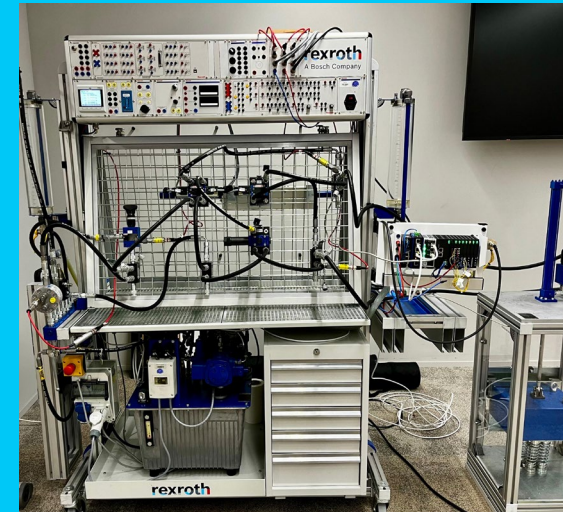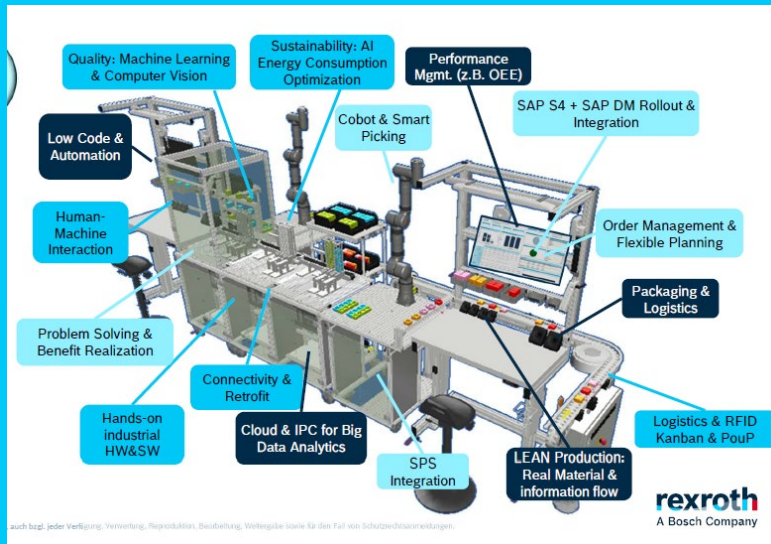# Learn Factory integration

Paper:

From Rule-Based PLC Monitoring to Real-Time Anomaly Detection: A Machine Learning Framework for Hydraulic Systems Using Probabilistic and Deep Learning Models

rexroth

A Bosch Company

Target:

Enable the Automax 105# to have the same analysis and monitoring capabilities as the Learn Factory.

Integration

- **No data storage**
- **No historical analysis**
- **Monitoring based on hard-coded PLC conditions**

Unlocking the Potential of Intelligent Hydraulic Monitoring

- We are developing an AI-driven monitoring system that leverages historical operability data to enhance hydraulic system performance. While engineers traditionally rely on PLC threshold alerts, empowering them to interpret data and refine models opens new avenues for efficiency and predictive maintenance.

- This initiative is just the beginning. Our first success in monitoring a specific hydraulic setup lays the foundation for a scalable, industry-agnostic solution. The vision: a generalized intelligent system adaptable to any client and any hydraulic configuration, unlocking broader industrial applications and a new standard in operational intelligence.

Second paper/Thesis:

> **"Adaptive AI framework for Predictive Maintenance Across Varied Hydraulic Systems"**

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Architecture HYDRA – *Hydraulic Data-driven Reliability & Analysis*
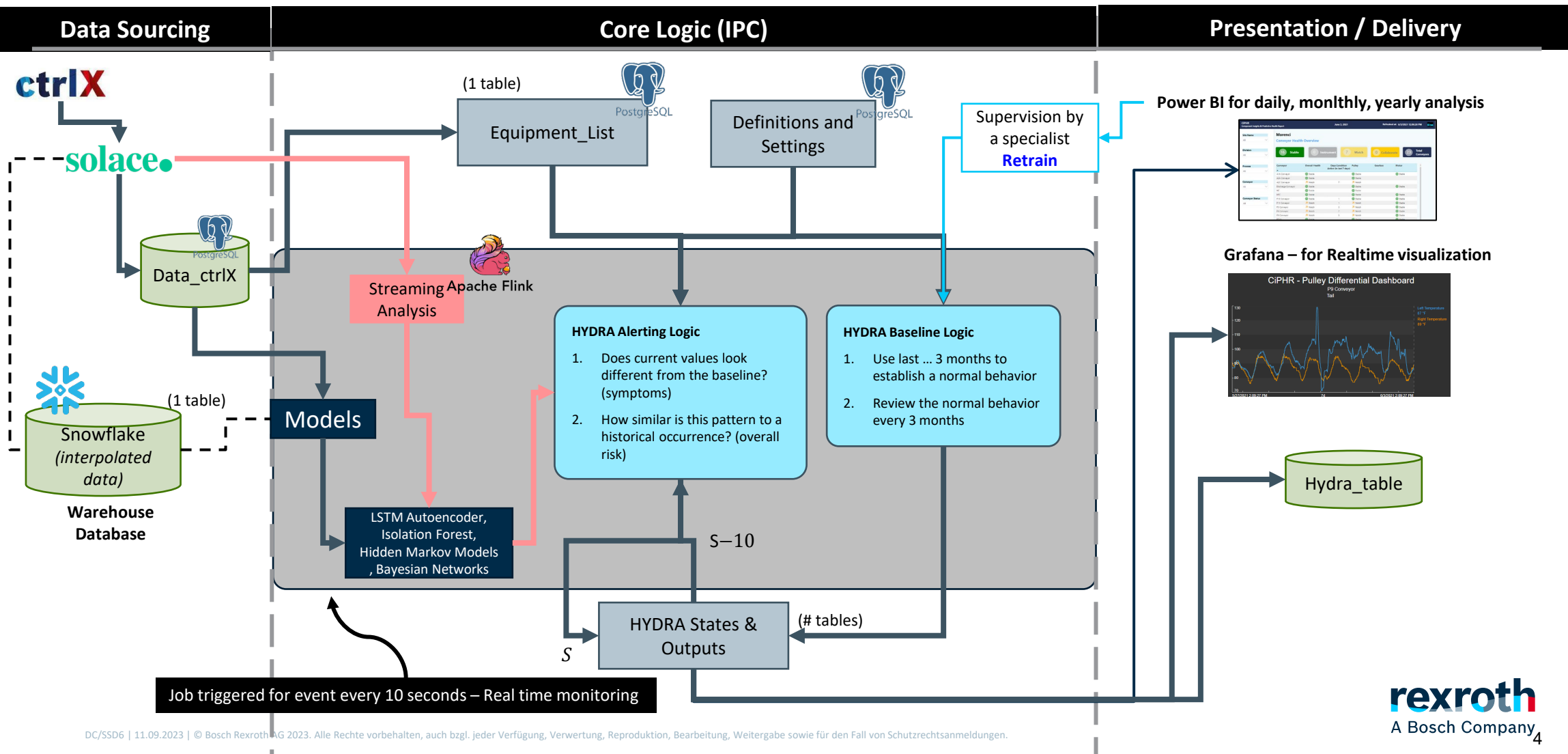
ETL – Extract transform load from CtrlX

