

# NEXT GENERATION PRODUCTIVITY THROUGH SELF-SERVICE INDUSTRIAL ANALYTICS

Analyze, Monitor and Predict the operational performance of batch, grade and continuous manufacturing processes

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Global Partner Mgr.





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- Welcome
- Intro To TrendMiner
- Demo – Temp Spike/Root Cause Analysis
- Demo – Heat Exchanger Fouling
- Lunch Break
- Demo – Golden Batch Production Monitoring
- Demo – Powder Pro – Contextual Information
- Questions
- End



- What is Self Service Analytics
- Who is Trendminer
- Industry Challenges
- Why TrendMiner
- What is TrendMiner
- Use Cases
- What People are Saying
- Questions



Classical model-based predictive analytics typically require expensive projects and data science expertise. For many analytics questions it is faster and more efficient to use a self-service analytics tool, designed with operational end-users in mind. Robust algorithms and familiar interfaces maximize ease of use for non-data scientist users. As a result, many cases to optimize the operational performance of the plant can be handled by the people who can really interpret the data.

**80%+**

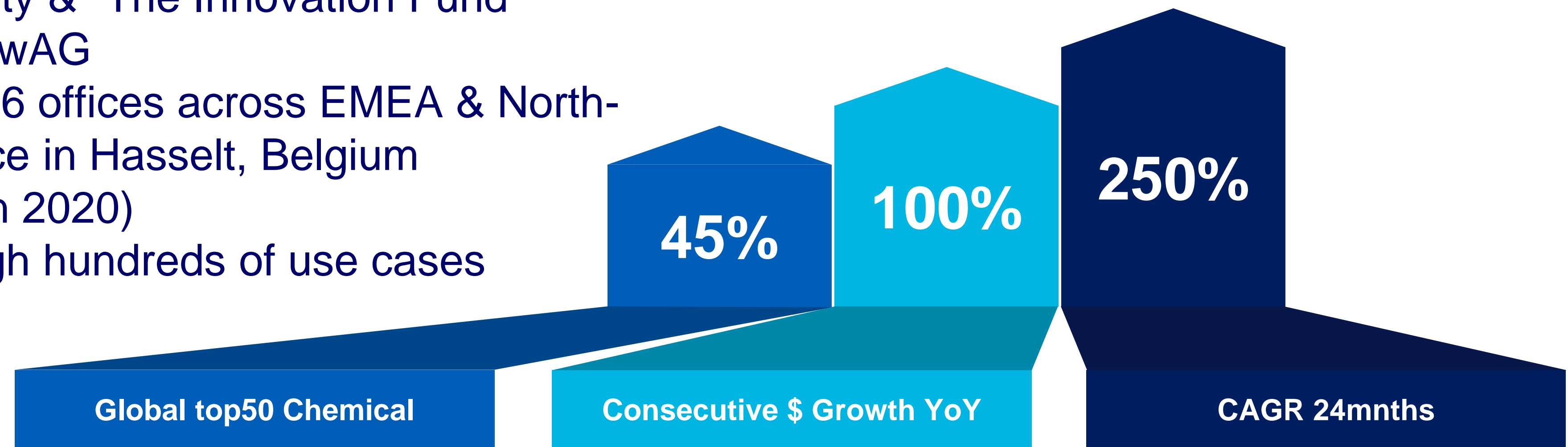
**Process Engineers and Operators**



# Who is Trendminer



- Founded as University Leuven research spinoff in 2007 through private equity & "The Innovation Fund"
- 2018 Acquired by SwAG
- Global support with 6 offices across EMEA & North-America - head-office in Hasselt, Belgium
- 90+ employees (Jan 2020)
- Proven value through hundreds of use cases



INDUSTRIES SERVED



Chemical



Oil & Gas



MMM



Energy & Utilities



Food



Pharma



Paper



Chemicals  
Petro-chemicals  
Oil & Gas  
Pharmaceuticals  
Pulp & paper  
Metals & Mining  
Food & beverage  
Utilities  
Power Generation



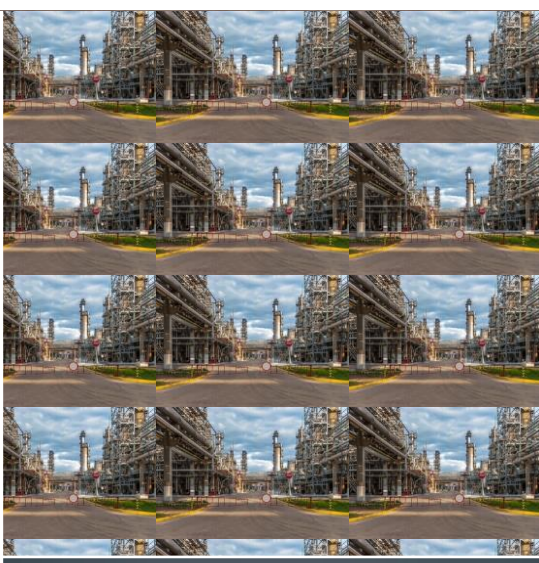








- OSIssoft PI System
- Honeywell PhD
- Yokogawa Exaquantum
- GE Proficy
- Aspentech IP 21
- Wonderware
- SQL
- And Others



# TrendMiner - CUSTOMERS BY INDUSTRY



<p>Chemicals</p> 	<p> </p>	
<p>Oil &amp; Gas</p> 	<p> </p>	
<p>Metals &amp; Mining</p> 	<p> </p>	
<p>Energy &amp; Utilities</p> 	<p> </p>	
<p>Food &amp; Beverages</p> 	<p> </p>	<p>Pulp &amp; Paper</p> 
<p>Pharma &amp; Biotech</p> 	<p> </p>	<p> </p>



# Market Challenges



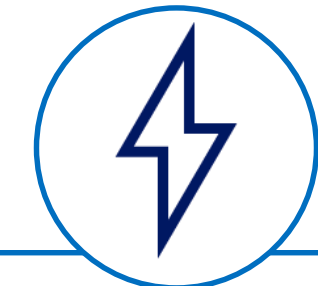
Predict maintenance based on process data?



Monitor process behaviour real-time?



Solve 80% of your day-to-day production issues?



