AVEVA PI WORLD

Cloud Process Analytics System from PI

Klabin – Monte Alegre

Presented By: Julimar Bonicenha

KLABIN

About company

With 121 years in the market, 24 industrial units and 23 thousand employees, Klabin is the largest producer and exporter of packaging paper in Brazil and a leader in the production of paper packaging.








Klabin AVEVA

PULP & PAPER

Klabin

AVEVA

Leader in Brazil in the production of cardstock, corrugated cardboard packaging and industrial bags. It also provides the market with the best solution in hardwood, softwood and fluff pulp.

24
factories
23 in Brazil
and 1 in Argentina

Business offices in
10
Brazilian states
+ North America and Europe

Annual production capacity:

2.1 million tons of paper

1.6 million tons of market pulp

AVEVA

Forestry

Forestry Logistics Center

24/7

24h a day, 7 days a week

585 thousand

hectares of total forest area

Mean radius of

82 km

between the forests and pulp and paper mills

Klabin plants an average

100 trees

a minute

Management as a MOSAIC

Forms ecological corridors

Preserves river springs

Protects fauna and flora

Klabin’s forestry management protects natural resources, potentializes production and contributes to preserving biodiversity.

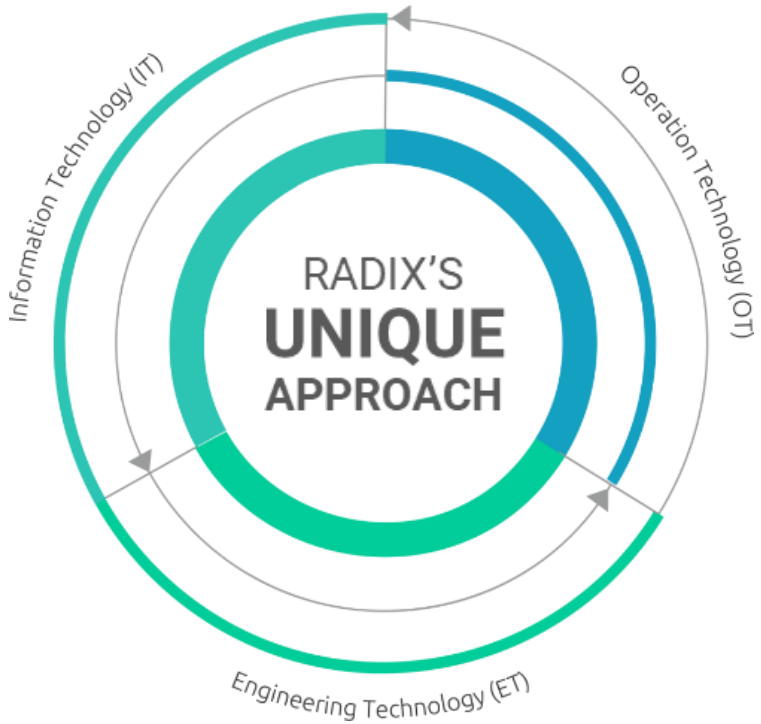
Partnership

radix

Engineering and Software

TRANSFORM TECHNICAL AND SCIENTIFIC KNOWLEDGE INTO **IMPACTFUL RESULTS**

WE COMBINE ET, OT AND IT



1000+
employees
around the world

Projects in
25+ countries

Extensive
industrial
domain expertise

multidisciplinary team
highly qualified, constantly trained
engaged leadership

FIRST-CLASS TECHNOLOGY ECOSYSTEM

OSIsoft. Microsoft Schneider Electric Seeq SIEMENS
aws AVEVA HEXAGON PPM ELEMENT ANALYTICS Rockwell Automation

Overview

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Cloud Process Analytics System from PI

Klabin

Challenge

- Increase the speed of data analysis helping decision making faster and more effectively through statistical understanding of data and discovering new operational patterns

Solution

- Organize and clean PI System process data and make it available to build an efficient data analytics application

Benefits

- Increased data analysis speed and powerful statistical tools developed in a user-friendly interface for end users to understand the process more efficiently

