Erratic server behavior detection using machine learning on streams of monitoring data

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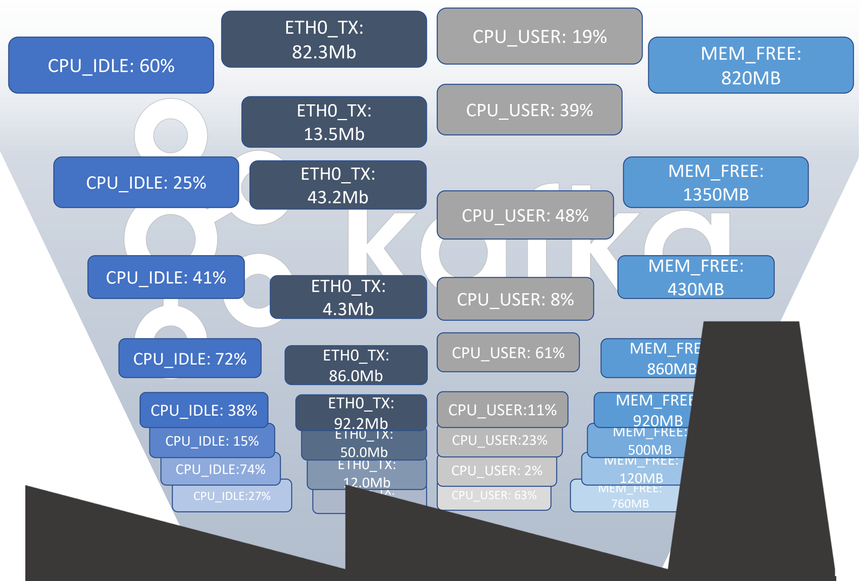
Introduction

In modern data centers the variety and complexity of services creates an overflow in monitoring data, both in terms of volume and diversity. Standard threshold-based alarms are by nature limited in coverage and can produce alert-fatigue and problem-miss.

Goals

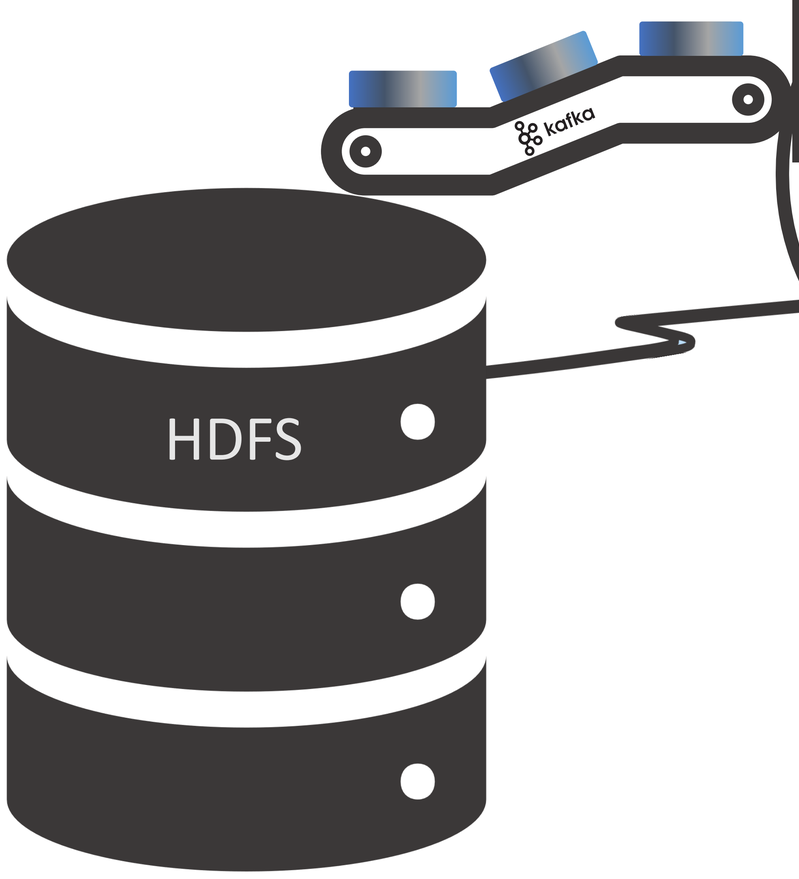
1) Gather a ML ready dataset
2) Confirm, that given a history of a **distributed application** workload and a **cluster** of servers running said application, it is possible to **detect an erratic server** by analyzing **only the os-level metric** data.

