

# SERVERLESS ON EDGE

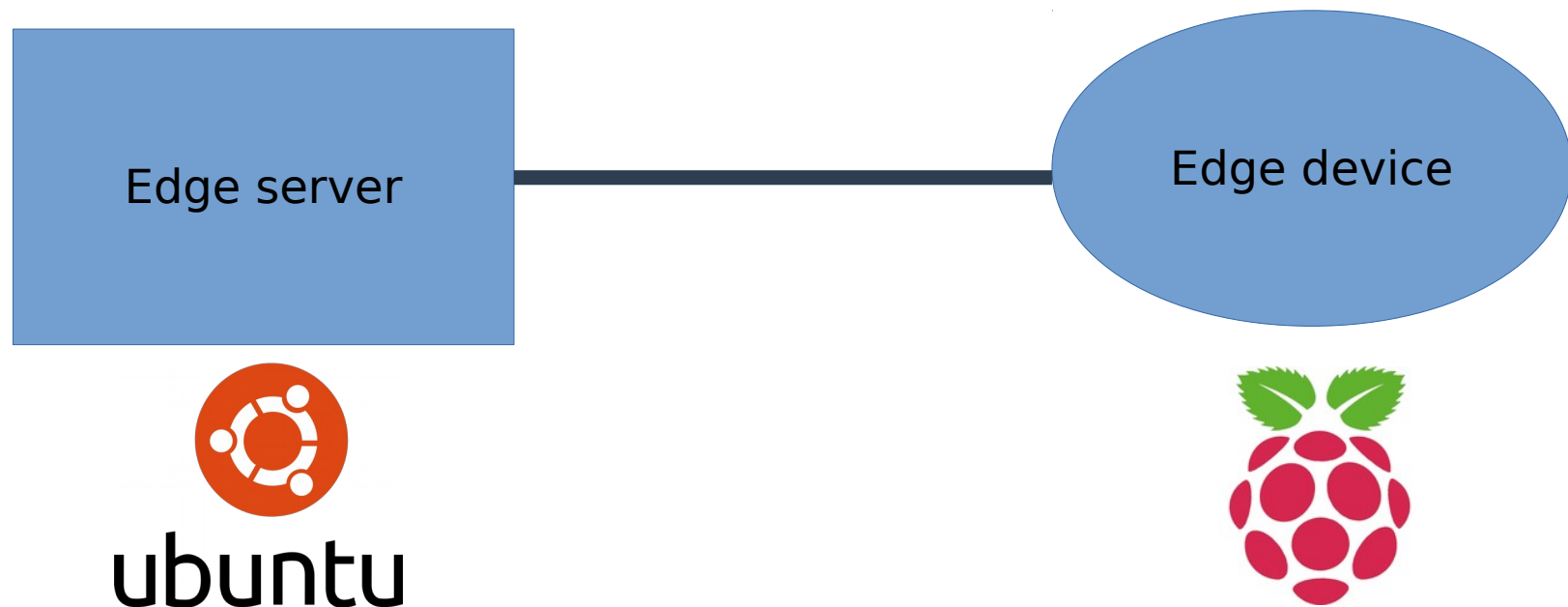
Σχεδιασμός Ενσωματωμένων Συστημάτων



Χρήστος Παπακωστόπουλος




# PROJECT GOAL

**Main objective: Create and test a serverless system on the