handle high volume of requests

FaaS scales services up and down, on demand.

My Contributions

Investigate

- Using Knative to provide FaaS
- Applying FaaS to CERN use cases

Automate

- Knative + Istio installation on a Kubernetes cluster

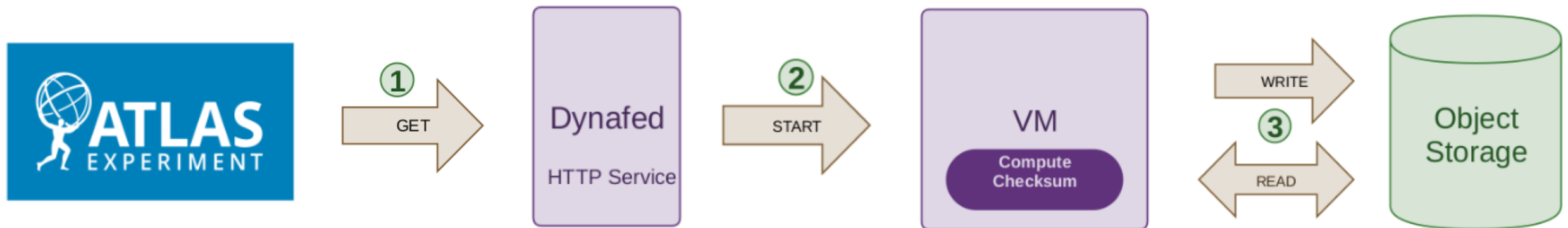
Prototype

- Apps as Knative Services to demonstrate potential

Scenario at CERN

Dynafed service supports reading & writing experiment data

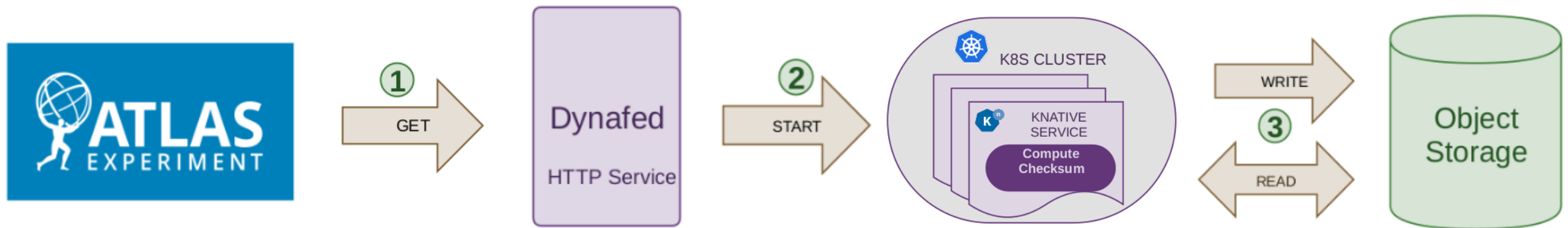
- Process for computing file checksums currently runs on VM



My Prototype on Knative

Implemented, containerized, & deployed as Knative Service

- Servers are spawned & shut down on-demand, automatically



```
Activities Terminator
Mi 10:20
juan@juan-NUC5I5MYHE: ~/code/knative-sample-apps
juan@juan-NUC5I5MYHE: ~/code/knative-sample-apps 146x17
juan@juan-NUC5I5MYHE ➤ knative-sample-apps ➤ master ➤ for i in `seq 1 5`;
do
  curl -s -H "Host: sample-app.default.example.com" http://188.185.112.219:31380/checksums/?bucket=demo&file=file.txt > file_"$i".txt &
done
```

```
kubectl get pods --watch 146x18
juan@juan-NUC5I5MYHE ➤ knative-sample-apps ➤ master ➤ kubectl get pods --watch
NAME                                READY   STATUS    RESTARTS   AGE
default-broker-filter-585fd9ccfd-fm5pc 1/1     Running   0           4d10h
default-broker-ingress-5bdf94dcb6-xxwm9 1/1     Running   0           4d10h
```

Future Work

Integrate with GitLab, S3, & OpenStack

- Use Eventing to consume events & notifications

Continue collaborating on FaaS use cases at CERN

- As in Compute Checksum example

Investigate multi-tenancy on K8s & Knative

- Determine the necessary level of isolation



QUESTIONS?

juan.carlos.gallegos.dupuis@cern.ch

github.com/okjuan