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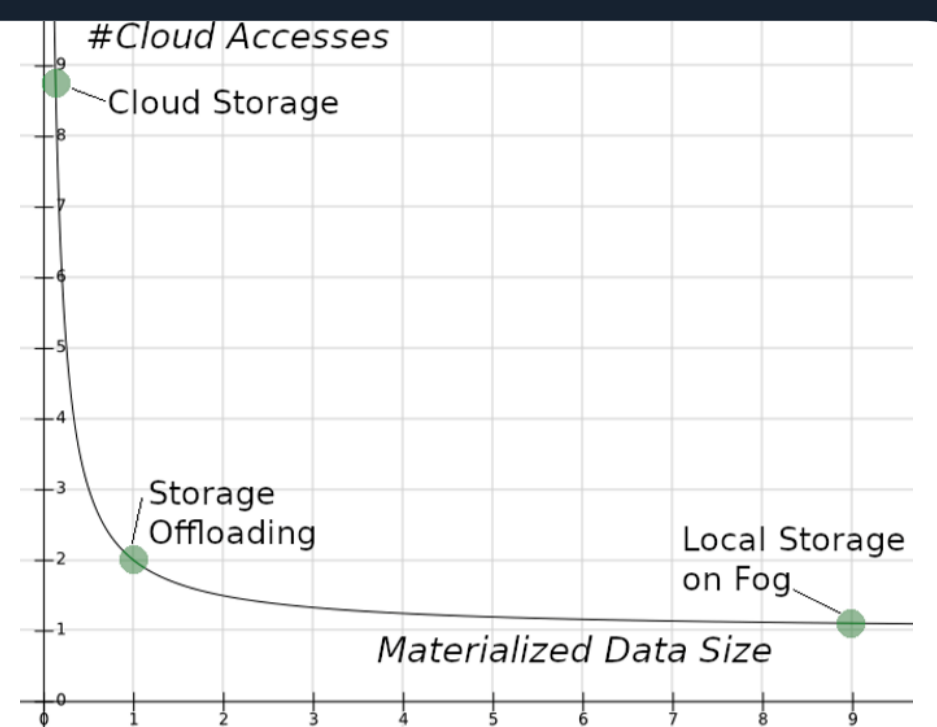
Tutor: Prof. Sergio Di Martino

