SIMULATING IOT FOR FUN AND PROFIT

Heating a room with IoT on OpenShift
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2017-06-24
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- Working on Eclipse Kapua & Eclipse Kura
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KEY COMPONENTS
3 TIER IOT ARCHITECTURE

Sensor → Gateway → Cloud
KEY COMPONENTS

- OpenShift™
  - MiniShift – Single node OpenShift
- Eclipse Kapua™ – IoT cloud platform
  - Gateway Client SDK
  - Kura simulator
- Eclipse Kura™
  - Emulator Docker image
- Grafana™
ARCHITECTURE

What needs to be tested

Sensor  Eclipse Kura  Eclipse Kapua  “Business System”

Edge  Cloud
BUILDING BLOCKS
OpenShift Metrics, Kapua & Grafana
USE CASES

Components

- Kura simulator framework
- Kura simulator application
- Gateway client SDK
- Kura emulator

Use cases

- Unit tests
- Integration testing – Cloud application
  Scale out testing
- Integration testing – Cloud application
- Integration testing – Gateway application
  Interactive/development testing
THE CODE...

- ... is available on GitHub:
- https://github.com/ctron/simulating-iot
DEMO
FIRE UP OPENSIFT

```
minishift start --metrics --memory 16384 --cpus 4
```
DEPLOYING THE CORE

./scripts/deploy-hawkular.sh
./scripts/deploy-kapua.sh
./scripts/deploy-grafana.sh
THE KURA SIMULATOR
WHAT IS IT?
A lightweight mock implementation of Kura

- Framework or ready-to-run application
- Plain Java
- Mock services for e.g. Bundle installation
- Allow custom applications
- Data generation framework
TWO WAYS
Framework vs. application

Your Application
Eclipse Kapua
Mock Gateway

Unit Tests

Full application setup

Your Application
Eclipse Kapua
Mock Gateway
DATA SIMULATION
Creating telemetry data streams

Allows to create streams of time-synced telemetry data with easy scaling

- Multiple application and topics
- Mapping value generators to metrics
- Configured via JSON
- Allow dropping in custom generator implementations
- Create re-producible values for a point in time

Reproducible values

<table>
<thead>
<tr>
<th>TIMESTAMP</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>t1</td>
<td>=sine(t1)</td>
</tr>
<tr>
<td>t2</td>
<td>=sine(t2)</td>
</tr>
<tr>
<td>t3</td>
<td>=sine(t3)</td>
</tr>
</tbody>
</table>
IT’S LIKE MINECRAFT

Re-creating worlds with the same seed
DEMO
DEPLOY THE KURA SIMULATOR

./scripts/deploy-kura-simulator.sh
SCALING UP

```
oc scale --replicas=10 dc simulator
oc set env dc/simulator KSIM_NUM_GATEWAYS=100
```
CHECKING THE DATA
CHECKING THE DATA
QUESTIONS?
**LINKS**

**THIS TUTORIAL**
https://github.com/ctron/simulating-iot

**ECLIPSE KAPUA**
https://eclipse.org/kapua

**GATEWAY CLIENT SDK**
https://github.com/ctron/kapua-gateway-client