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Slides

- Da slide 15 di [Bononi e Felice - IoT Sensor Data Processing 1.pdf] (file:///C:/Users/david/Zotero/storage/WUYV8GM5/Bononi%20e%20Felice%20-%20IoT%20Sensor%20Data%20Processing.pdf)
- Slides [Bononi e Felice - IoT Sensor Data Management.pdf] (file:///C:/Users/david/Zotero/storage/4Z3ESYTU/Bononi%20e%20Felice%20-%20IoT%20Sensor%20Data%20Management.pdf)

Installation 1.x

According to Downloads (influxdata.com)

```
sudo apt-get install influxdb
sudo service influxdb start
```

Play with 1.x (on WSL)

```
influx // this will start the client
show databases
create database myfirstdatabase
use myfirstdatabase
show measurements
```

We get empty measurements. They are typically collected by agents like Telegraf,etc.

We can manually insert measurements as follows:

```
insert cpu,host=node1 value=10
```

Now we can show the recently added measurement with

```
show measurements
```

We can get the content of the *cpu* measurement as follows

```
select * from cpu
```

We can drop measurements with the following command

```
drop measurement cpu
```

Let's insert some measurements:

```
insert cpu,host=node1 value=10
insert cpu,host=node2 value=15
insert cpu,host=node3 value=22
```

Now we can do again

```
select * from cpu
```

We can see all the series as follows:

```
show series
```

We can do some filtering as follows:

```
select * from cpu where host='node2'
```

We can also do filtering based on time, e.g. I want to retrieve the data related to the last 5 minutes

```
select * from cpu where time >= now() - 5m
```

```
select * from cpu where time >= now() - 5m and host='node3'
```

And what happens if I do as follows?

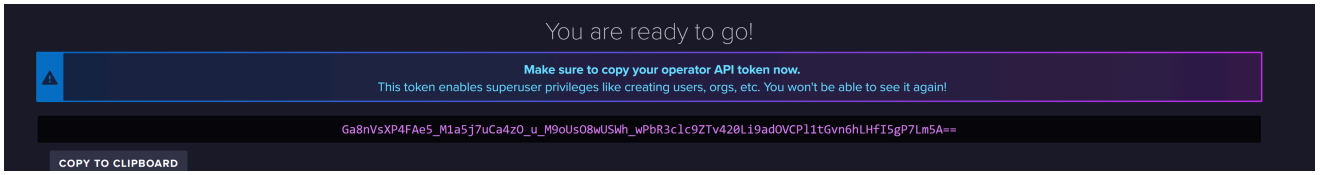
```
select * from cpu where time >= now() - 1m
```

- # Installation 2.x

- Remember to stop influxdb 1.x
- ```
  sudo service influxdb stop
  ```
- ```
  wget https://dl.influxdata.com/influxdb/releases/influxdb2\_2.0.3\_amd64.deb
  sudo dpkg -i influxdb2\_2.0.3\_amd64.deb
  influxdb
  ```

  The web dashboard is available at localhost:8086
-

- # Play with 2.x (in [docker]

- First of all you have to install it according to Install InfluxDB | InfluxDB OSS v2 Documentation (influxdata.com) and run it
- ```
  docker run --name influxdb -p 8086:8086 influxdb:2.7.4
  ```
- 

- 5LW7B-5ySei2kPoLtPIwBFS0KfK-uAcnxYE04BoJhalwdzQjvRz5zi7bELcTNw_WDkfCUkJiDd-wvIIDvnYHjQ==

Set up a configuration profile [NOT NEEDED HERE]

```
influx config create -n default \
-u http://localhost:8086 \
-o univaq \
-t 5LW7B-5ySei2kPoLtPIwBFS0KfK-uAcnxYE04BoJhalwdzQjvRz5zi7bELcTNw_WDkfCUkJiDd-wvIIDvnYHjQ== \
-a
```