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Challenges project

Step Back

Digitalization Master Plan

- 4 months
- 24 areas consulted
- 223 pain points
- 182 opportunities

9 PAIN POINTS

6 OPPORTUNITIES

1 PROJECT

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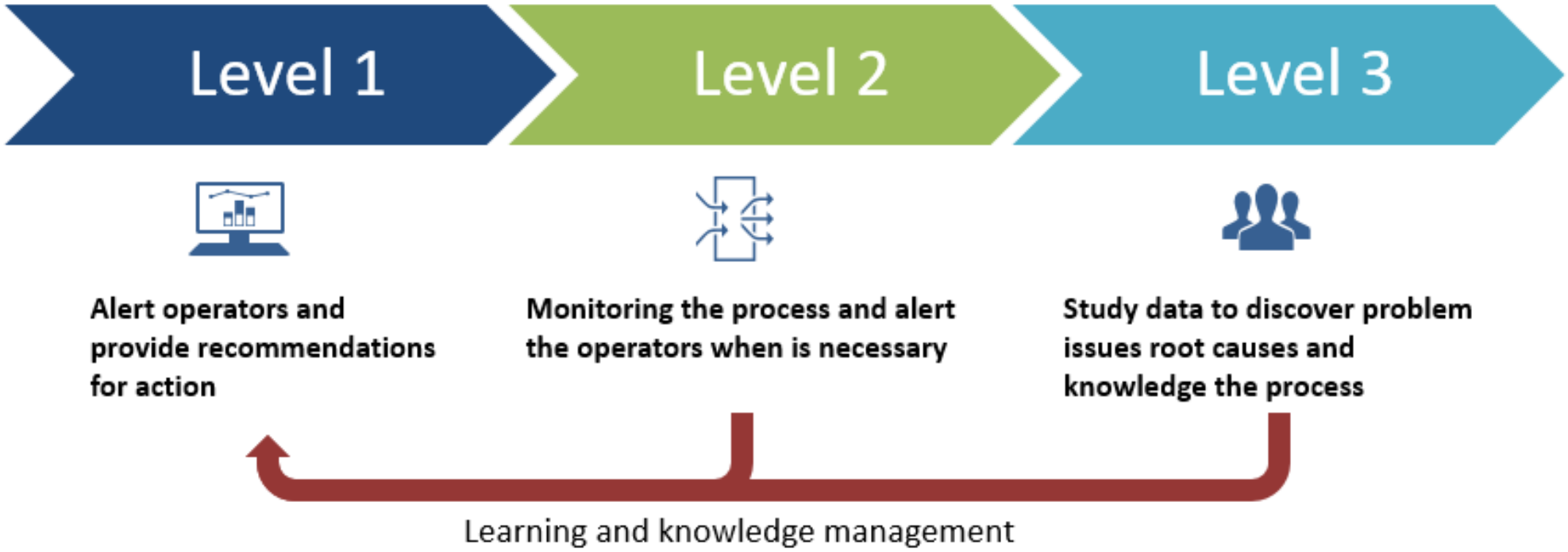
Purpose of the Project

Increase deviation response speed based on process knowledge



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Let’s Start

How to begin? Where to start?

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ARRANGE THE HOUSE

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Let’s Start

How to begin? Where to start?

- Choose Datasources
- Look data
- Analyze irregularities

Sources

Osisoft PI
Process data history

LIMS
Quality and Lab data

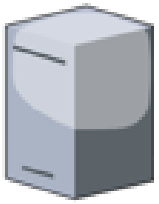
ISRA
Vision system

PI System

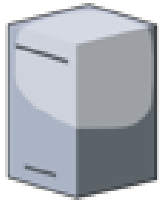
System Overview

We found some issues

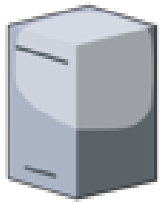
- Unused points
- Duplicate tags
- Many tag pattern
- Outdated interfaces due to incompatibility with old versions of windows
- Somme issues on interface buffer
- Decentralized collection interfaces
- Asset Framework without site structure



PI Server



AF Server



PI Vision Server

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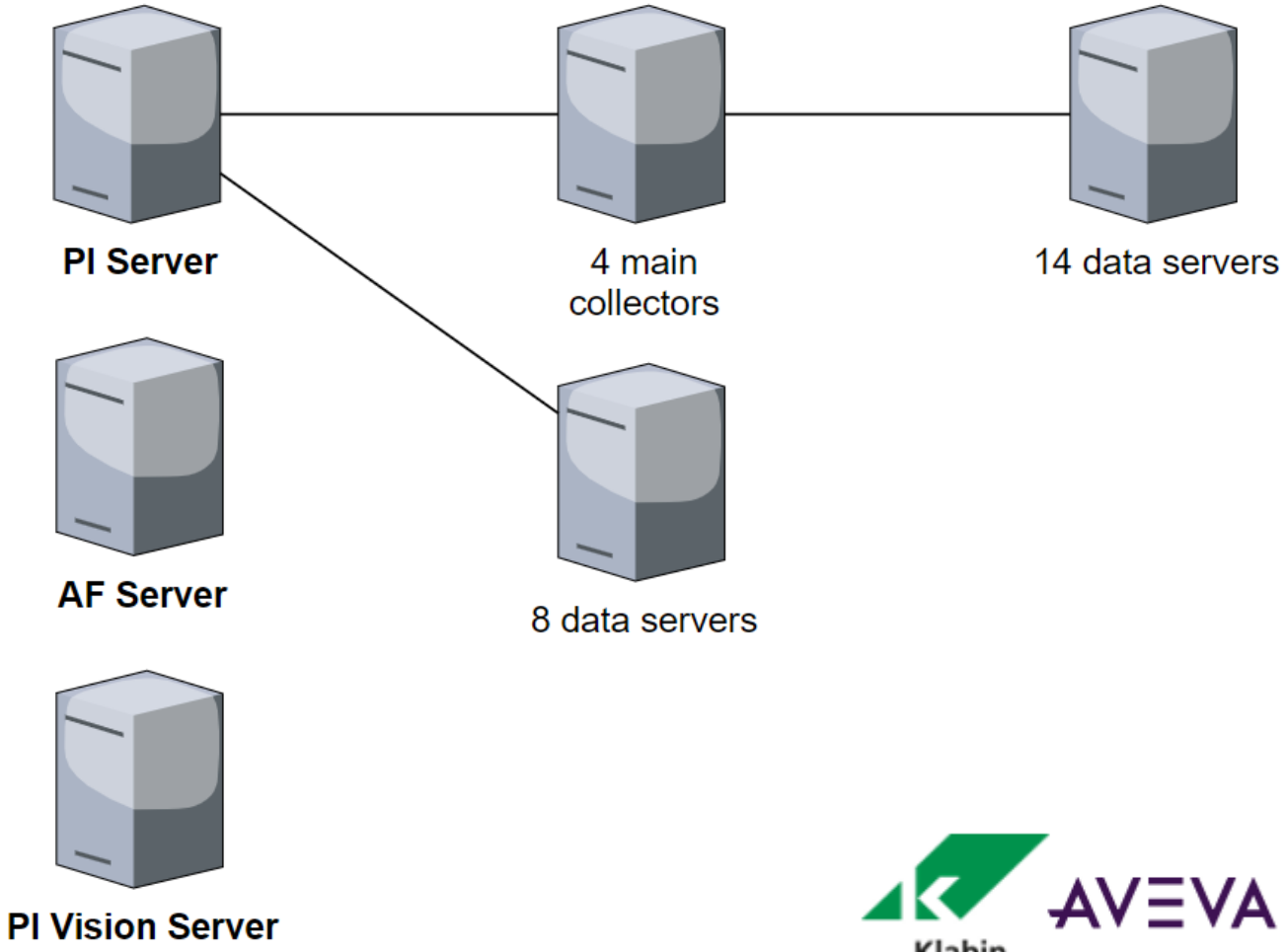
PI System