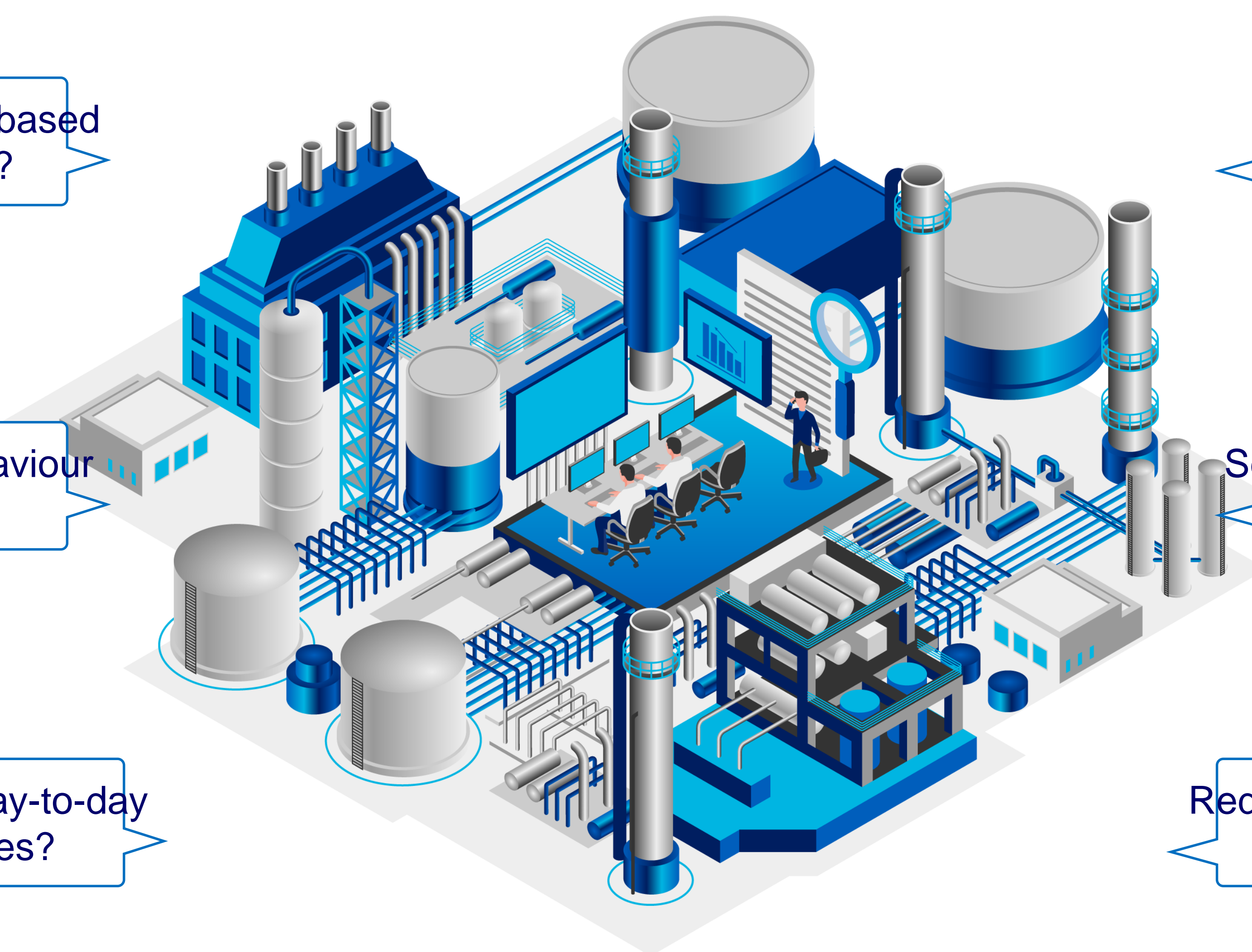
Optimize your Energy Efficiency?



Send early warnings to your control room?



Reduce cost, while improving product quality?





## Unmanaged Risks

Unplanned process downtime  
Meeting customer (Quality) demands  
Brand reputation (Safety)

## Profitability

Faster response to market change  
Increasing capacity without CAPEX  
Decreasing costs without CAPEX