XXXIV Cycle - II year presentation

Industry 4.0: Storing, Retrieving and Mining IIoT Sensor Data

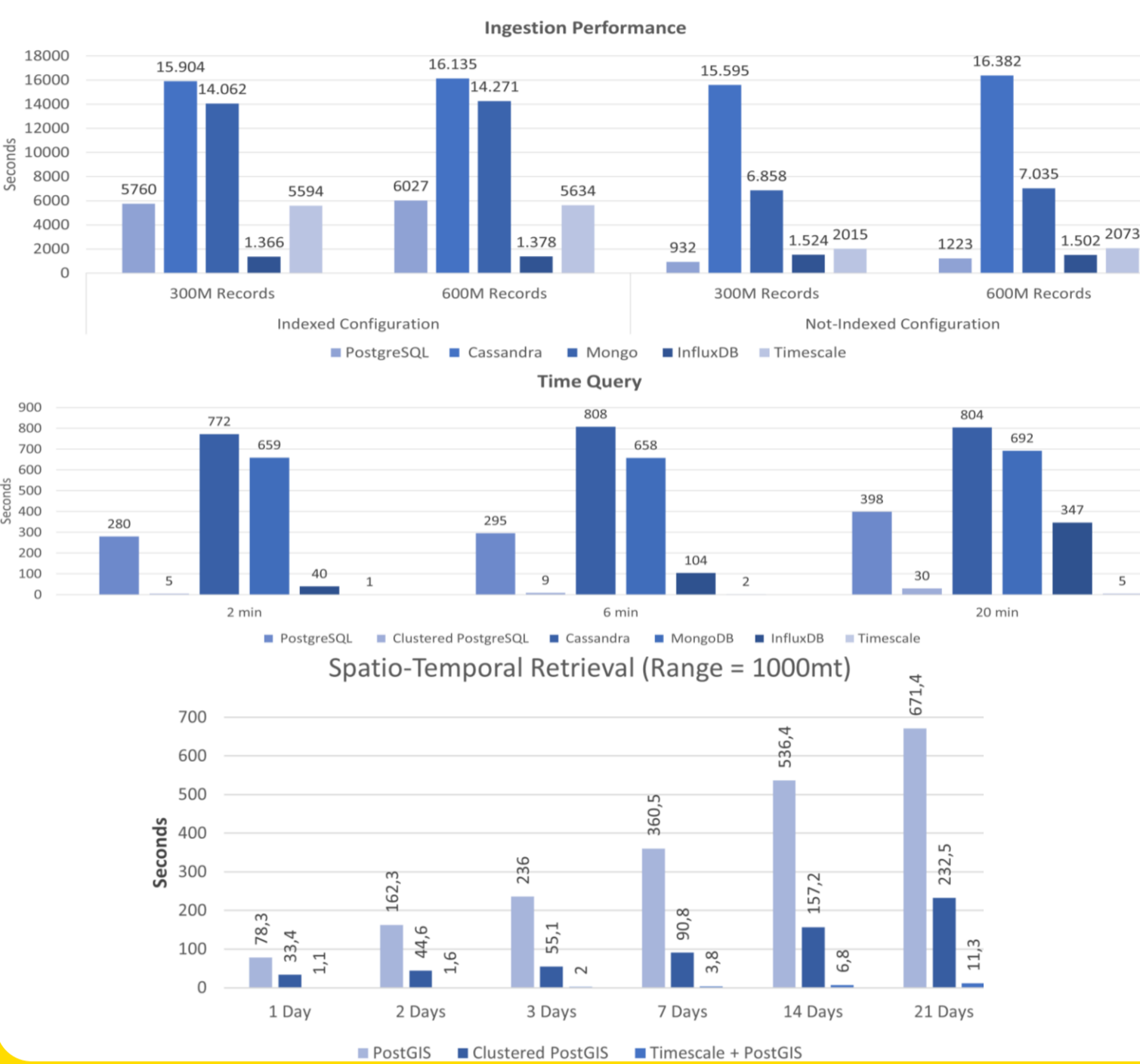
In the industrial context, over 4 trillion Gigabytes of data, could be generated in a year. Such massive Industrial IoT (IIoT) datasets are usually represented as heterogeneous Time Series (TS), often asynchronous and with variable resolution. Usually, companies use the Cloud for long-term storage, also due to reduced Total Cost of Ownership (TOC). Nevertheless, performing analytics tasks on data in the Cloud, can lead to high costs for data access/processing.

Goal of the Ph.D investigation: To define and assess a proper Fog-based approach to reduce the costs of analytics tasks on IIoT spatio-temporal data stored in the Cloud.