Architecture Overview

Caracteristcs

- 68 Thousand points
- Many scan frequency – 1s to 1 day
- All PI Server applications running in virtual servers
- 5 years history active
- Old history stored
- Backup daily
- Upgrade yearly or about demand



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PI System

Prepare the database with high confidence

Tags renaming: Defined the default of Tags based on the ISA Standard

- Total Tags renamed: **33026**
- Tags ISA: 19696
- Laboratory sytem LIMS: 3423
- Energy and Power supply: 847
- Paper profile: 9060

Deleting old and unused tags:

- Total deleted: **11481**

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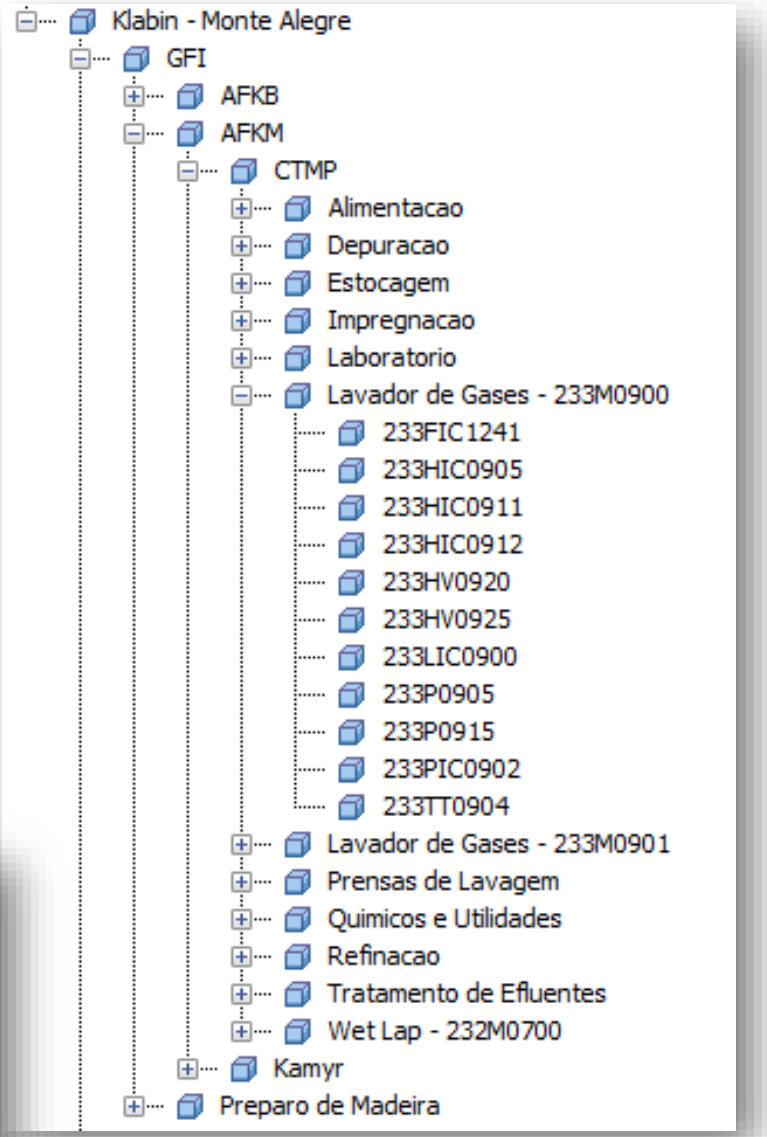
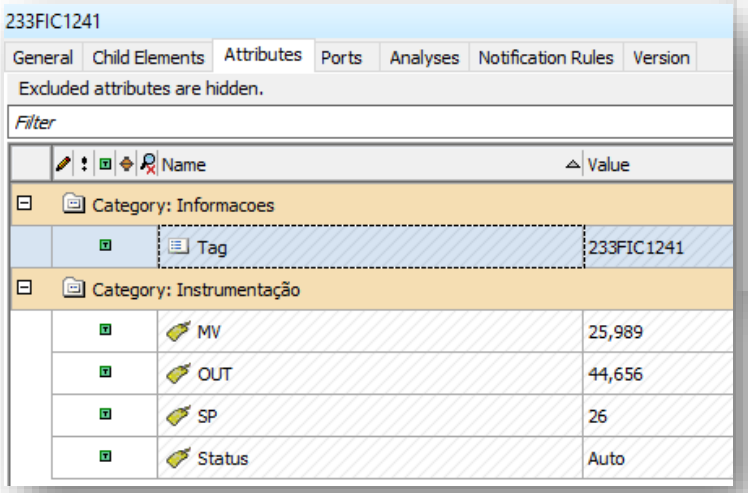
PI System