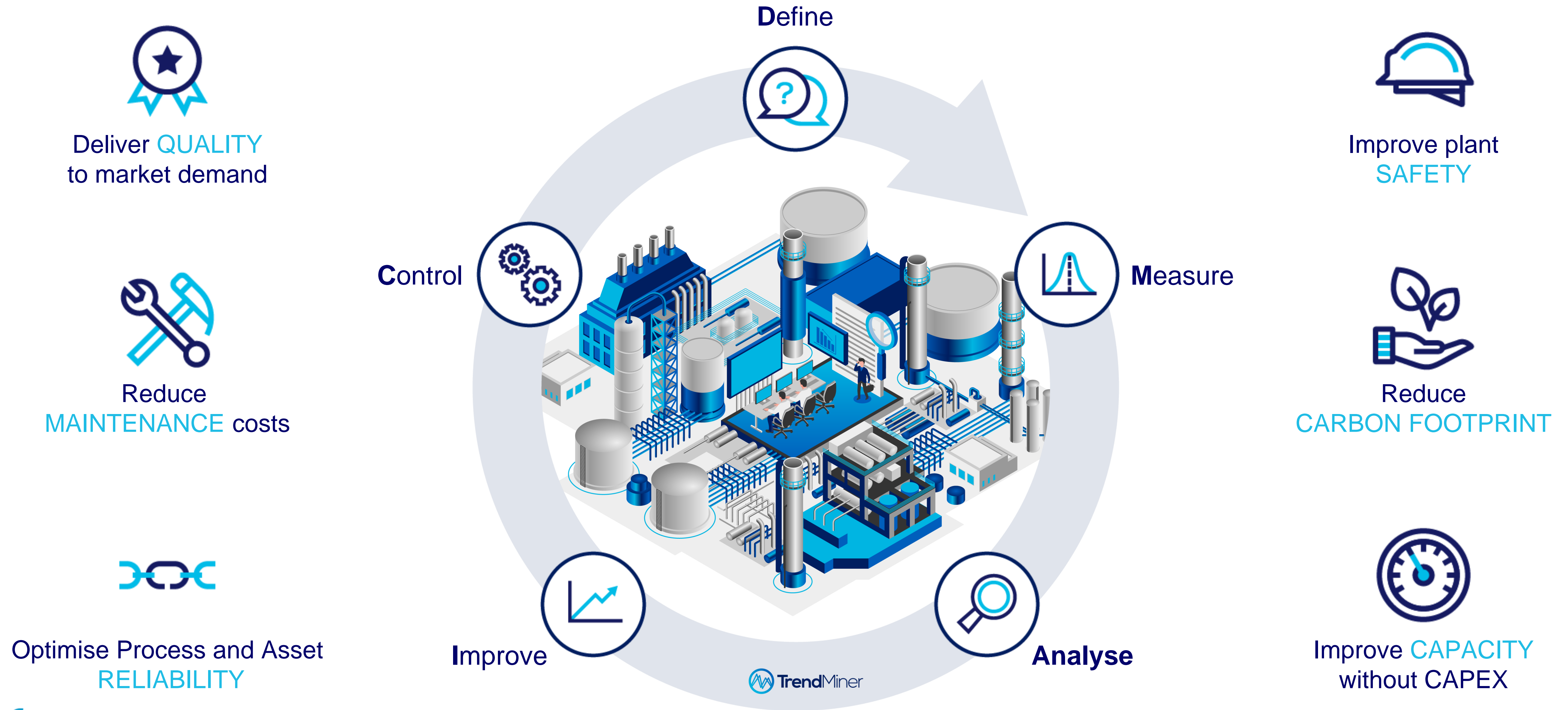
## Volatility

Technology shifts & Innovations  
Changing regulations  
Emerging markets & consolidations

## Workforce

Knowledge scarcity  
Future generation of digital natives  
Analytics awareness

# TrendMiner - Promises of Digital Transformation?



# TrendMiner - Promises of Digital Transformation?



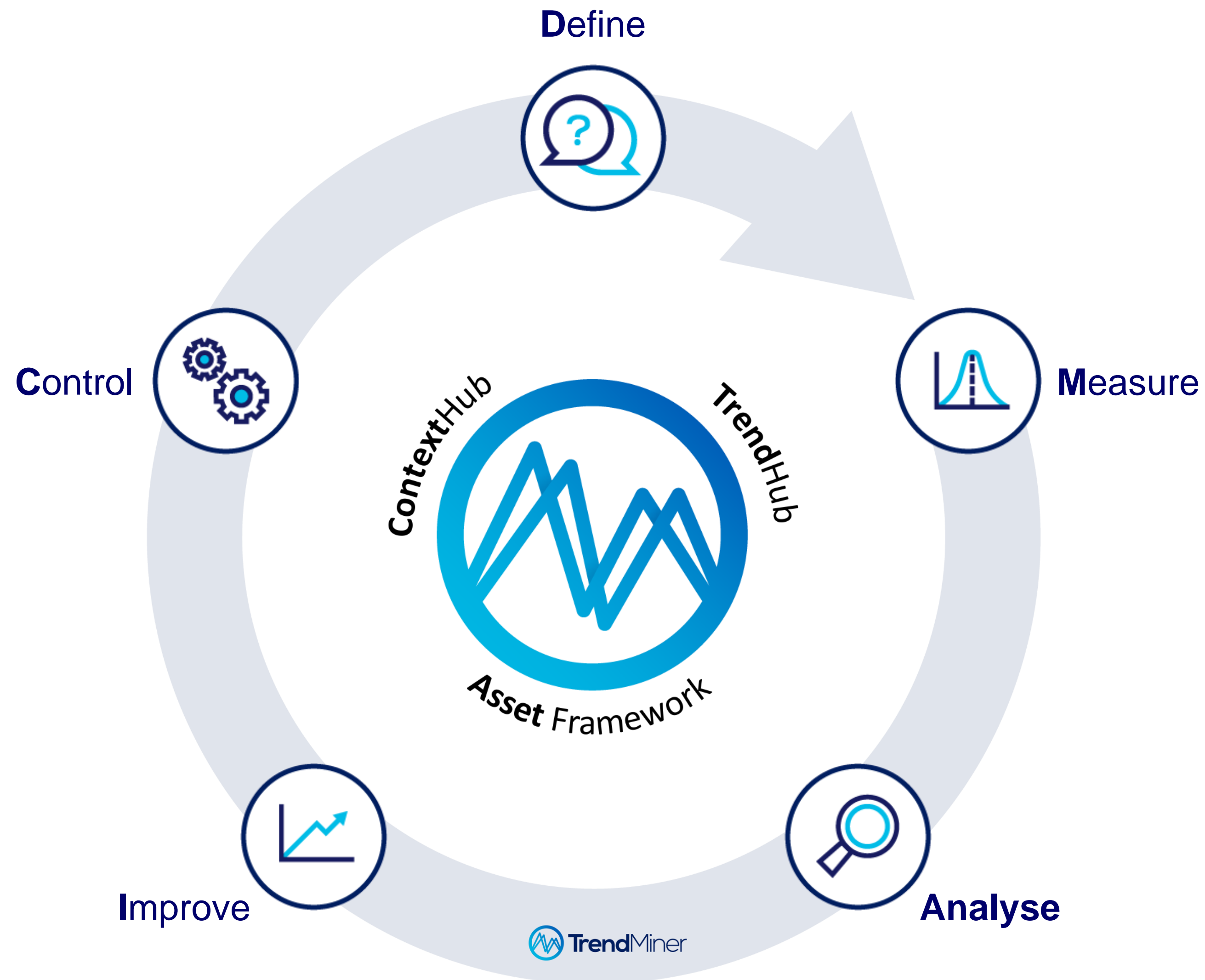
Deliver **QUALITY**  
to market demand



Reduce  
**MAINTENANCE** costs



Optimise Process and Asset  
**RELIABILITY**



Improve plant  
**SAFETY**



Reduce  
**CARBON FOOTPRINT**



Improve **CAPACITY**  
without **CAPEX**



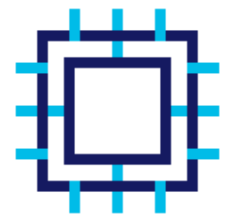
## Searching in the dark

- Users have to know something happened
- Incidents often too small to see bigger picture
- Uncorrelated external events
- Missing meta data to process behaviour



## Knowledge gets lost

- Experts are leaving the organization
- Cross departmental collaboration is difficult
- What are the lessons learned from historical events?
- Limited knowledge on demand at incidents



## Dispersed Data Sources

- Users have to know something happened
- Incidents often too small to see bigger picture
- Uncorrelated external events



## Maintain License to Operate

- Learning from other experts
- Learning from historical events
- Limited knowledge on demand

Process, Assets, Context Issues  
Continuous improvement  
Work prioritisation





# Why TrendMiner



**1**

## **Ease of use Plug-and-Play**

- **Easy deploy on premises or consume from the cloud**
- **Plug-and-play connections to PIMS systems**
- **Robust algorithms for non-data scientists**
- **Intuitive User Experience**

**2**

## **Unique analytics capability**

- **Powerful search and diagnostics on massive data**
- **Time-series recommender engine**
- **Rapid responses for interactive analysis**
- **Easy creation of advanced monitors**

