IoT Data-modelling using Time Series Database

24 February 2019

Tracker

IOT v/s IIOT

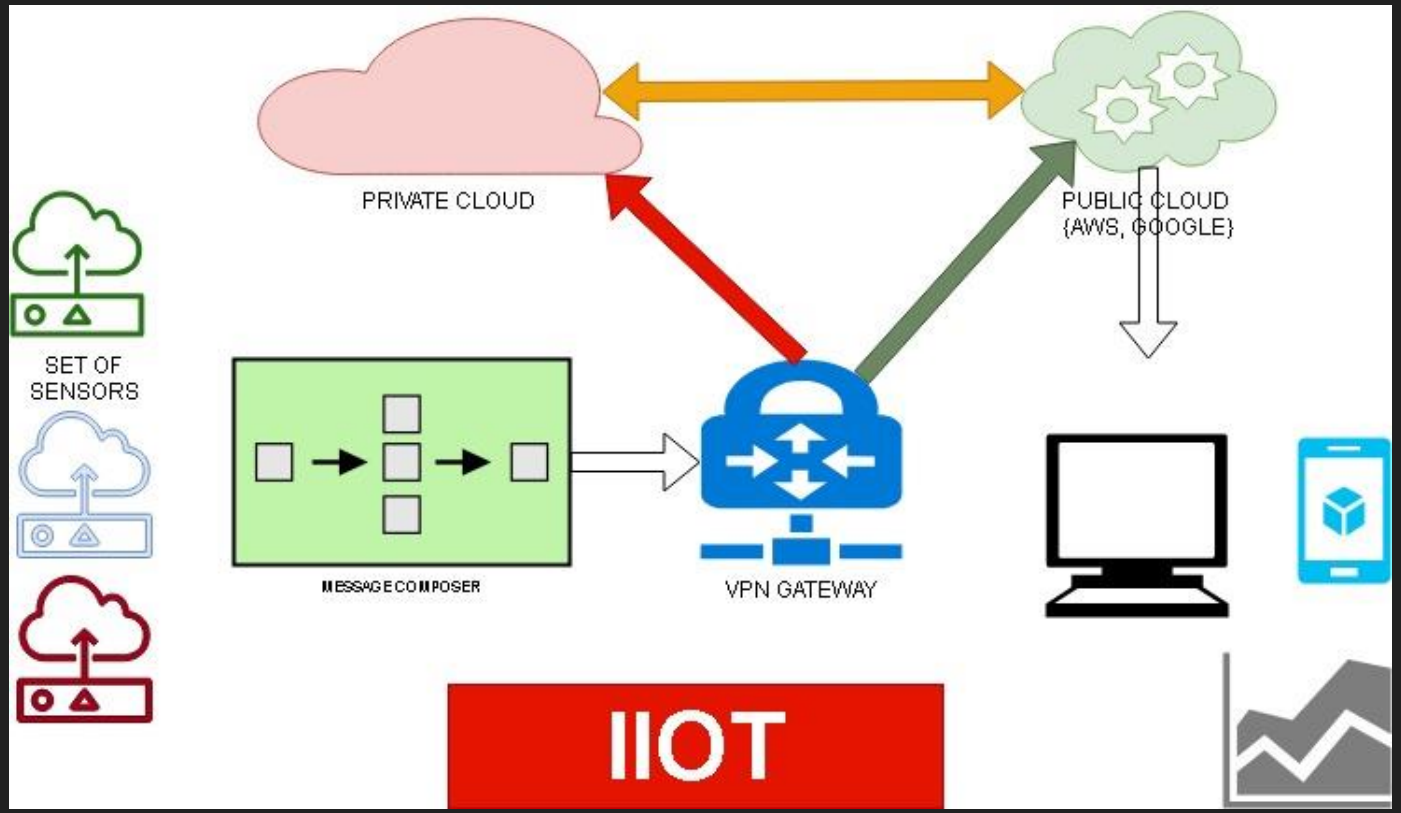
Time series database

Graphite + Influx

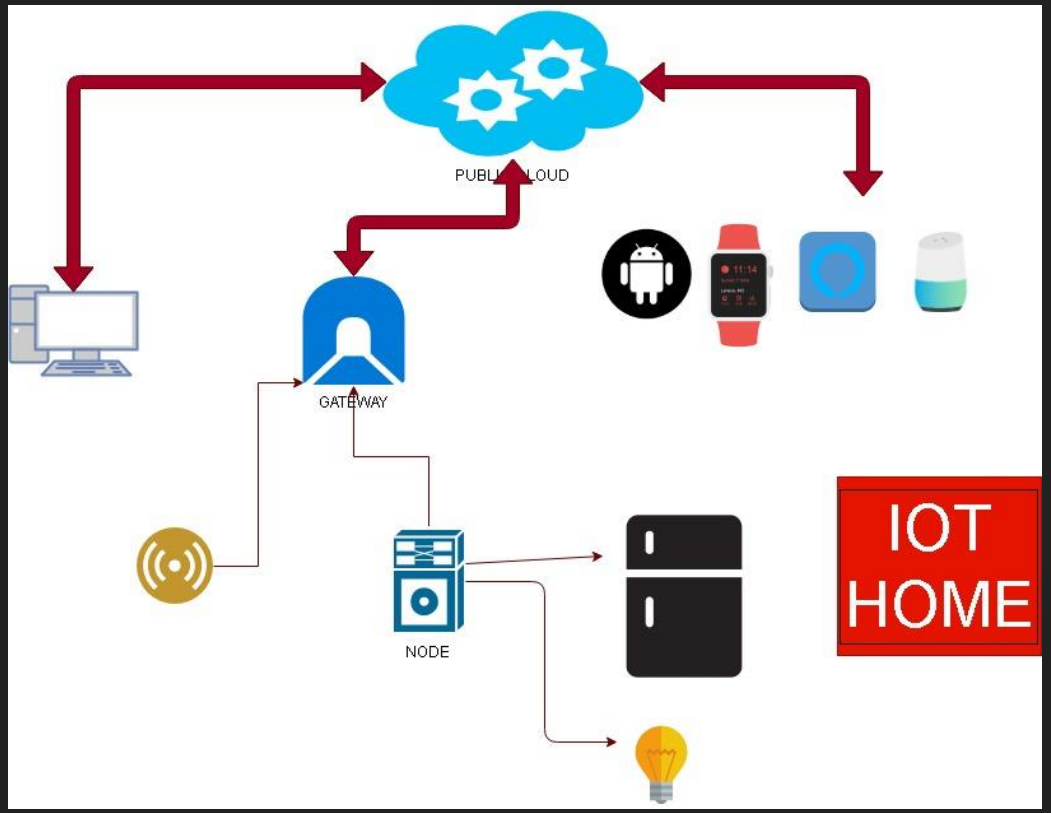
Short Demo

Reporting

IIOT DATA FLOW



IOT DATA FLOW



IOT VS IIOT

SMALL DATA SIZE	HUUUUUUGE DATA
Human intervention to end node	Human intervention is very less
Security is *USUALLY* LOW	Higher security
Sensors are usually with lower sensitivity	Extremely high sensitive sensors
Public cloud	Private cloud AND/OR Public cloud
OOTB Analytics	Very high level of specific, targetted, directed analytics