Prepare the database with high confidence

Árvore AF: Creation of the complete Klabin Monte Alegre Process Tree in AF.

- Total Mapped Elements : 12844
- Pumps: 1103
- Switches and Sensors : 238
- Control Loops: 1933
- Engines : 1460
- Transmitters: 3030
- Manual valves: 1663
- Other Elements: 3412





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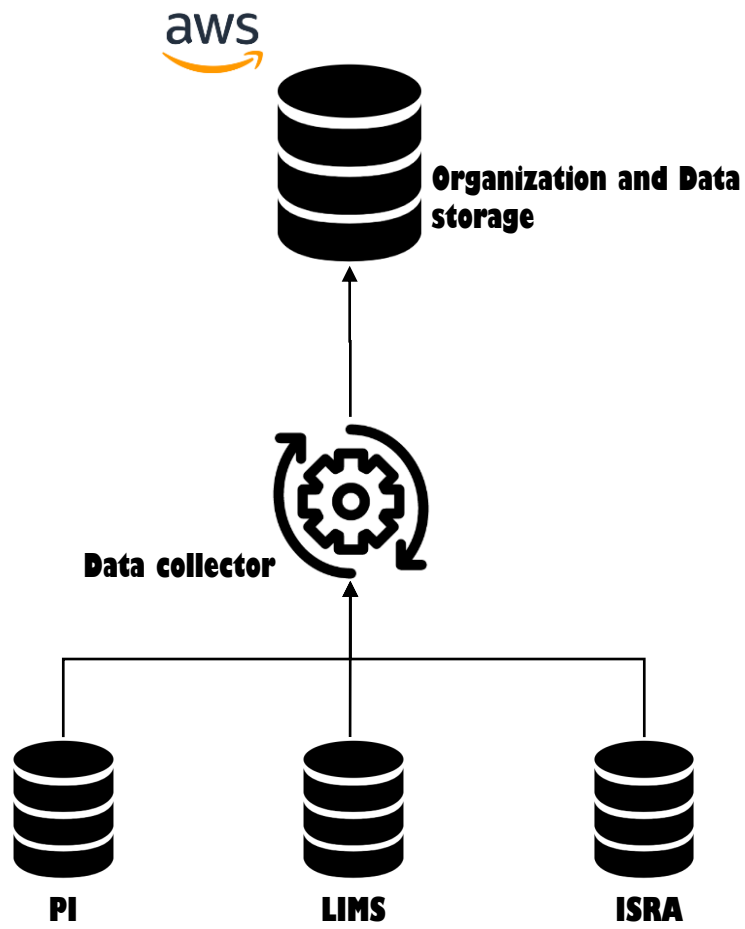
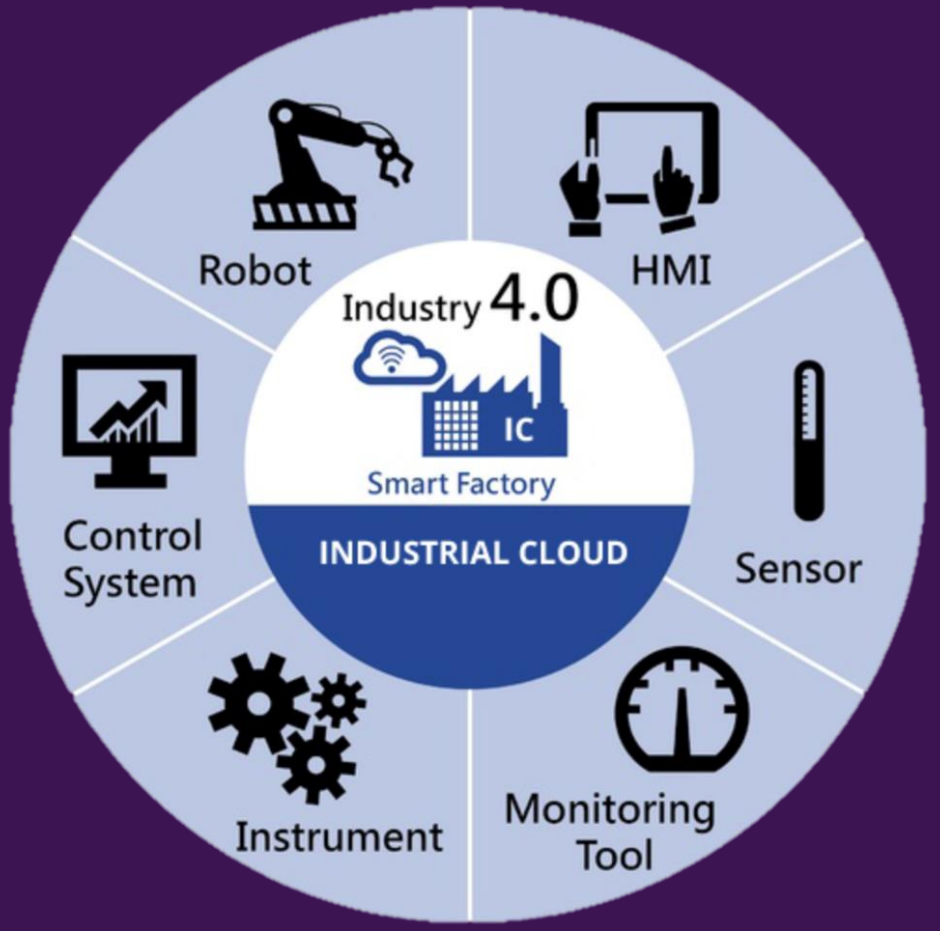
Data architecture