edge**



# TOOLS AND TESTING

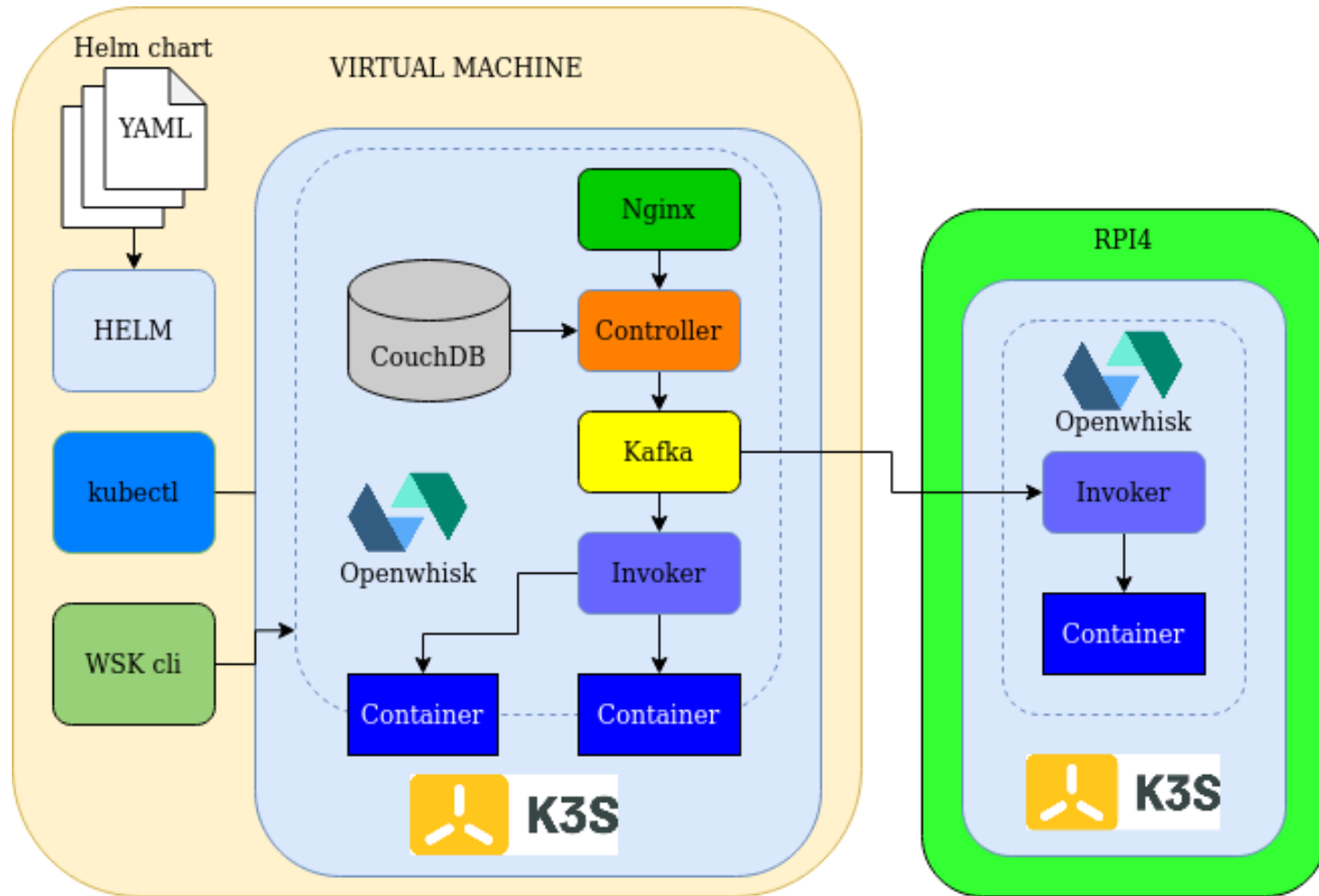
## SET UP TOOLS

- **K3S: lightweight kubernetes**  K3S
- **Helm: kubernetes package manager** 
- **Openwhisk: Open source Serverless Platform** 