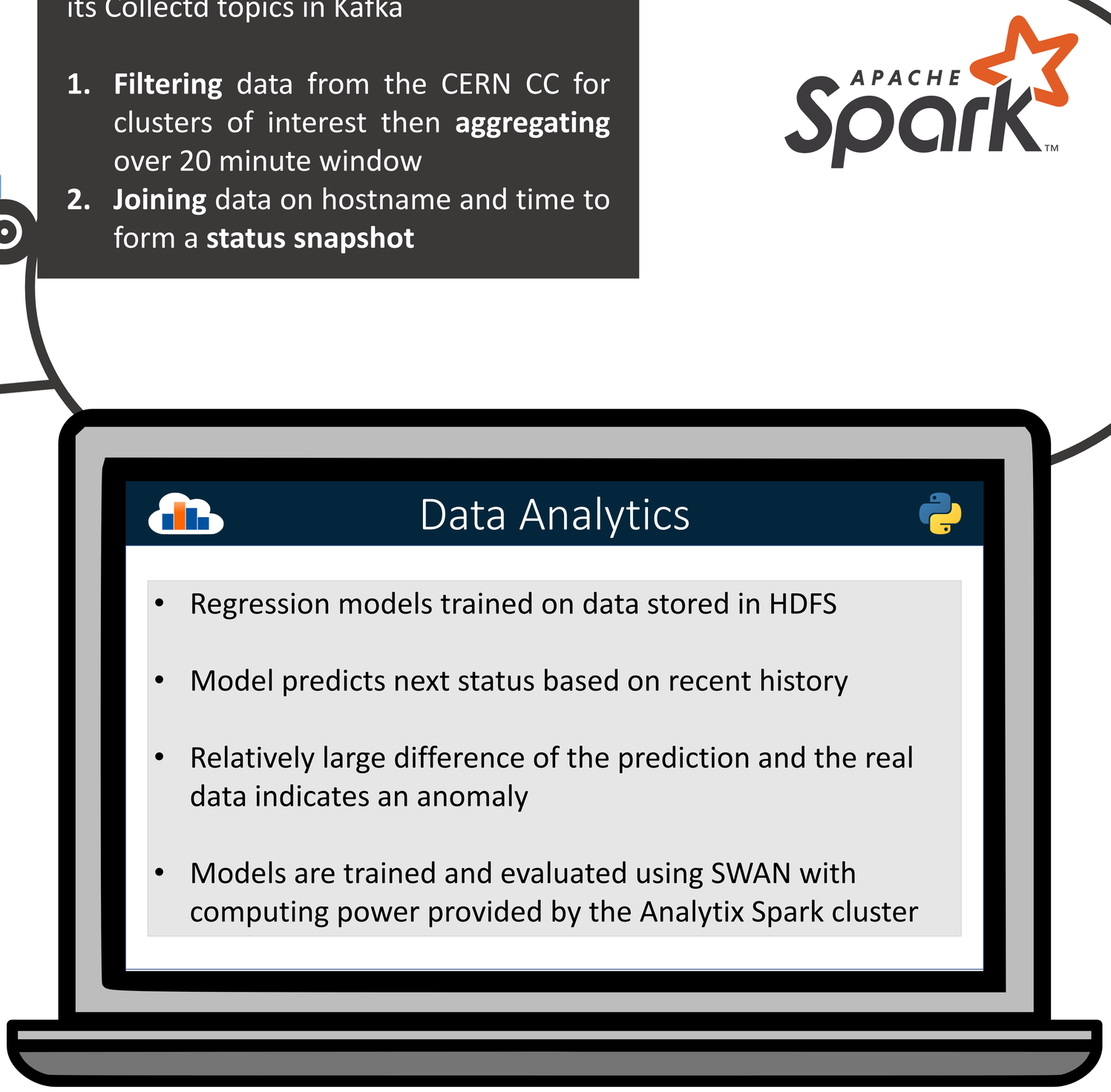


Data Gathering & Preprocessing

2 Spark streaming jobs running in the MONIT infrastructure reading data from its Collectd topics in Kafka

1. **Filtering** data from the CERN CC for clusters of interest then **aggregating** over 20 minute window
2. **Joining** data on hostname and time to form a **status snapshot**





Results & Acknowledgements

Both tested types of models (Linear regression and Random forest regressor) give satisfactory results on simple anomalies with basic preprocessing. Attempts to further pre-process the data using PCA yield mixed results.

Special thanks to the MONIT team and to the Hadoop and SWAN team from CERN.

Conclusion & Future Work

The **concept of a ML model detecting** a simple artificial **anomaly only using the os-level monitoring metrics has been confirmed**. The next step is studying a wider array of anomalies as well as model universalness. Final challenge would be converting this experimental setup to a production ready application running without user interference.