Information flow



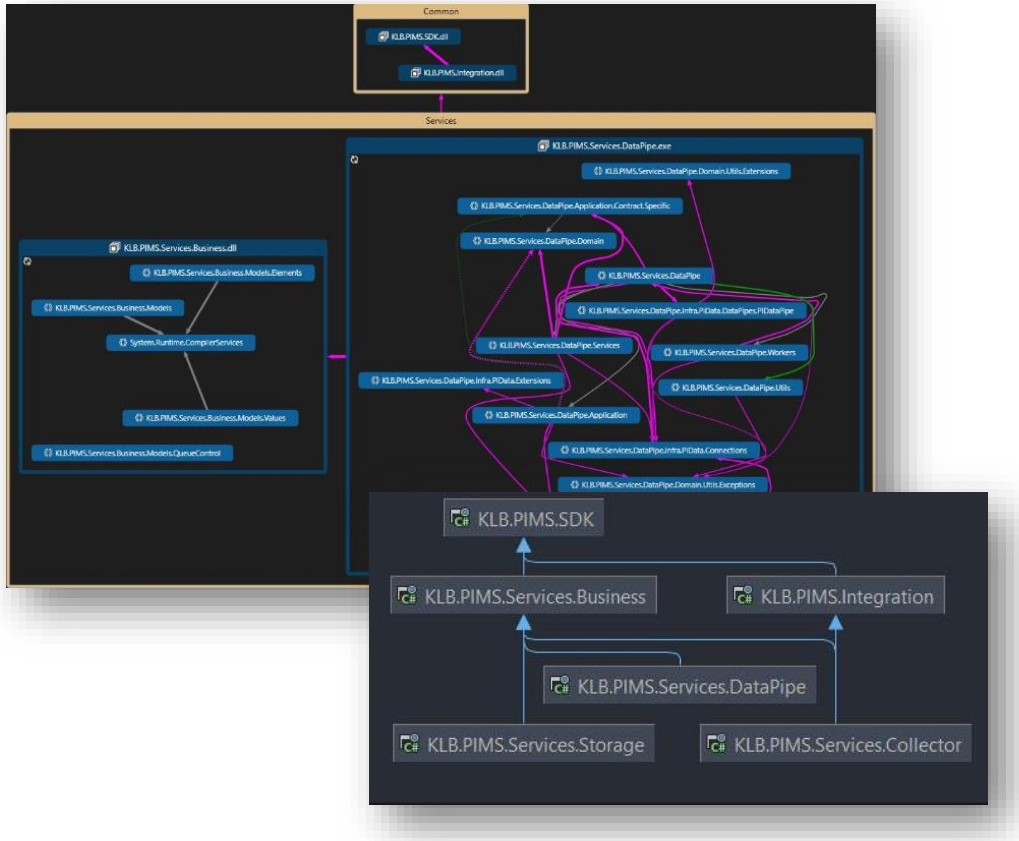


Data Collector

Cloud Migration

Developed data collection service for site to cloud data migration

- Online data collection via AF SDK
- Relationship of data during collection (product grade, production status)
- Recollection (capable backfill to cloud database)
- Developed Efficient way of sending data
- Individual tag collection
- Send data to kafka to avoid data loss and buffering
- Packet storage for database efficiency