**3**

## **Proven path to success**

- **Proven Customer Success approach (on-boarding provided with every pilot)**
- **High value cases that exceed typical time savings ROI**
- **Proven track record in process industry with many global enterprises**



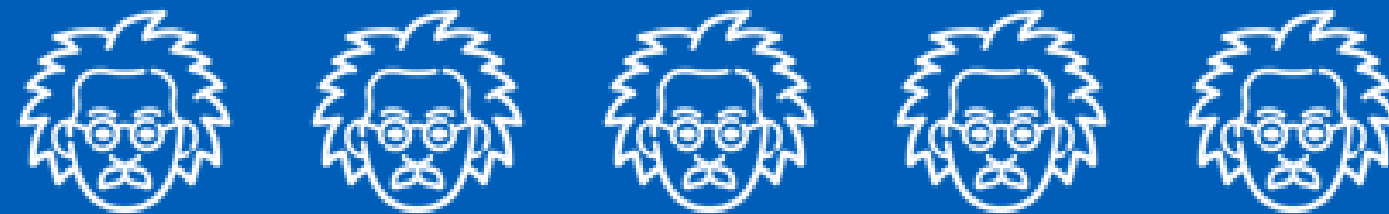
1

We need more business  
**INSIGHTS** from data



2

We should hire **MORE**  
data scientists



3

We don't have  
**ENOUGH** data-scientists  
(with Engineering background)



4

We need to empower **EVERYBODY** else!



# EMPOWERING EVERYONE WITH ANALYTICS



## Operations Manager

Increase employee effectiveness & overall profitability



## Process Engineer

Solve More Cases & Crack Unsolved Cases



## Maintenance Engineers

Predict Maintenance  
Reduce downtime



## Plant Manager

Contribute to Corporate KPI's



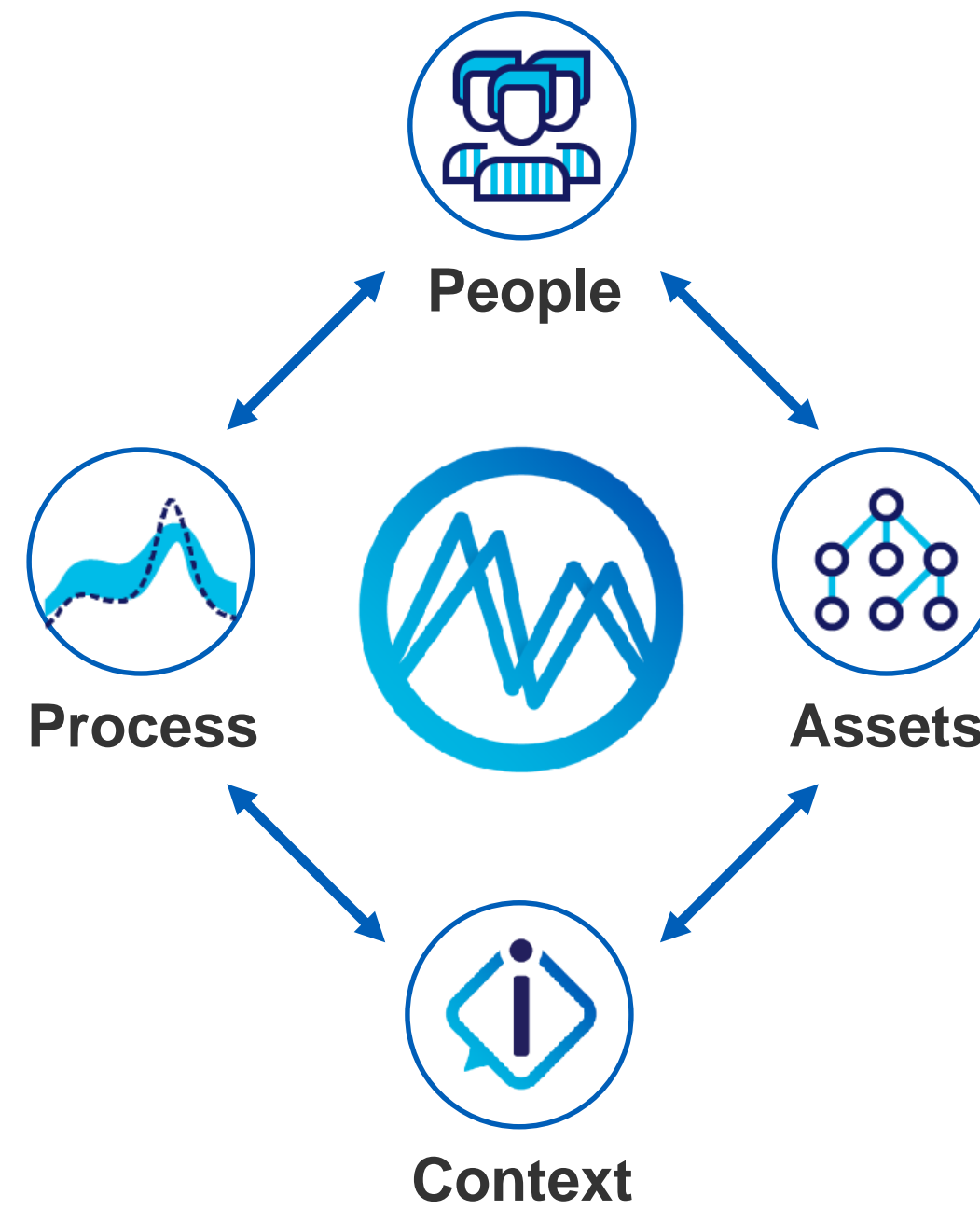
## Control Room Operator

Data-driven Control over Operational Performance



## Production Engineer

Improve OEE and Product Quality



## Operational Excellence Team

More improvement projects per year



## Site Leader

Increased Yield  
And Plant Safety



# What is TrendMiner



What happened?

Why did it happen?

What will happen?

What to do?

