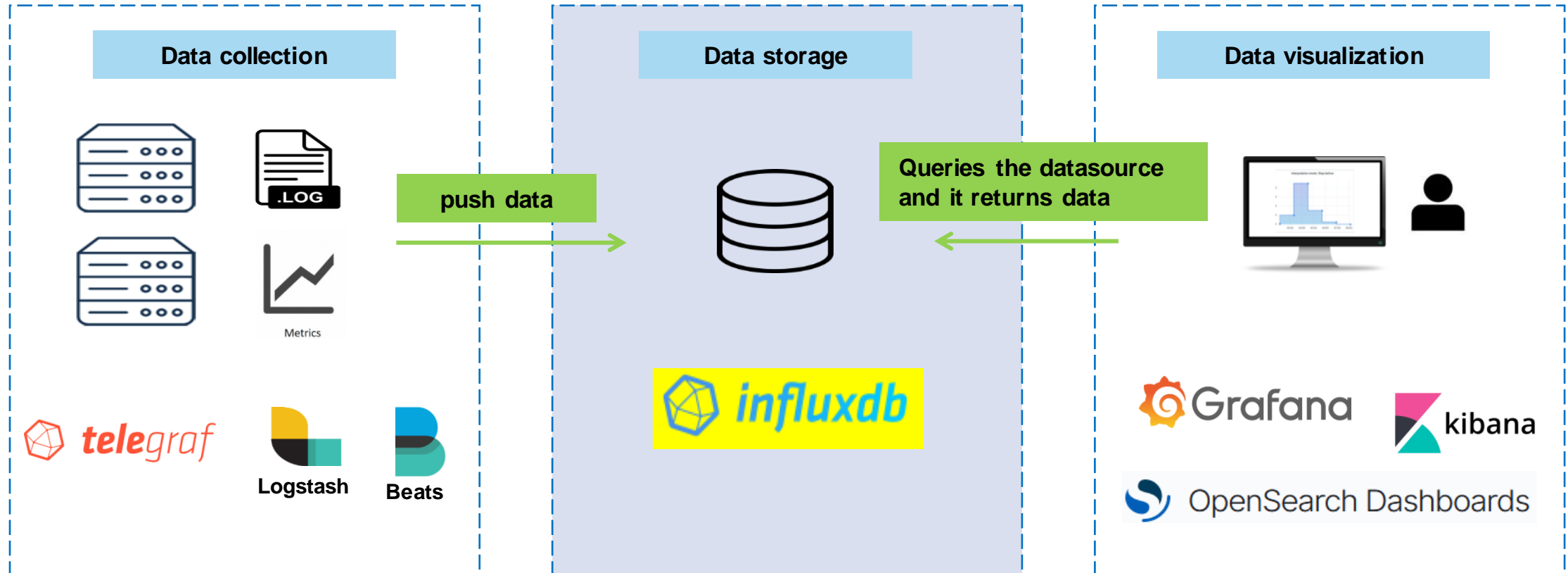# InfluxDB

Introduction to InfluxDB

Components of monitoring architecture

Agenda

- What is InfluxDB?
- Time Series Data and Databases
- Data model of InfluxDB
- Query languge flux

What is InfluxDB

- InfluxDB, released in 2013, is a time series database

- evolved into a time series application development platform

- InfluxDB includes the InfluxDB User Interface (InfluxDB UI) and Flux

- used for server monitoring, financial applications, customer facing IoT and many other applications.

- InfluxData Inc. → https://www.influxdata.com

- written in Go programming language, also called Golang

- supports many programming languages like Java, JavaScript, Perl, PHP, Python...

InfluxDB versions

InfluxData offers three different versions

- **InfluxDB:**   Open Source

- **InfluxCloud:** fully customised and has a web-based user interface for the data ingestion and visualization

- **InfluxEnterprise:** installed on the server within a corporate network. It provides maintenance agreements and special access controls for the business customers

What are Time Series?

Time series data is a sequence of data points indexed in time order.

Data points typically consist of successive measurements made from the same source and are used to track changes over time.

Examples: weather data, monitoring data, Stock prices...
everything that can be viewed over time!

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What are Time-Series Databases

A time series database is defined as a database system optimised to provide the time series data and its storage in association with the value and time

Times series databases can ingest millions of data points per second, resulting in high-level performance

Why use InfluxDB

- storing large amounts of data
- faster than traditional databases for time series data
- Real-time data and parallel incoming data possible
- Includes UI dashboards to see the data such as Chronograf, Grafana
- It is easy to build, easy to share templates via influxdb templates
- InfluxDB is a storage, ingest, query, and visualisation platform that you can access through a unified API

Write data to Influx

InfluxDB provides many different options for ingesting or writing data, including the following

- Influx user interface
- InfluxDB HTTP API
- Influx Cli
- Telegraf
- InfluxDB client libraries

Data model

Bucket: Named location where time series data is stored
                 A bucket can contain multiple measurements.

Measurements: Logical grouping for time series data.
                 A measurement contains multiple *tags* and *fields*.

– Tag values → describe/identify the data points
– Field values → the actual measured values
– Timestamp → the time of the measurement

Data model example

name of the measurement   **Tag values(s)**   **Fields value(s)**   **timestamp**

Temperatur,place=room1,sensor=1 temp=24.5 159345356

Temperatur,place=room2,sensor=1 temp=20,5 159345350
Temperatur,place=room2 temp=20,5 159345350

Query Language

- **InfluxQL**
  - for the first version of InfluxDB
  - SQL-like query language

- **Flux**
  - Since version 1.8
  - a functional data scripting language designed for querying, processing, writing, analyzing, and acting on data
  - based on JavaScript
  - published by InfluxData on GitHub as an open-source project

Flux Query

A Flux query does the following:

- Retrieves a specified amount of data from a source.
- Filters data based on time or column values.
- Processes and shapes data into expected results.
- Returns the result.

```
from(bucket: "example-bucket")
    |> range(start: -1d)
    |> filter(fn: (r) => r._measurement == "example-measurement")
    |> mean()
    |> yield(name: "_results")
```

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Flux Query

When querying InfluxDB with Flux, there are three primary functions:

- from():   Queries data from an InfluxDB bucket.

- range():   Filters data based on time bounds. Flux requires "bounded" queries - queries limited to a specific time range.

- filter():   Filters data based on column values. multiple filters possible

- More functions: https://docs.influxdata.com/flux/v0.x/stdlib

Examples of time ranges

Query a time range relative to now

```
from(bucket: "example-bucket")
      |> range(start: -12h)
```

Query an absolute time range
```
from(bucket: "example-bucket")
      |> range(start: 2021-05-22T23:30:00Z, stop: 2021-05-23T00:00:00Z)
```

Query an absolute time range using Unix timestamps
```
from(bucket: "example-bucket")
      |> range(start: 1621726200, stop: 1621728000)
```

Links

https://www.influxdata.com/products/influxdb-overview/

Dokumentation:
https://docs.influxdata.com/influxdb/v2.6/

Free courses:
https://university.influxdata.com/catalog/

InfluxData community
https://community.influxdata.com

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