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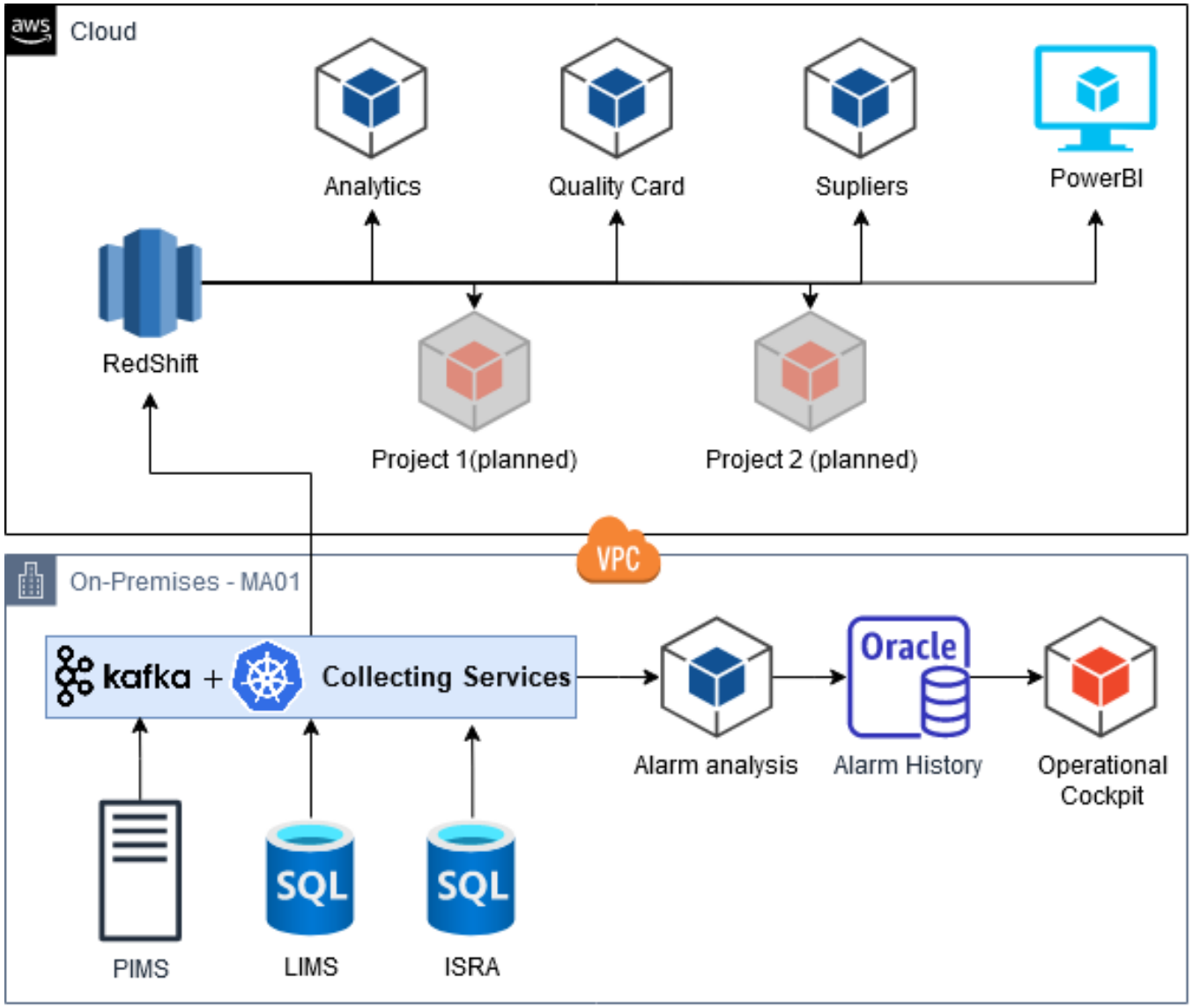
Cloud process analytics system architecture



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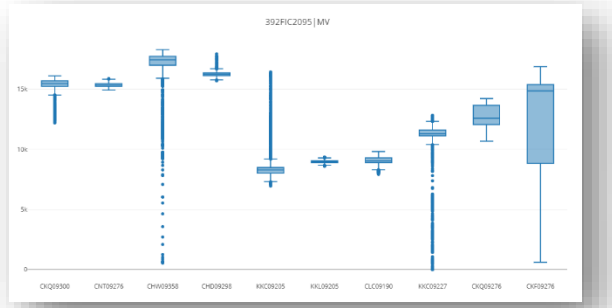
Analytics System

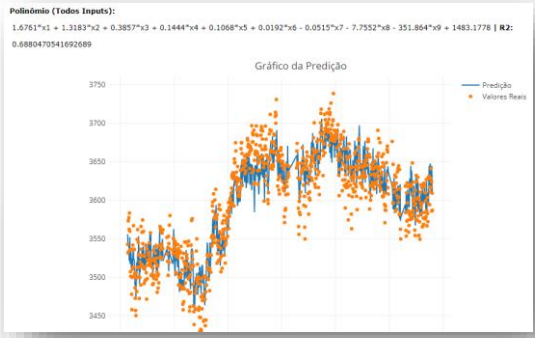
Application

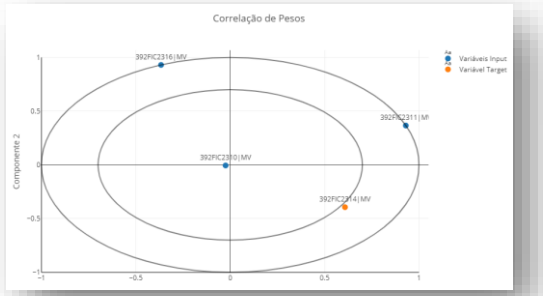
Tool developed for end user Egineers

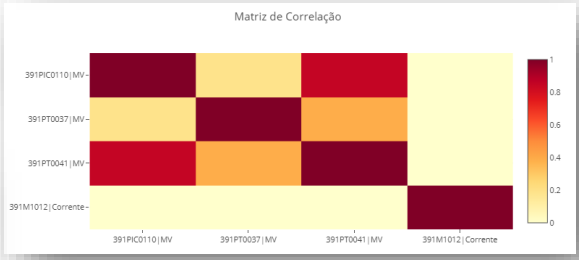
- Execution on demand by user
- Execution of machine learning methods on demand

