



Science Hack 2018

BASF DATA 2

TIMESERIES HISTORIAN

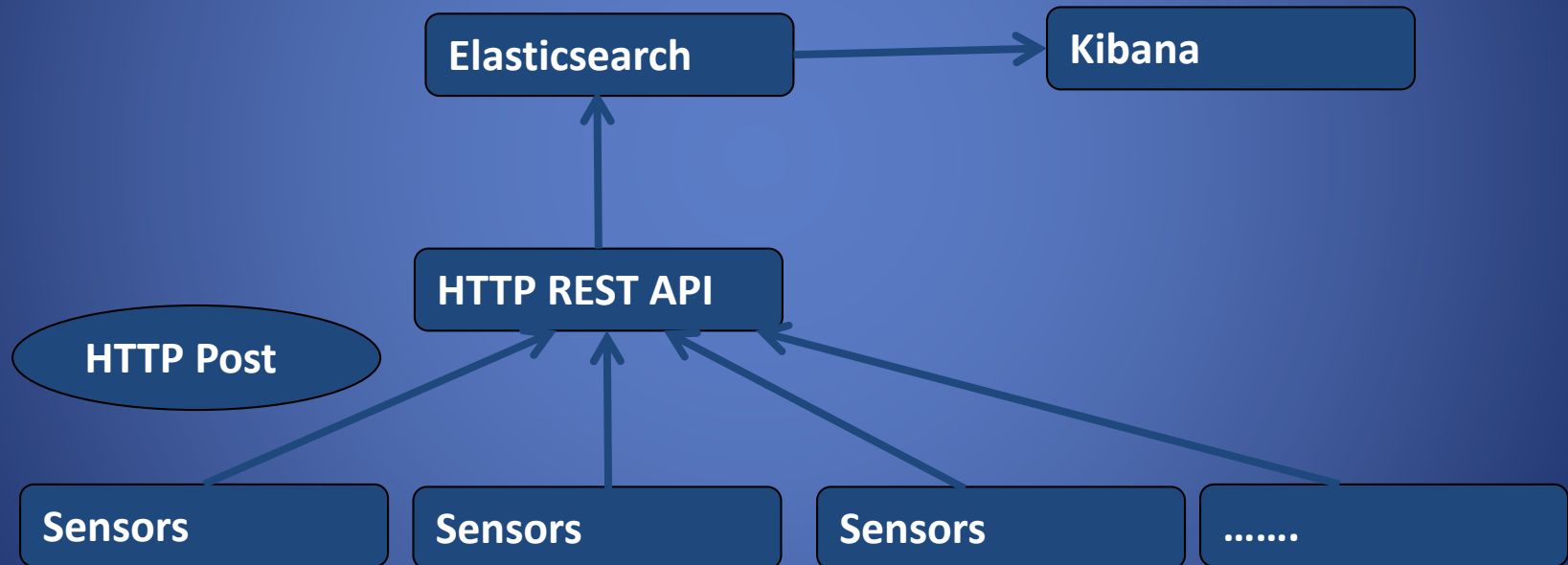




Problem Statement

- More than a billion data points per second
- Need for storing and retrieving data in a reliable and efficient manner

Solution Framework





Tools and their justification



Elasticsearch:

- Apache Lucence based search engine.
- Open source & developed using Java



Kibana

- Data exploration & visualization tool
- Used for log & time series analytics, application monitoring & operational intelligence.



Python

- Used for Sensor emulation.



Framework Capabilities

- Offline capability through database setup on PC
- Created replicas of sensor data
- Generated automatic indexing and query distribution across the cluster



Challenges

- Limited data points
- Minimizing risk of data loss
- Minimizing storage consumption
- Working with multiple nodes



Sensor data emulation

balu@balu-Inspiron-5520: ~/demo

```
{'timestamp': '2018-12-02T13:48:36.499522', 'humidity': -7} 201  
{'timestamp': '2018-12-02T13:48:36.600268', 'NO2': 65} 201  
{'SO2': 27, 'timestamp': '2018-12-02T13:48:36.700999'} 201  
{'SO2': 32, 'timestamp': '2018-12-02T13:48:36.801751'} 201
```

```
^CTraceback (most recent call last):  
  File "sensor-emulate.py", line 51, in <module>  
    time.sleep(1/int(sys.argv[1]))
```