## TESTING

- **ServerlessBench: A testing suite for serverless platform** 

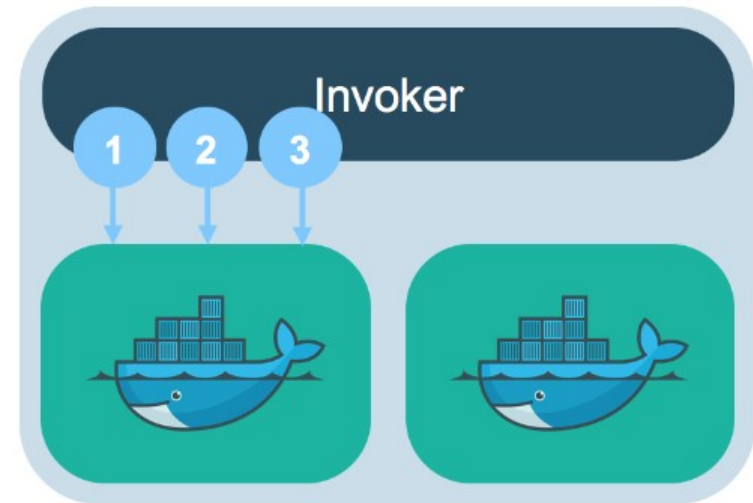
# SET UP



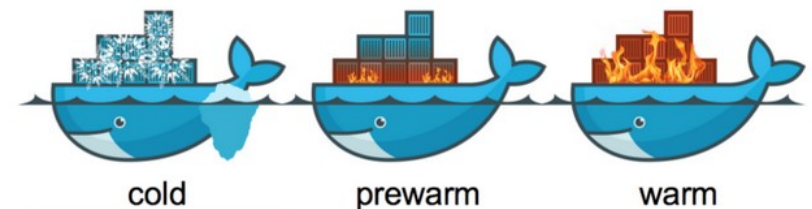
# COLD-PREWARM-WARM CONTAINER

The 3 stages to invoke an action:

- Start the container
- Init the action
- Run the action



Medium.com



Starting the container

Initializing the action

Running the action



Medium.com

# CREATE & INVOKE ACTIONS

A simple example...

- **Create action:**

```
wsk -i action create hello hello.js
```

- **Invoke action:**

```
wsk -i action invoke hello --result --param name  
Christos
```

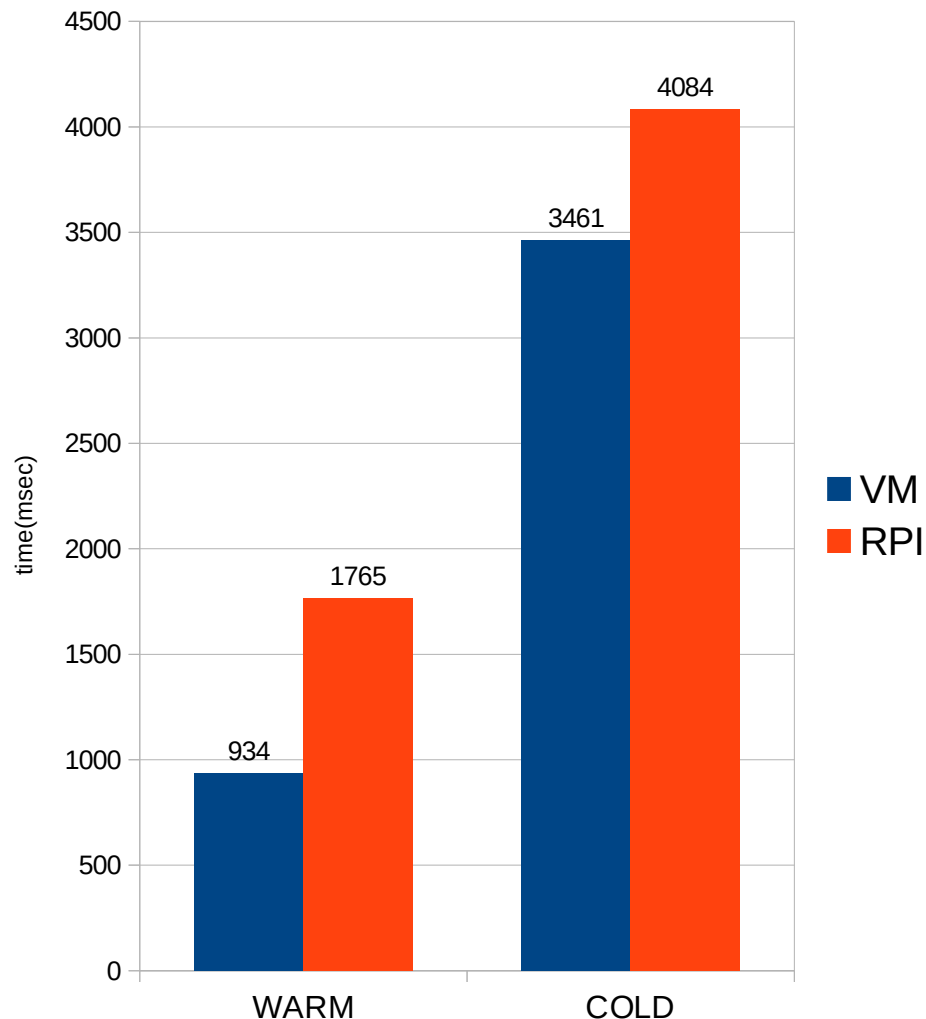
- **Result:**

```
{
```

```
  "payload": "Hello, Christos!"
```

```
}
```