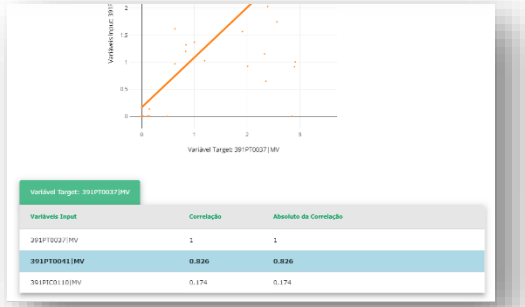
Analytics tools	
Graphical analysis	Tukey analysis
Correlation	Root cause analysis
Regression	PCA
FFT analysis	PLS

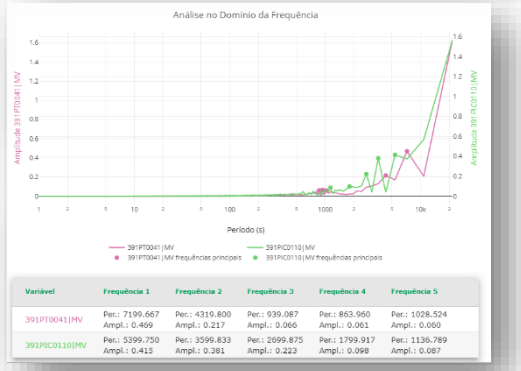












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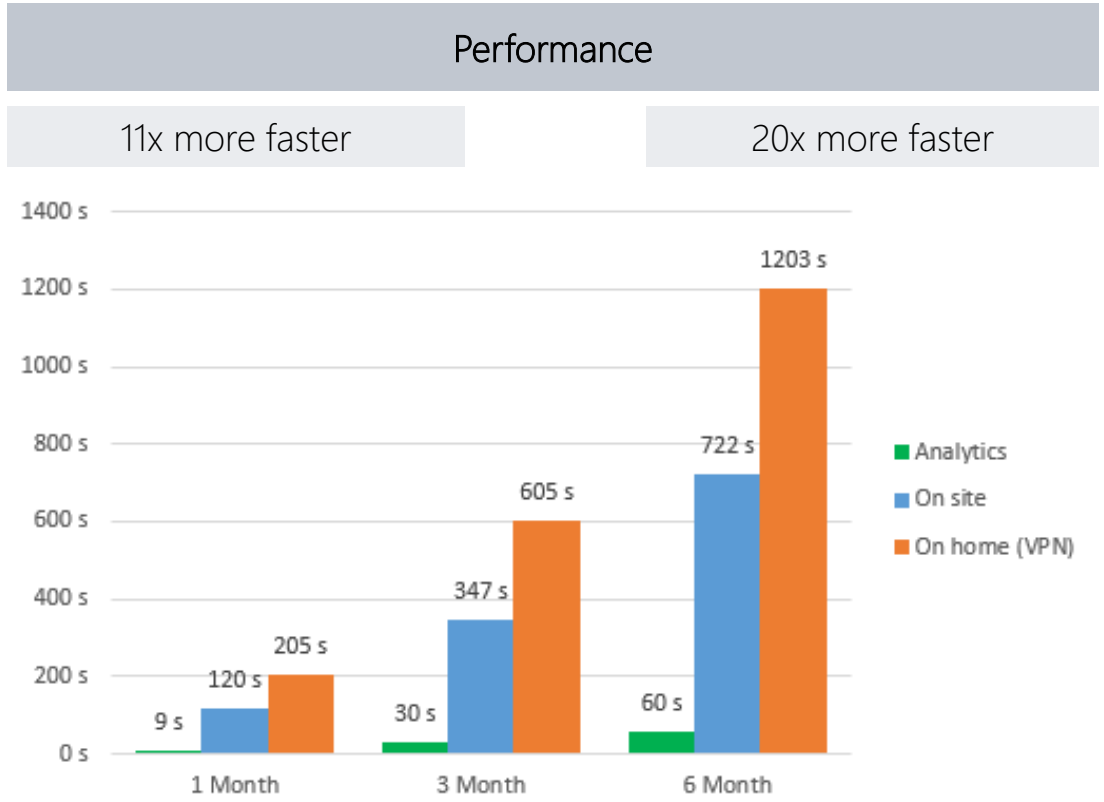
Analytics System

Performance

- Execution of machine learning methods (on demand)
- Classical statistics technics on demand