KeyboardInterrupt

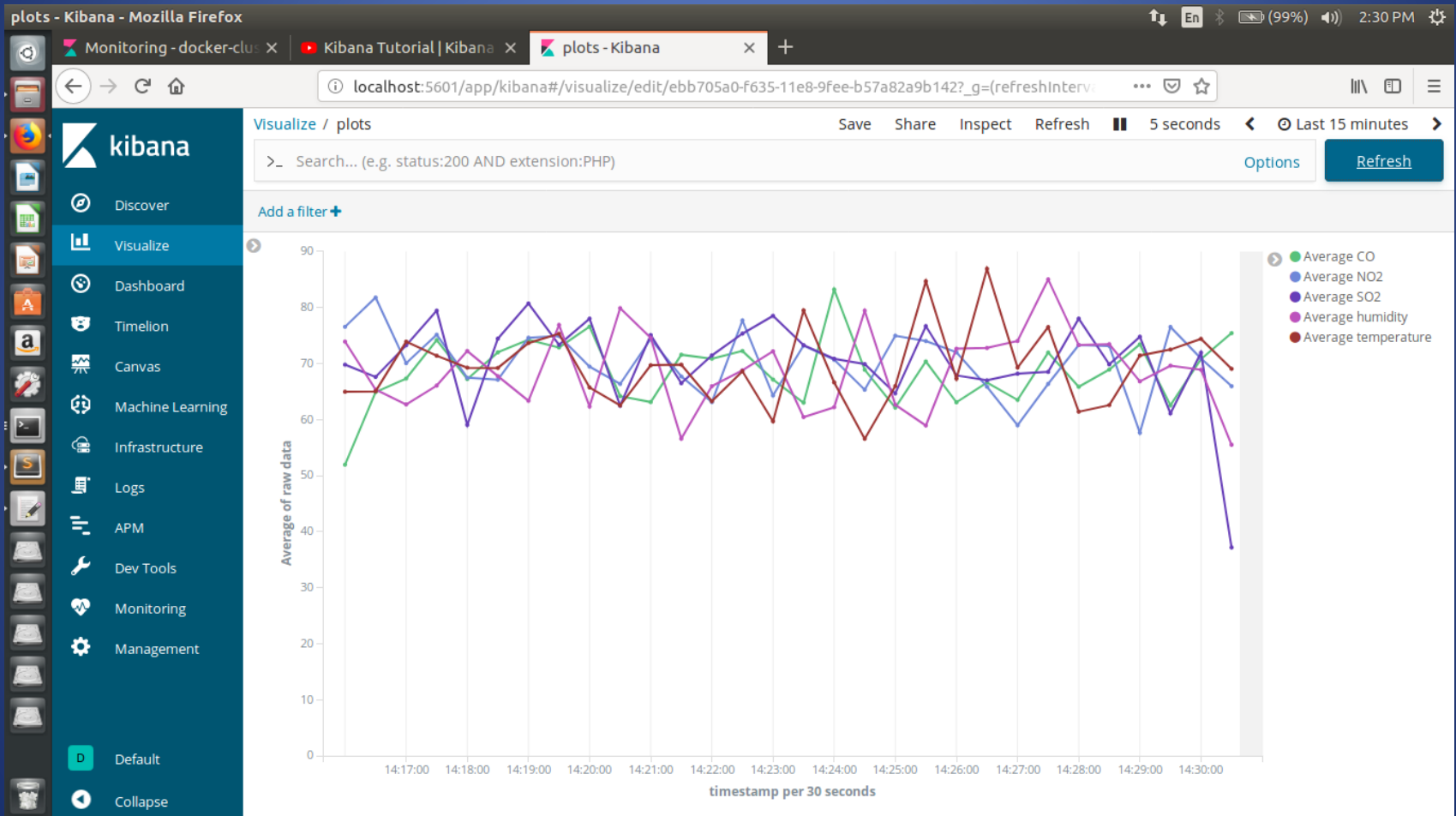
balu@balu-Inspiron-5520:~/demo\$ sudo sh start.sh

[sudo] password for balu:

```
{'CO': -7, 'timestamp': '2018-12-02T13:48:40.646732'} 201  
{'NO2': 84, 'timestamp': '2018-12-02T13:48:40.748523'} 201  
{'humidity': 104, 'timestamp': '2018-12-02T13:48:40.850373'} 201  
{'CO': 61, 'timestamp': '2018-12-02T13:48:40.951851'} 201  
{'NO2': 125, 'timestamp': '2018-12-02T13:48:41.053283'} 201  
{'SO2': 141, 'timestamp': '2018-12-02T13:48:41.154709'} 201  
{'humidity': 94, 'timestamp': '2018-12-02T13:48:41.255404'} 201  
{'CO': 46, 'timestamp': '2018-12-02T13:48:41.356769'} 201  
{'SO2': 52, 'timestamp': '2018-12-02T13:48:41.457523'} 201  
{'humidity': 64, 'timestamp': '2018-12-02T13:48:41.558844'} 201  
{'temperature': 120, 'timestamp': '2018-12-02T13:48:41.660104'} 201  
{'NO2': 9, 'timestamp': '2018-12-02T13:48:41.760856'} 201  
{'SO2': 108, 'timestamp': '2018-12-02T13:48:41.861643'} 201  
{'CO': 98, 'timestamp': '2018-12-02T13:48:41.962428'} 201  
{'humidity': 41, 'timestamp': '2018-12-02T13:48:42.063185'} 201
```