Tools

Sensor data processor

Message processor

Gateway with VPN

Streaming data

Data saving

Scheduler for data processing

Reporting

IOT and Analytics

Need for Analytics

Raw Data vs Aggregated Data

Learning from Raw data

Descriptive, Diagnostic, Prescriptive

Save analysis output to TSDB again

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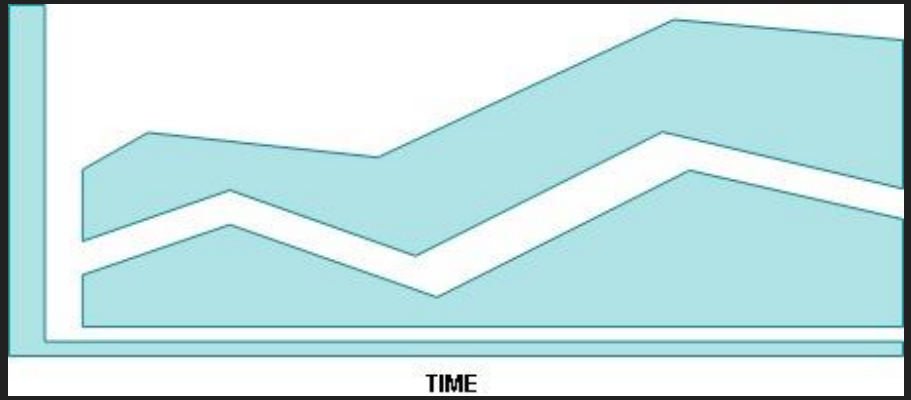
Timeseries Database [tsdb]

X-Axis is ALWAYS time

A time series is a sequence taken at successive equally spaced points in time. it is a sequence of discrete-time data

Time series analysis is the use of statistical methods to analyze time series data and extract meaningful statistics and characteristics about the data.



List of timeseries databases

Name	License	Language	References
Atlas	Apache License 2.0[4]	Java	[5]
Cube	Apache License 2.0[6]	JavaScript	[5]
DalmatinerDB	MIT[7]	Erlang	[5]
Druid	Apache License 2.0	Java	[5]
eXtremeDB	Commercial	SQL, Python, C / C++, Java, and C#	[5]
InfluxDB	MIT.[8] Chronograf AGPLv3, Clustering Commercial[9]	Go	[5][10]
Informix TimeSeries	Commercial	C / C++	[5][11]
IRONdb	Commercial	C / C++	[5][12]
KairosDB	Apache License 2.0[13]	Java	[5]
Kx kdb+	Commercial	q	[5]
OpenTSDB	GPLv3+[14]	Java	[5]
Prometheus	Apache License 2.0	Go	[5]
Riak-TS	Apache License 2.0	Erlang	[5]
RRDtool	GPLv2	C	[5]
TimescaleDB	Apache License 2.0[15]	C	[5][10][16][17]
Whisper (Graphite)	Apache 2	Python	[18]

Kairos DB

```
put <metric name> <time stamp> <value> <tag> <tag>... \n
```

```
[{
    "name": "archive.file.tracked",
    "timestamp": 1349109376,
    "type": "long",
    "value": 123,
    "tags":{"host":"test"}
},
{
    "name": "archive.file.search",
    "timestamp": 999,
    "type": "double",
    "value": 32.1,
    "tags":{"host":"test"}
}]
```

Influx DB

```
weather,location=us-midwest temperature=82 1465839830100400200
  |    -------------------- --------------  |
  |             |             |             |
  |             |             |             |
+-----------+--------+-+---------+-+---------+
|measurement|,tag_set| |field_set| |timestamp|
+-----------+--------+-+---------+-+---------+
```

```
curl -i -XPOST "http://localhost:8086/write?db=science_is_cool" --data-binary
'weather,location=us-midwest temperature=82 1465839830100400200'
```

```
INSERT weather,location=us-midwest temperature=81i 1465839830100400300
```

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Graphite Protocol

Graphite Project -Graphite web, carbon+ carbon relay, Whisper database

Graphite/Carbon protocol -responsible for receiving metrics over the network and writing them down to disk using a storage backend.

Both Kairos DB and Influx DB Support this

echo "measurement_name `date +%s`" | nc graphite.example.com 2003

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Web UI

Mobile

Voice

Reinforcements

IOT - make adjustments?

Thank you!

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