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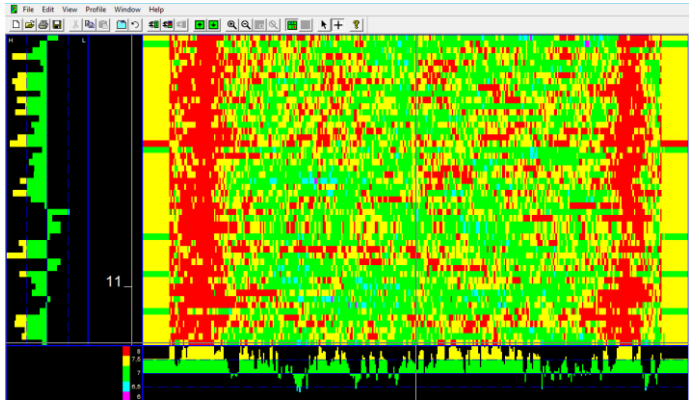
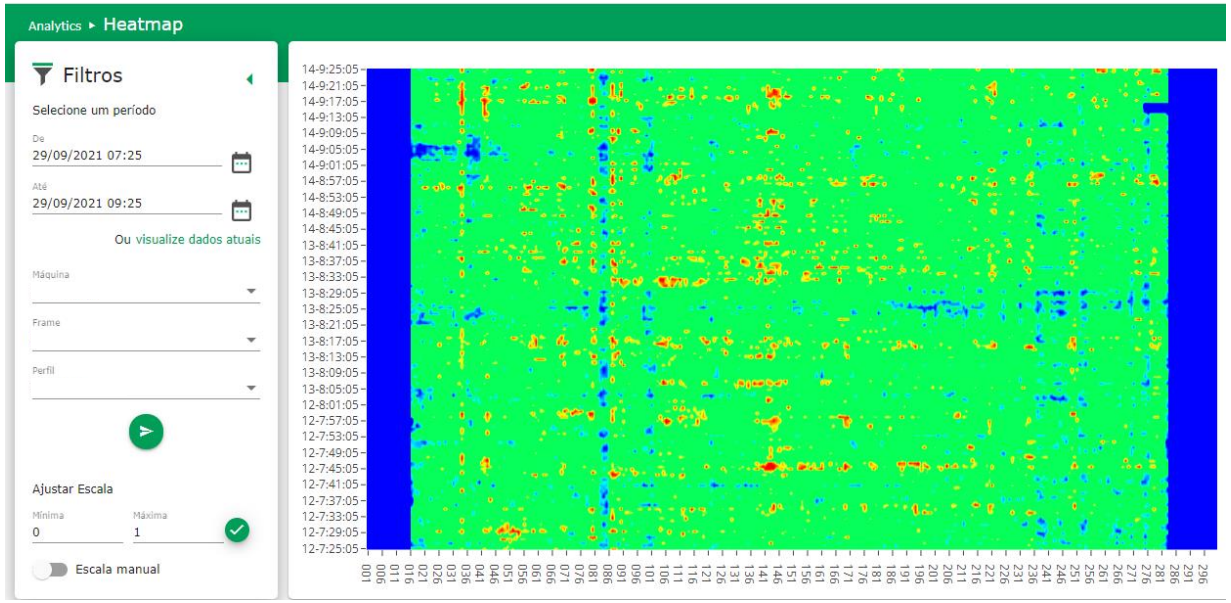
Analytics System

Heatmap Chart

Designed to view paper machine profile

- View main variables profile
- Web developed
- Solution to replace OSIsoft profile
- Colors based on product grade





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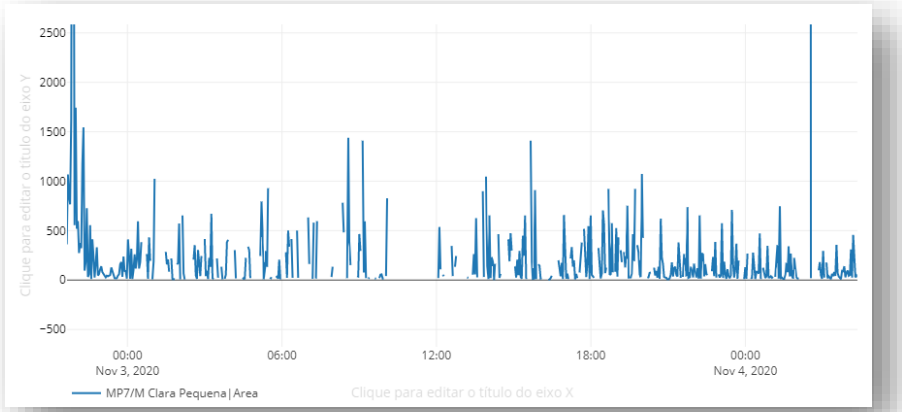
New way to Discover

Database data inaccessible in the past

Improvements

- history storage
- Graphical analysis capability
- Correlation with process
- Defect volume analysis
- Loss volume calculation for new specifications



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Conclusion

Important points

- Know your data
- Understand data rate
- Keep quality data
- Choose right software solutions
- Keep looking forward
- Have a good project team

Understand the difficulty very well and concentrate on it!

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Julimar Bonicenha

Senior Engineer

- Klabin
- Julimar.Bonicenha@klabin.com.br

The evolution of Technology is fantastic but what makes it happen with quality are the people behind

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