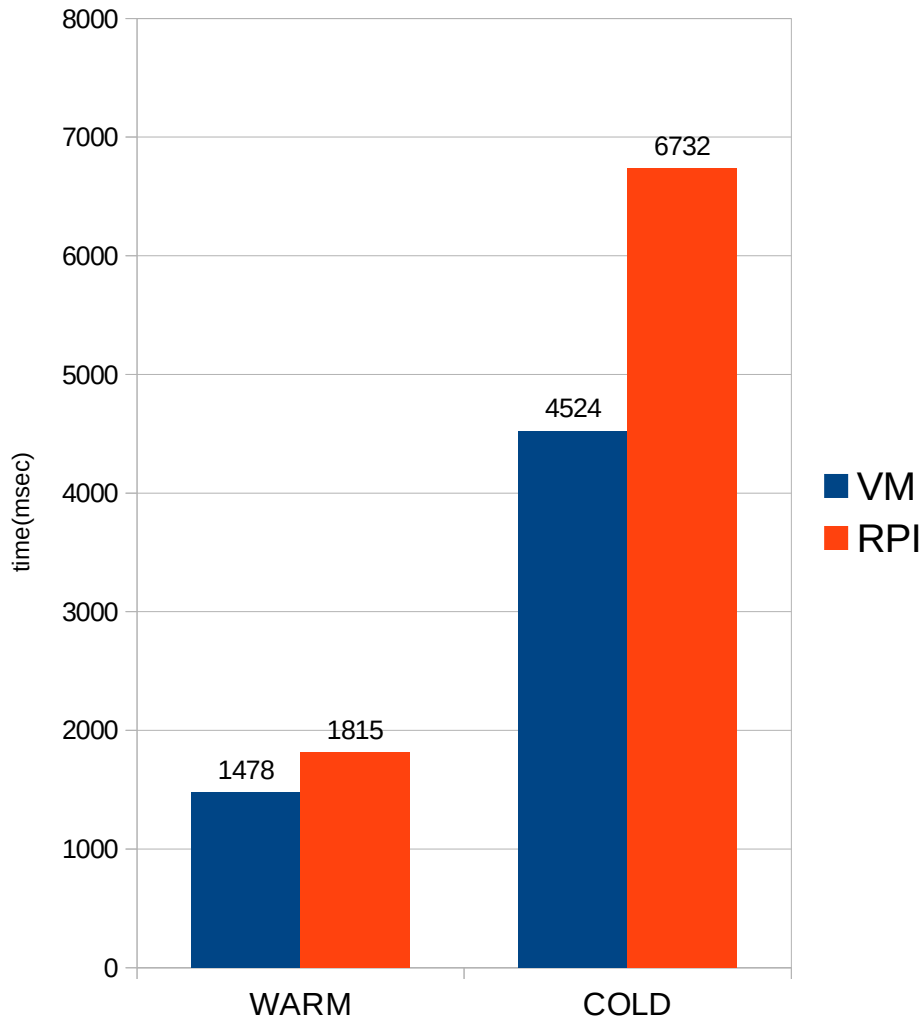
# TESTING: SERVELESSBENCH, TESTCASE 6 STARTUP/BREAKDOWN



- Invoke action of a simple hello.java program
- Run test on VM and RPI separately.
- Run test on cold and warm mode
- Result:
  - VM is faster than RPI
  - Faster response with warm containers

# TESTING: SERVELESSBENCH, TESTCASE 10

## STATELESS COSTS



- Invoke action of an image resizing program
- The same procedure
- Results:
  - Much higher response times for heavier workload
  - Similar results with the first program



# SOURCES

- **K3s:** <https://k3s.io/>
- **Helm:** <https://helm.sh/docs/intro/install/>
- **Openwhisk:**  
<https://github.com/apache/openwhisk-deploy-kube#DeployingOpenwhisk>
- **WSK cli:**  
<https://github.com/apache/openwhisk-cli>
- **Medium:** <https://medium.com/>
- **ServerlessBench:**  
<https://github.com/ServerlessBench/ServerlessBench>

**THANK YOU**