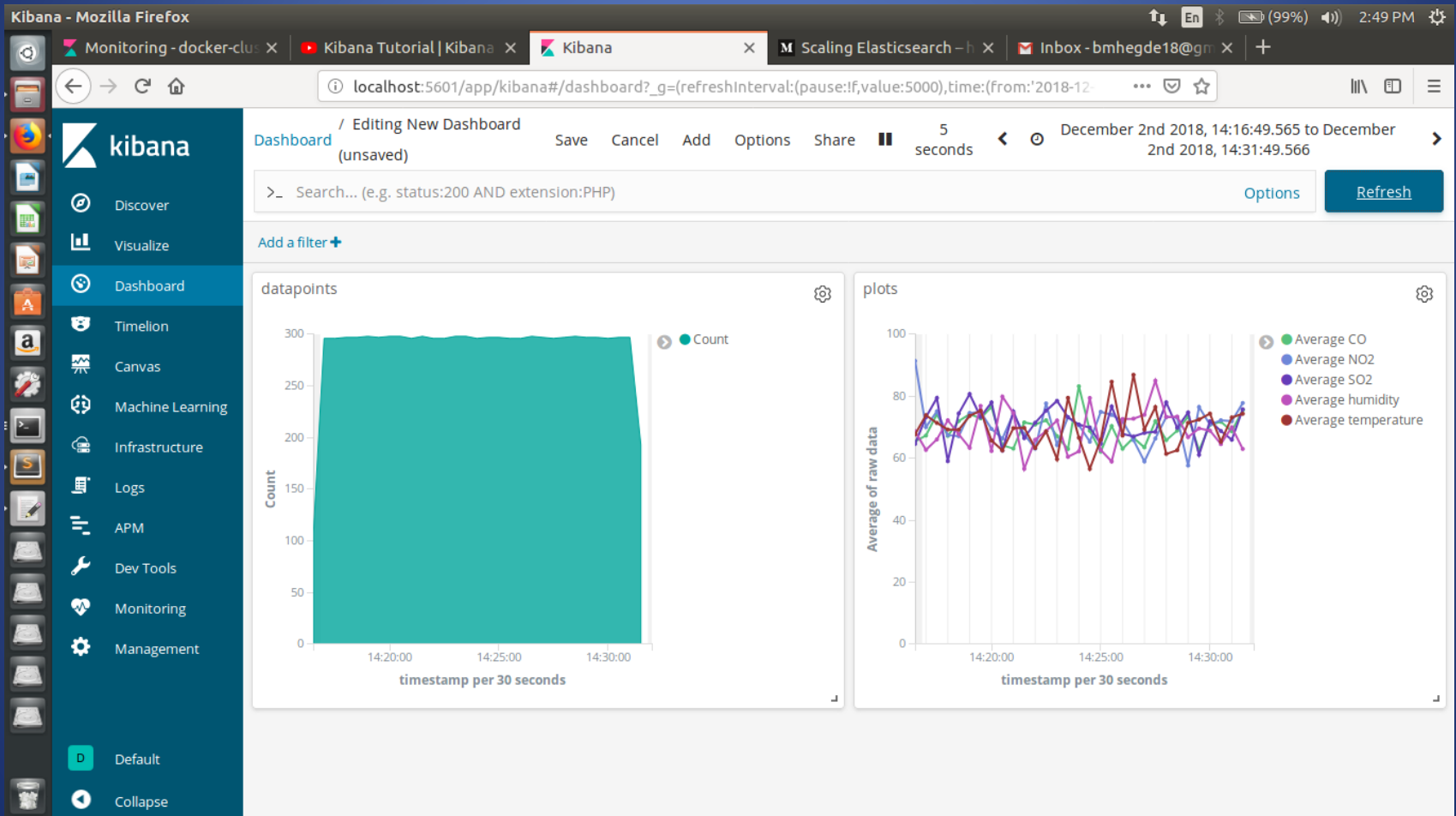


Data Retrieval





Data visualization





Thank you