

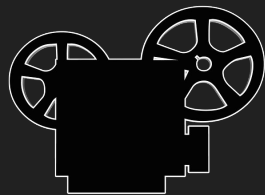
Internet of Things and Free Software ?

Internet of Things, August Penguin 2017
Yaacov Zamir <yzamir@redhat.com>



Movie

Why your device should speak modbus



Who am I, and what am I doing here ?

I am a Software Engineer at Red Hat,
part of the Container Management
Team of ManageIQ.

I used to write firmware for Industrial
Controllers and measurement equipment.



ManageIQ

Free software that Manages containers, virtual machines, networks, and storage from a single platform.

We are on github:

<https://github.com/ManageIQ/>

We share the oVirt/Gluster booth



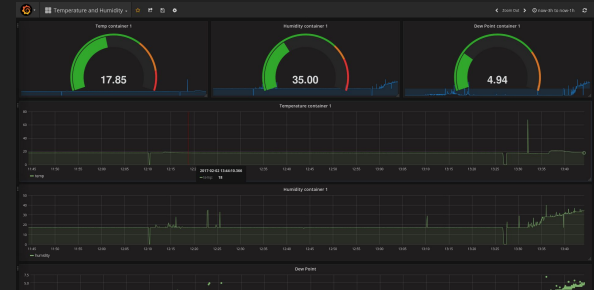
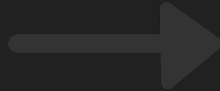
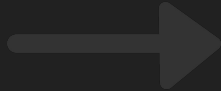
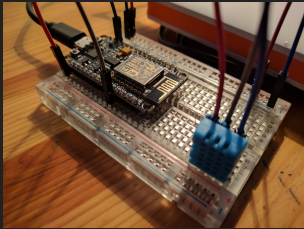
ManageIQ

Agenda

Collector : Script/program that collects data from device into a data-store.

Data Store : Database that can scale.

Visualizer : A program that display the data collected, in a useful way.



Demo

What we are actually talking about ...

Modbus

Modbus is a serial communication protocol developed in 1979 for use with programmable logic controllers (PLCs).

It's openly published, royalty-free, simple and robust.

<https://github.com/yaacov/node-modbus-serial>

<https://www.npmjs.com/package/node-red-contrib-modbus>

<https://github.com/bashwork/pymodbus>

Bash examples

Modbus client:

```
#> npm install modbus-cli
```

```
#> modbus-cli read -u modbus.local -a 0 -l 3
```

Hawkular client:

```
#> pip install hawkular-client-cli
```

```
#> hawkular-cli -U http://localhost:8080 -T token -t ops
```

Mohawk server:

```
#> go get github.com/yaacov/mohawk
```

```
#> mohawk -backend sqlite -port 8080 -tls false
```

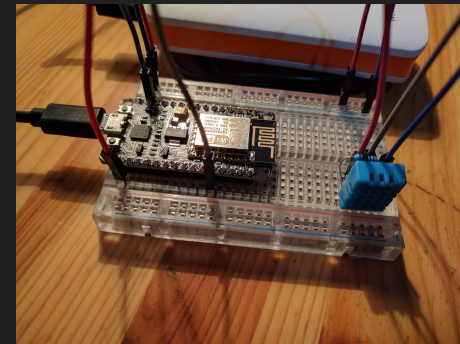
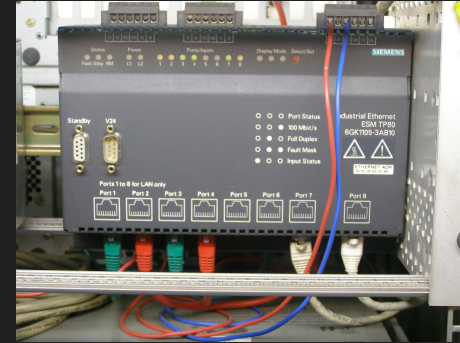

Sensor

Any modbus capable controller (TCP or RTU).

It is very easy to teach devices to speak modbus.

<https://github.com/yaacov/ArduinoModbusESP>

<https://github.com/yaacov/ArduinoModbusSlave>



Sensor code example (Arduino):

```
#include <ModbusSlaveTCP.h>

...

ModbusTCP slave(SLAVE_ID);

...

void setup() {

...

    slave.cbVector[CB_WRITE_COIL] = writeDigitalOut;
    slave.cbVector[CB_READ_COILS] = readDigitalIn;
    slave.cbVector[CB_READ_REGISTERS] = readAnalogIn;

...
}
```

Collector

Collecting metrics from device and store the data in a data store.

<https://github.com/yaacov/node-modbus-cli>

<https://github.com/yaacov/hawkular-client-cli>

https://github.com/yaacov/fosdem-2017/blob/master/scripts/collector_sensor.sh



A Bash Collector:

```
#!/bin/bash
hawkular_cli="hawkular-client-cli -U http://localhost:8080 -T t -t ops"
readings=$(timeout 5s modbus-cli read -u modbus.local -a 0 -l 3)
keys=(temp humidity dew-point)
n=0
while [[ $n -lt 3 ]]; do
    values="{values} ${keys[$n]}=${readings[$n]}"
    n=$((n+1))
done
$hawkular_cli $values
```

Data-store

Hawkular-metrics is a Free software Time Series Database (TSD) for big data.

Hawkular's goal is to be able to monitor things and catch anomalies in fast pace environments. The project started around the end of 2014.

<http://www.hawkular.org/>

<https://github.com/hawkular/hawkular-client-python>

<https://github.com/yaacov/mohawk>



Getting the Hawkular server running

Hawkular:

Hawkular comes pre installed on OpenShift deployments, there it will take advantage of the cloud morphology.

MoHawk:

For small scale we can use a Mock Hawkular server (used for testing).

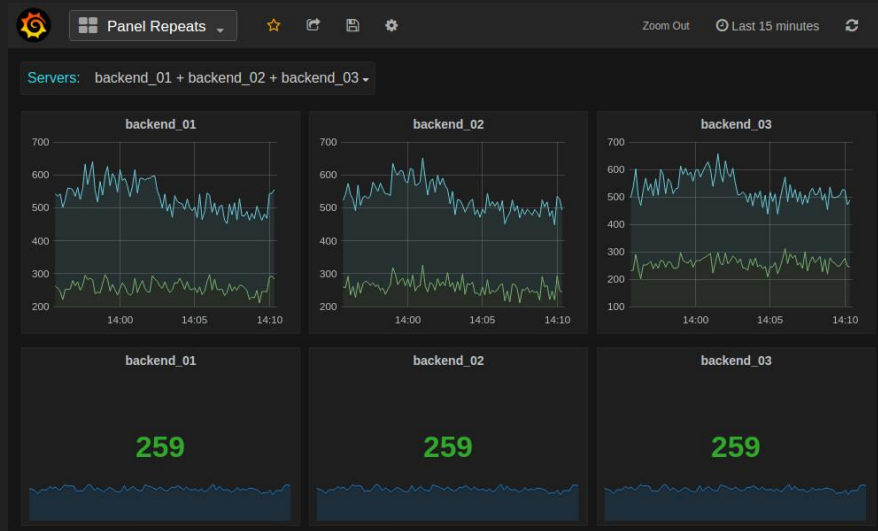
```
#> go get github.com/yaacov/mohawk
```

```
#> mohawk -backend sqlite -port 8080 -tls false
```

Visualizer

Grafana provides a powerful and elegant way to create, explore, and share dashboards and data with your team and the world.

<http://grafana.org/>



Questions ?



"What I really need is a droid that understands the binary language of moisture vaporators."

Owen Lars

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