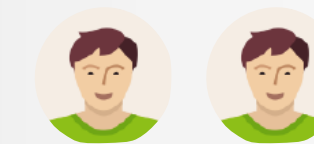
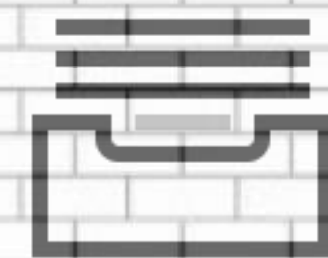
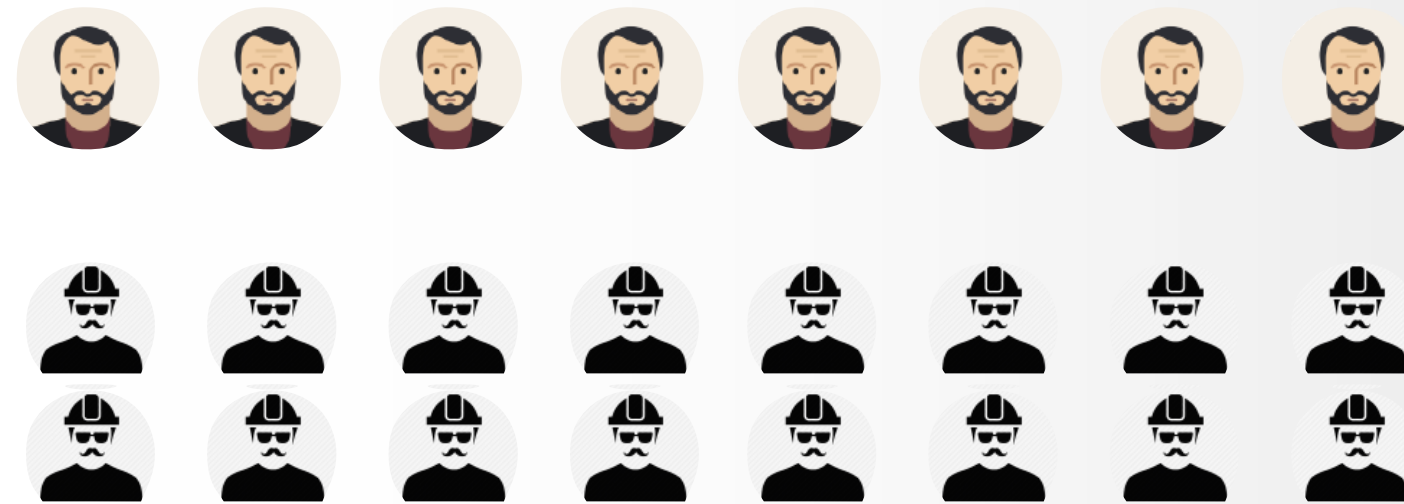
Descriptive

Diagnostic

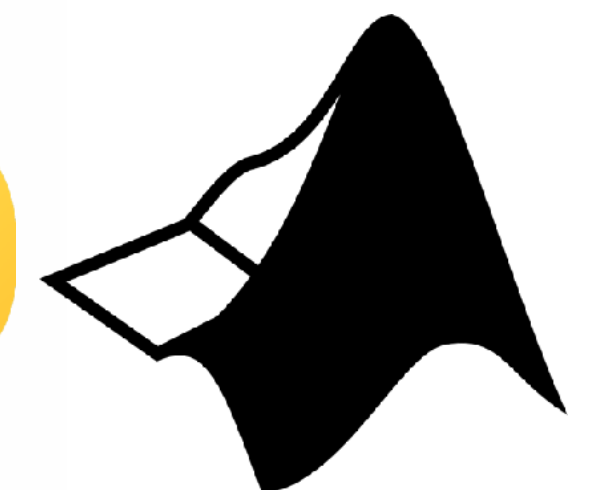
Predictive

Prescriptive

Engineers & Operators



Data Scientists & Statisticians



**Analytics AWARE**  
Descriptive,  
Data Exploration



**Analytics WIZARD**  
Scripting, Parsing,  
Hacking



What happened?

Why did it happen?

What will happen?

What to do?