The token given above needs to be retrieved from Tokens | Load Data | -- | InfluxDB

To list the created configuration (**from within the docker container**)

```
influx config list
```

The bucket given above is selected from Buckets | Load Data | -- | InfluxDB

Insert measaurements via NodeRed from MQTT Publish to `/nodered/powerconsumption`

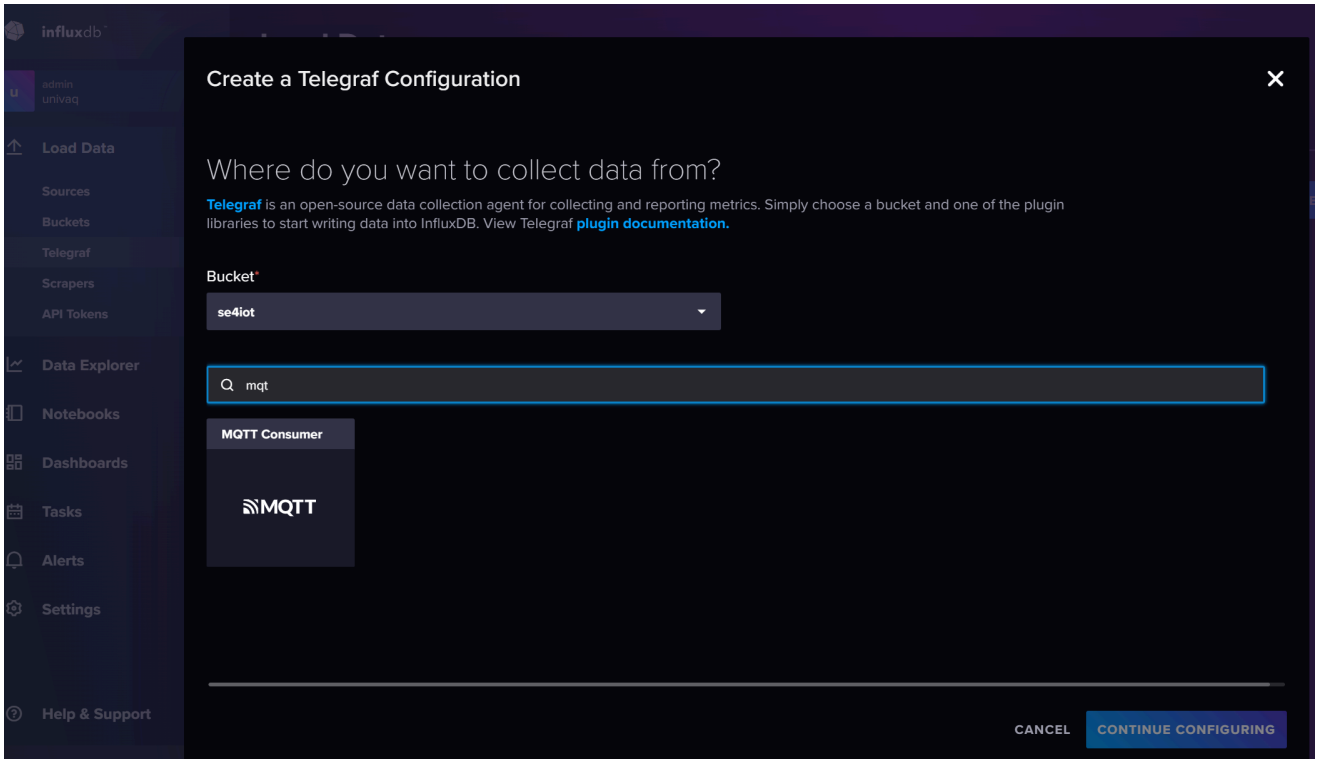
```
{
"device":"device1",
"host":"NodeRed",
```
```

```
"power":"373i"
}
```

- # Insert measurements via Telegraf from MQTT

Install Telegraf | Telegraf Documentation (influxdata.com)