Status:

Minimum Viable Product (MVP) – dockers and development   **Finished**
Implementing project in CtrlX connected with sensors   **In progress**

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Architecture ETL

Extraction	Transformation	Load

ctrlX

Docker Extract

Docker Dagster Orchestrator

Docker Transform

Docker Load

Re connection Extract

Extract

No

Are there messages From the broker?

Yes → Transform

Load

Docker Solace

Docker DB

SOLACE BROKER

Postgres Data base
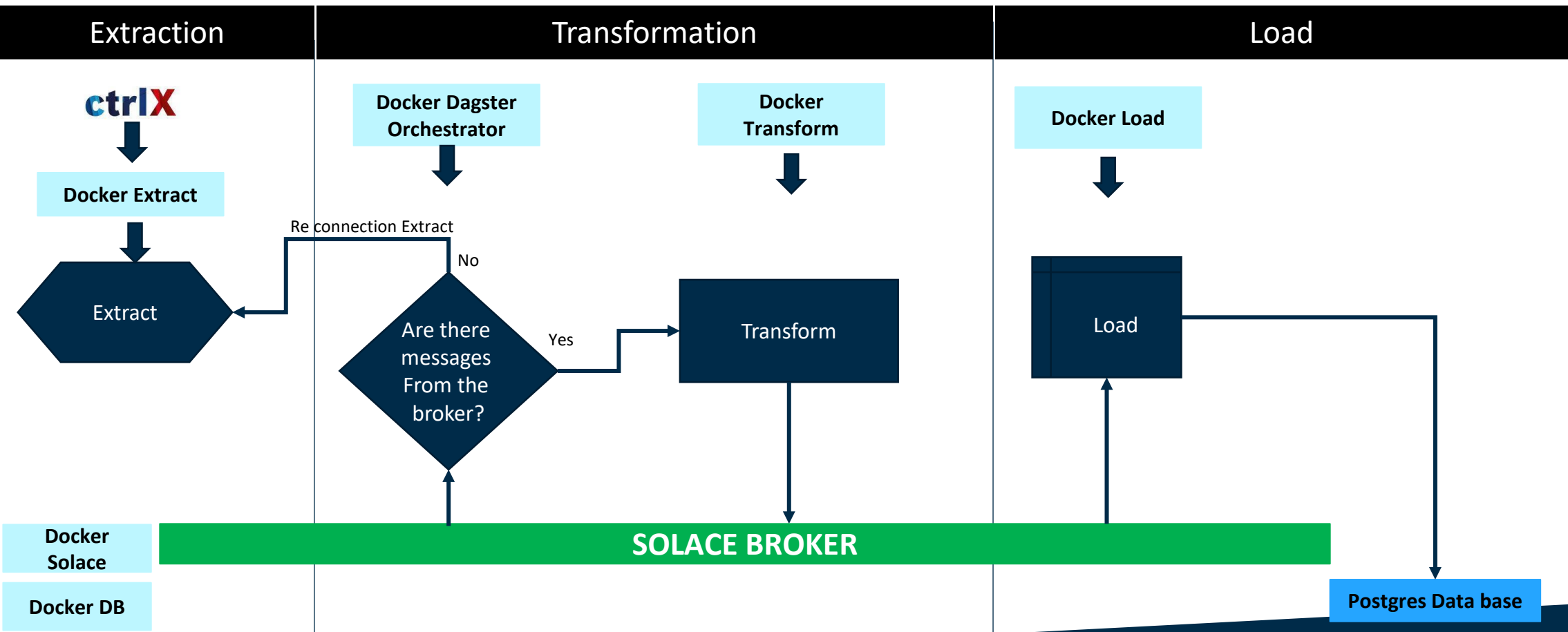
baseline and it has expired. All baseline values are accumulated and one-time put function writes it to SF Tables.

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Thank you!

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