Descriptive

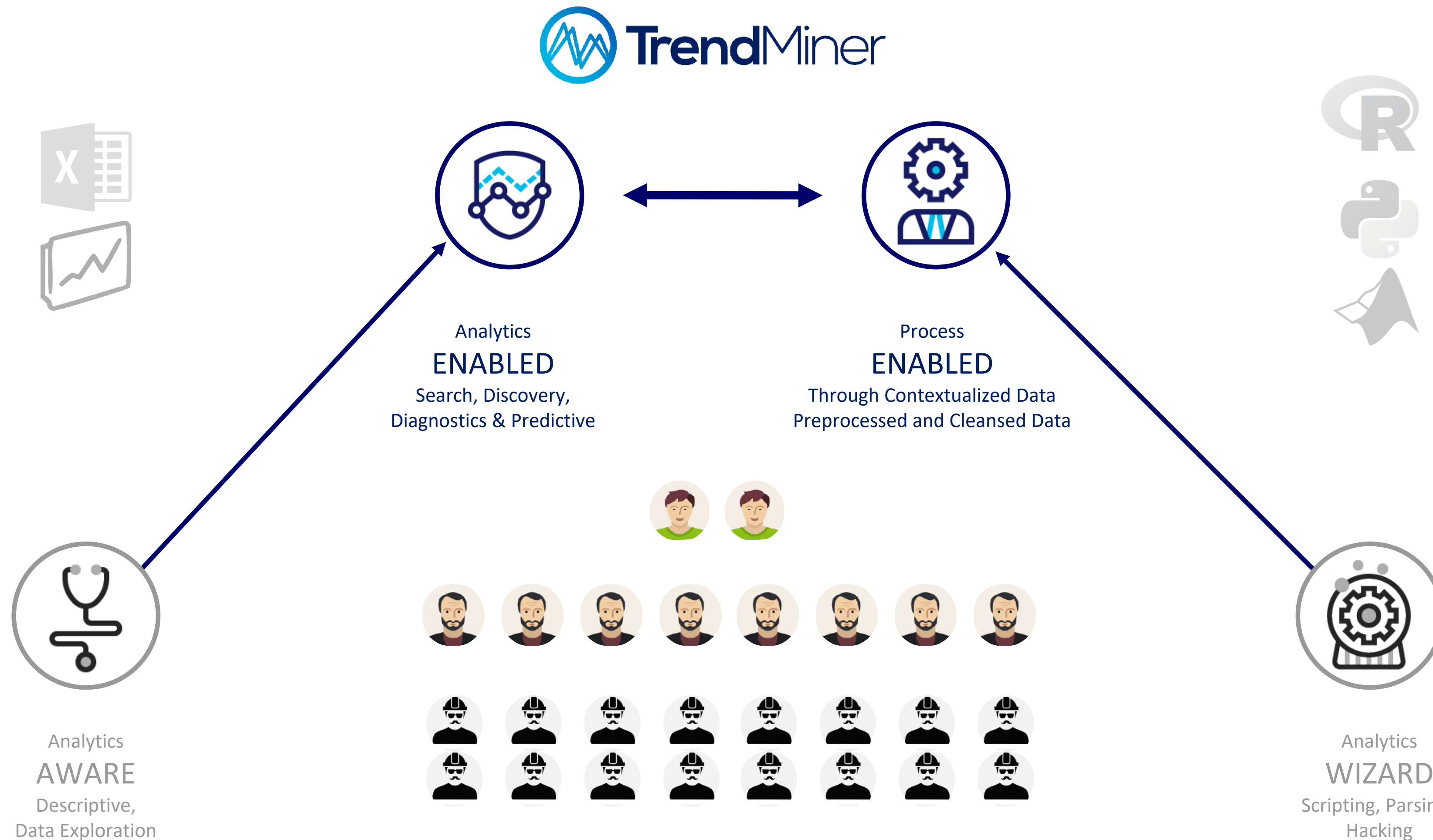
Diagnostic

Predictive

Prescriptive

Engineers & Operators

Data Scientists & Statisticians





**Increase employee efficiency**



**Solve more unsolved cases**

## **50% Downtime reduction**

Four hours for discovery, analysis and predictive alerting completion without a Data Scientist

Increase sprayer dryer yield and **Eliminate 25% quality waste**

**Two hours** to find ways to reduce energy consumption and avoid unnecessary overusing fines

**Controllable** energy consumption to minimise peak usage and avoid crossing penalty threshold

Decreased operating costs and increased yield **created \$4M of value**



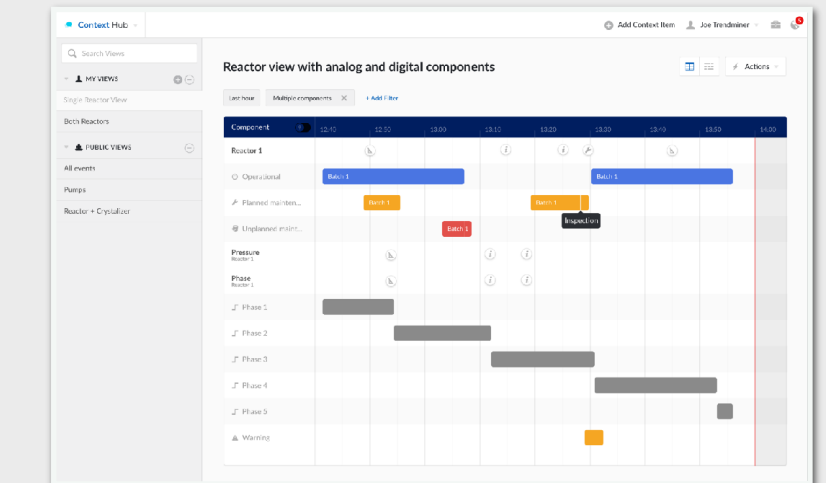
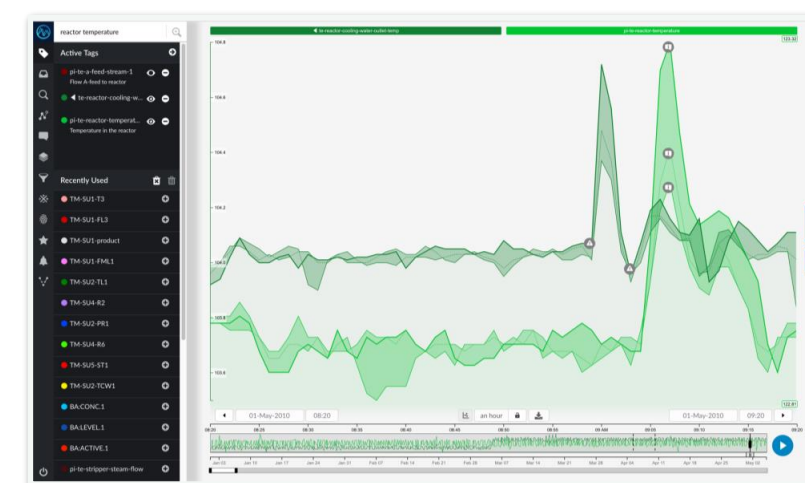
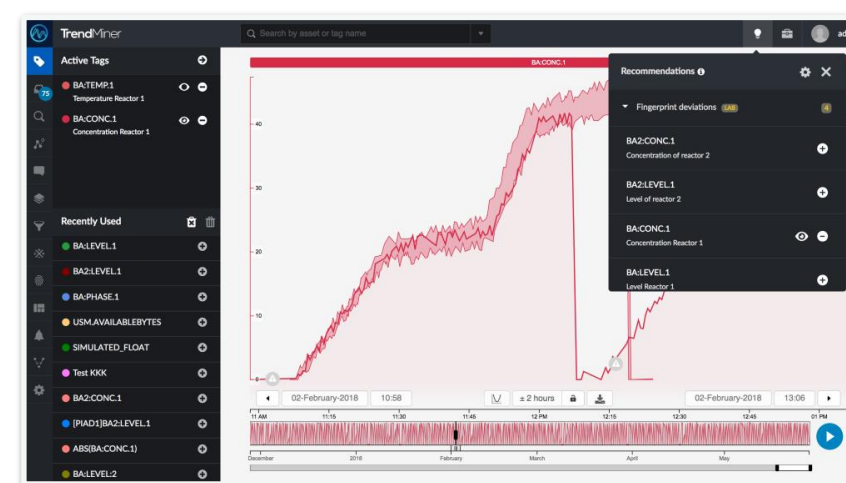
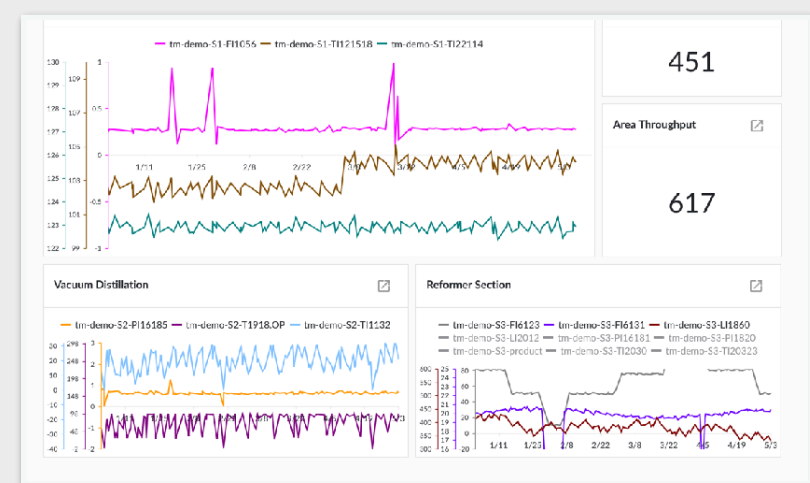
**Avoid abnormal situations**