```
# influxdata-archive_compat.key GPG Fingerprint:
9D539D90D3328DC7D6C8D3B9D8FF8E1F7DF8B07E
wget -q https://repos.influxdata.com/influxdata-archive_compat.key
echo '393e8779c89ac8d958f81f942f9ad7fb82a25e133faddaf92e15b16e6ac9ce4c
influxdata-archive_compat.key' | sha256sum -c && cat influxdata-
archive_compat.key | gpg --dearmor | sudo tee
/etc/apt/trusted.gpg.d/influxdata-archive_compat.gpg > /dev/null
echo 'deb [signed-by=/etc/apt/trusted.gpg.d/influxdata-archive_compat.gpg]
https://repos.influxdata.com/debian stable main' | sudo tee
/etc/apt/sources.list.d/influxdata.list
sudo apt-get update && sudo apt-get install telegraf
```

- 

- Telegraf Token

```
export INFLUX_TOKEN=YQ9t9PhYSeA6Ug0i44BInA-
53gYAvq6hwa4_fVPI7MrXhUOugIFMl_o0_ib5Ulhr80-nFVtOmvr-QZWZtxt--Q==
```

- Run the Telegraf agent

```
telegraf --config http://localhost:8086/api/v2/telegrafs/0e03dad63d8aa000
```

- Publish this to the topic `sensors/powerconsumption`

```
powerconsumption,device=device2,host=MyHost power=375i
```

There will be a Telegraf agent that will take such data and sends it to InfluxDB. To this end, Telegraf should be started (even on WSL) by using the following configuration file *telegraf_mqtt_to_influxdb2*

```
[[outputs.influxdb_v2]]
## The URLs of the InfluxDB cluster nodes.
##
## Multiple URLs can be specified for a single cluster, only ONE of the
## urls will be written to each interval.
## urls exp: http://127.0.0.1:8086
urls = ["http://localhost:8086"]

## Token for authentication.
token = "WdpITesY4yOqb0dBy7n2WQgWSHPRP66O9mAzlEn7vjYBaCrnn7-
bJEiKU5M0XqnU4Amf6So1XunJKKfyt9KGAA=="

## Organization is the name of the organization you wish to write to; must
exist.
organization = "univaq"

## Destination bucket to write into.
bucket = "se4iot"

[[inputs.mqtt_consumer]]
## Broker URLs for the MQTT server or cluster.  To connect to multiple
## clusters or standalone servers, use a seperate plugin instance.
##   example: servers = ["tcp://localhost:1883"]
##            servers = ["ssl://localhost:1883"]
##            servers = ["ws://localhost:1883"]
servers = ["tcp://127.0.0.1:1883"]

## Topics that will be subscribed to.
topics = [
  "sensors/#",
]

## The message topic will be stored in a tag specified by this value.  If set
## to the empty string no topic tag will be created.
# topic_tag = "topic"
```

```
## QoS policy for messages
##   0 = at most once
##   1 = at least once
##   2 = exactly once
##
## When using a QoS of 1 or 2, you should enable persistent_session to allow
## resuming unacknowledged messages.
# qos = 0

## Connection timeout for initial connection in seconds
# connection_timeout = "30s"

## Maximum messages to read from the broker that have not been written by an
## output.  For best throughput set based on the number of metrics within
## each message and the size of the output's metric_batch_size.
##
## For example, if each message from the queue contains 10 metrics and the
## output metric_batch_size is 1000, setting this to 100 will ensure that a
## full batch is collected and the write is triggered immediately without
## waiting until the next flush_interval.
# max_undelivered_messages = 1000

## Persistent session disables clearing of the client session on connection.
## In order for this option to work you must also set client_id to identify
## the client.  To receive messages that arrived while the client is offline,
## also set the qos option to 1 or 2 and don't forget to also set the QoS when
## publishing.
# persistent_session = false