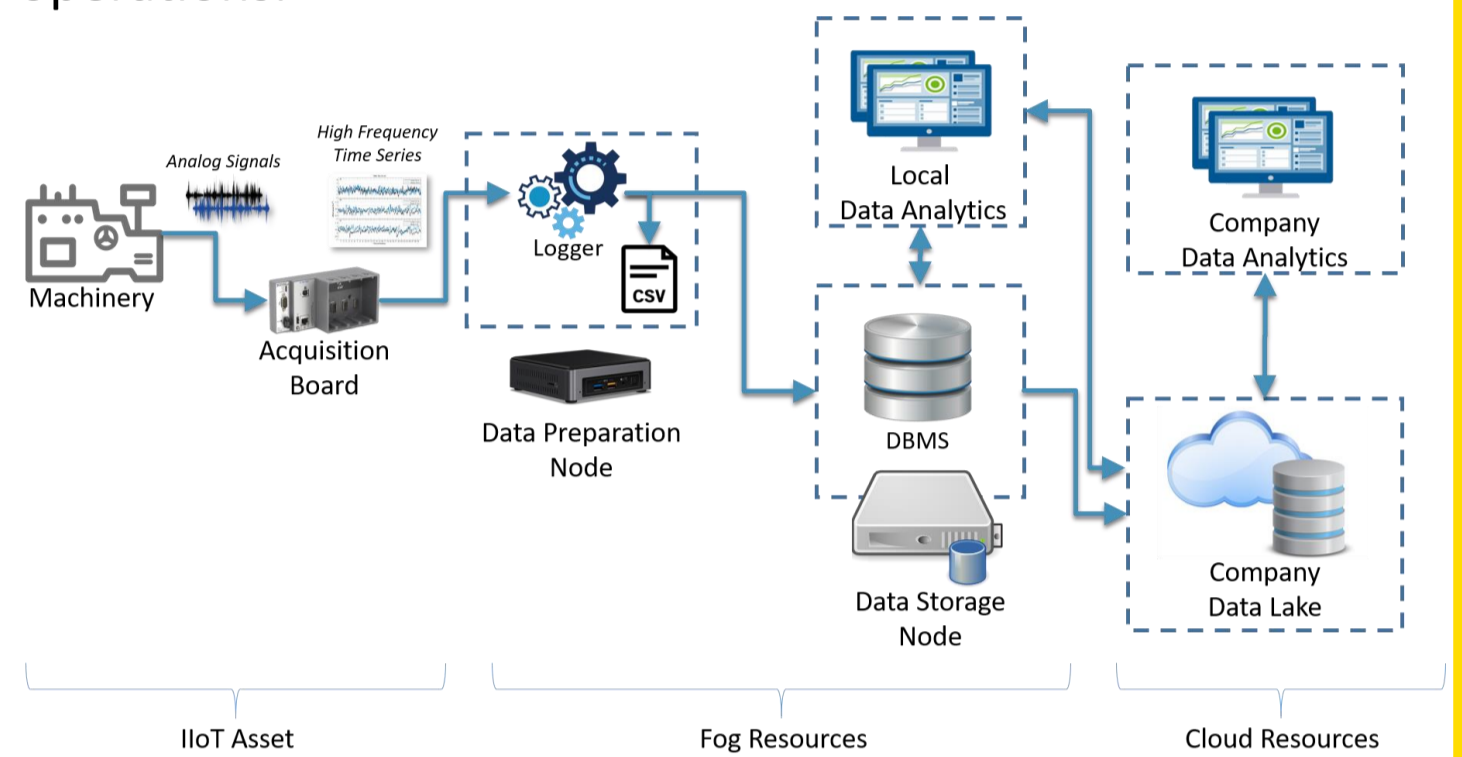
Massive Data Storage and Analytics

We defined and compared different storage strategies for massive Spatio-Temporal data management. Results highlighted weaknesses and strengths of each strategy.



Fog-Cloud Storage Offloading Architecture

We defined a multilevel architecture for massive series storage and analytics. The combination of the Fog layer with TSMS, offloads the Cloud from daily analytics operations.



A Cost Model for Shared Fog-Cloud Storage

We are defining a cost model to evaluate the effectiveness of storage offloading for analytic operations. It allows us:

- To estimate the benefits of Fog offloading with respect to pure Cloud storage.
- To evaluate per-operation analytics costs.

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Conclusions

We highlighted capabilities and limitations of existing solutions for massive spatio-temporal data analysis. We also defined a Fog-based Cloud offloading architecture, to take advantage of intermediate layers for analytic tasks. Lastly, we are defining a cost model to figure out when and how, it is convenient to offload storage on the Fog layer.

Future Work

- Definition of a strategy to proactively identify:
 - The most convenient TS to be offloaded.
 - The most appropriate representation for each TS.
- Automatic definition of retention policies.
- Evaluation with analytic workloads.



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