**Create a learning organization**



# TrendMiner - TRENDMINER KEY CAPABILITIES



- Sumarize Trend & Context Data
- Multiple dashboards
- Prioritize areas of interest
- Start performance investigations

- Google Like Search for Root Cause Analysis
- Pattern Recognition, Filtering & Layer Compare, Golden Fingerprints
- Monitor Best Operating Zones, Early Warnings & Notifications
- Model-free Performance Prediction & Predictive Maintenance
- Capture Knowledge

- Sumarize Trend & Context Data
- Multiple dashboards
- Prioritize areas of interest
- Start performance investigations



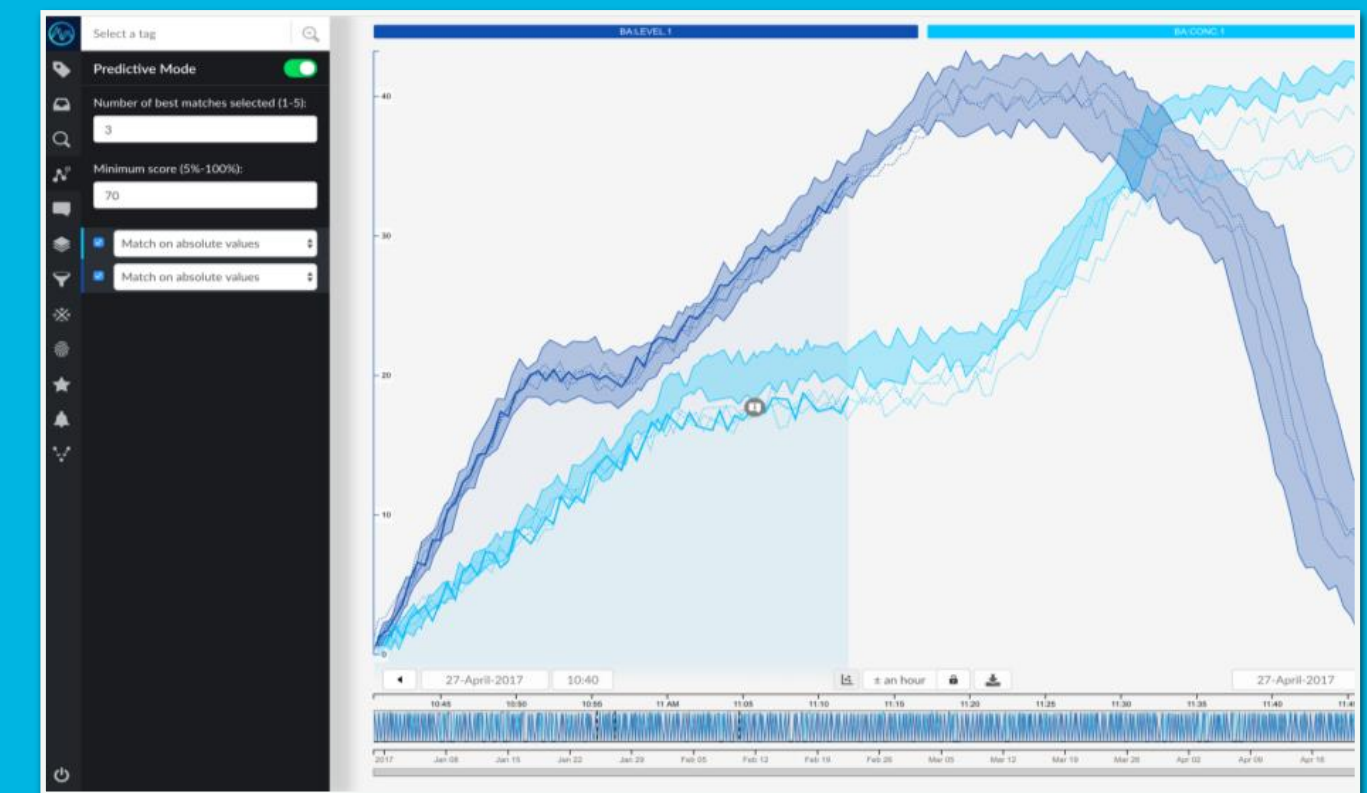
Analyze



Monitor



Predict



Past

Now

Future



Trend analysis



Filtering & Overlays



Pattern discovery



Layer Comparison



Recommendations



Influence factor discovery



Golden batch or transition



Startup fingerprints



Alerts & Notifications



Automatically label events