## If unset, a random client ID will be generated.
# client_id = ""

## Username and password to connect MQTT server.
# username = "telegraf"
# password = "metricsmetricsmetricsmetrics"

## Optional TLS Config
# tls_ca = "/etc/telegraf/ca.pem"
# tls_cert = "/etc/telegraf/cert.pem"
# tls_key = "/etc/telegraf/key.pem"
## Use TLS but skip chain & host verification
# insecure_skip_verify = false

## Data format to consume.
## Each data format has its own unique set of configuration options, read
## more about them here:
##
https://github.com/influxdata/telegraf/blob/master/docs/DATA_FORMATS_INPUT.md
data_format = "influx"
```

Similar things can be done via command line as follows

```
export
INFLUX_TOKEN=Ga8nVsXP4FAe5_M1a5j7uCa4zO_u_M9oUsO8wUSWh_wPbR3clc9ZTv420Li9adOVC
```

```
Pl1tGvn6hLHfI5gP7Lm5A==
influx write -b se4iot -o univaq -p s
'powerconsumption,device=device2,host=CommandLine power=675i'
```

- sensors/powerconsumption

Insert measurements via Java

```
package it.univaq.disim.se4iot.influxdbexample;

import java.time.Instant;

import com.influxdb.annotations.Column;
import com.influxdb.annotations.Measurement;
import com.influxdb.client.InfluxDBClient;
import com.influxdb.client.InfluxDBClientFactory;
import com.influxdb.client.WriteApi;
import com.influxdb.client.domain.WritePrecision;
import com.influxdb.client.write.Point;
import com.influxdb.query.FluxTable;

public class InfluxDB2Example {


public static void main(final String[] args) {

 // You can generate a Token from the "Tokens Tab" in the UI
 String token = "5LW7B-5ySei2kPoLtPIwBFS0KfK-
uAcnxYE04BoJhalwdzQjvRz5zi7bELcTNw_WDkfCUkJiDd-wvIIDvnYHjQ==";
 String bucket = "se4iot";
 String org = "univaq";

 InfluxDBClient client = InfluxDBClientFactory.create("http://localhost:8086",
token.toCharArray());

Point point = Point
 .measurement("powerconsumption")
 .addTag("device", "device3")
 .addField("power", 300)
 .time(Instant.now(), WritePrecision.NS);

try (WriteApi writeApi = client.getWriteApi()) {
 writeApi.writePoint(bucket, org, point);
}

}
}
```

In a dedicated Maven project with the following pom.xml

```
<project xmlns="http://maven.apache.org/POM/4.0.0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
https://maven.apache.org/xsd/maven-4.0.0.xsd">
<modelVersion>4.0.0</modelVersion>
<groupId>it.univaq.disim.se4iot.influxdbexample</groupId>
<artifactId>it.univaq.disim.se4iot.influxdbexample</artifactId>
<version>0.0.1-SNAPSHOT</version>
<dependencies>
<dependency>
<groupId>com.influxdb</groupId>
<artifactId>influxdb-client-java</artifactId>
<version>1.8.0</version>
</dependency>
</dependencies>
<build>
<sourceDirectory>src</sourceDirectory>
<plugins>
  <plugin>
    <artifactId>maven-compiler-plugin</artifactId>
    <version>3.8.0</version>
    <configuration>
      <release>12</release>
    </configuration>
  </plugin>
</plugins>

</build>
</project>
```

Some tutorials

(14) InfluxDB Tutorial - Complete Guide to getting started with InfluxDB - YouTube (14) Introduction to InfluxDB 2 & Flux | Rawkode Live - YouTube (14) Node-Red: inseriamo dati su InfluxDB - YouTube

-
- To remove all the data from the simple bucket
- influx delete --bucket se4iot --org univaq --start 1970-01-01T00:00:00Z --stop 2100-01-01T00:00:00Z