Detect failures and anomalies



Monitor best operating zones



Set up early warnings



Soft sensor design



Model free predictive mode



Predictive maintenance



Proactively trigger operators



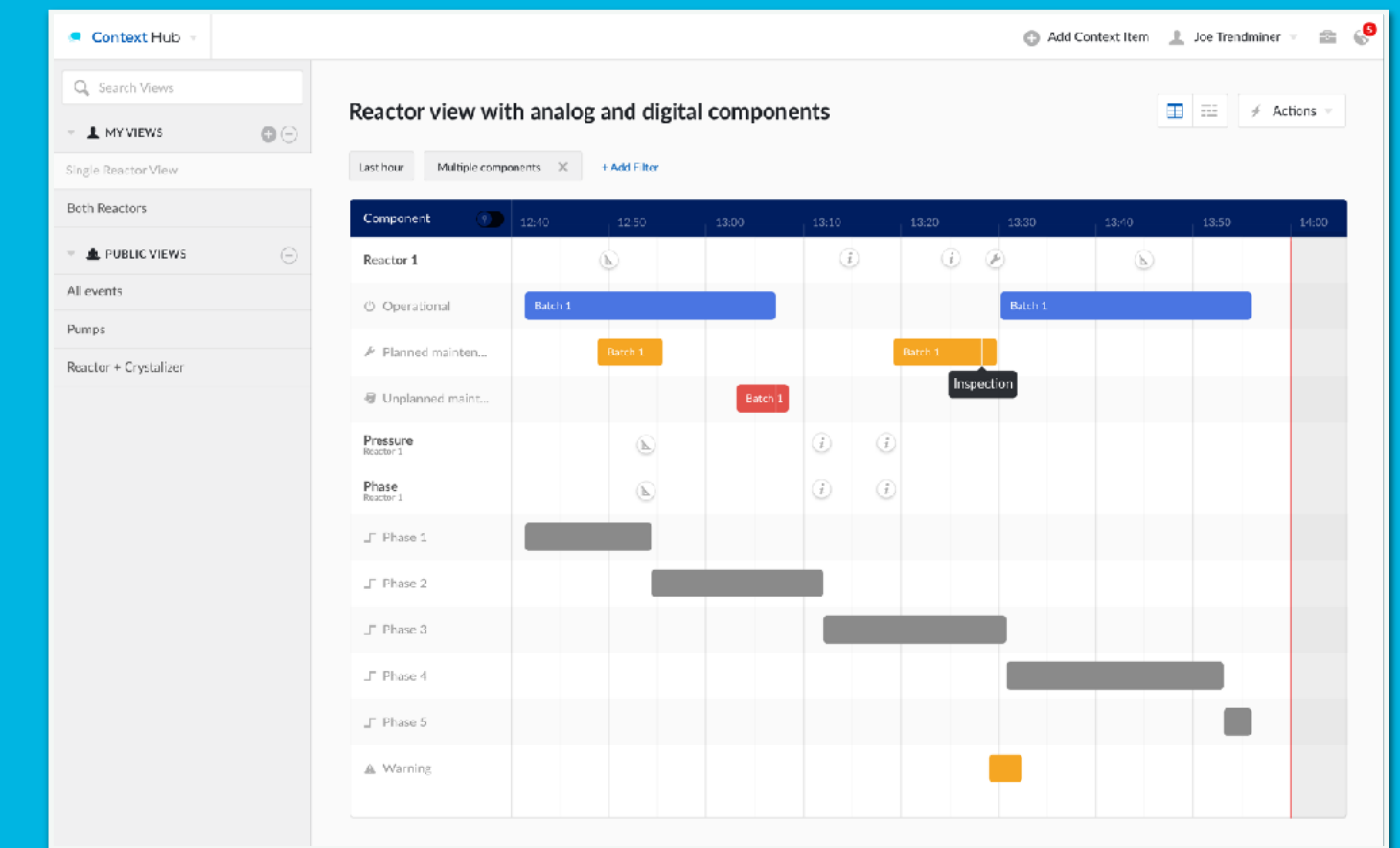
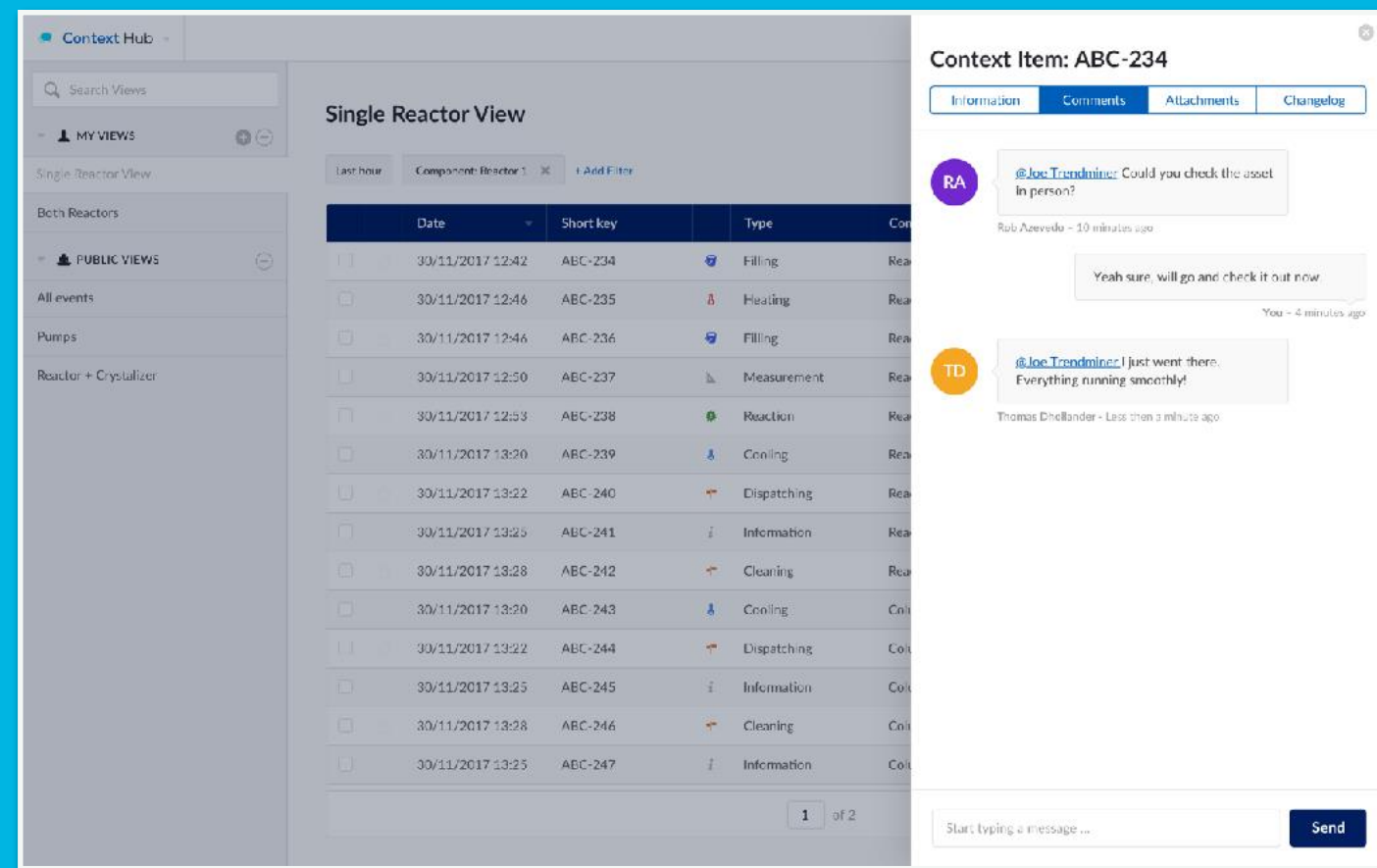
Capture



Unlock



Decide



Automatically captured



Manually entered



Search and filter context items



Commenting & Attachments



Collaborate & Discuss about events



Use as shift logbook



Get context from 3rd party systems



Central hub for operational context



API gateway to connect any system



Bi-directional dataflow



Native integration with PI-EF & PI-AF



Organize context by asset structure



Gantt or Table view



Query on context item properties



Use context to start trend analysis



Create relations for better RCA



Context for customer KPI Reporting



Query across data silos

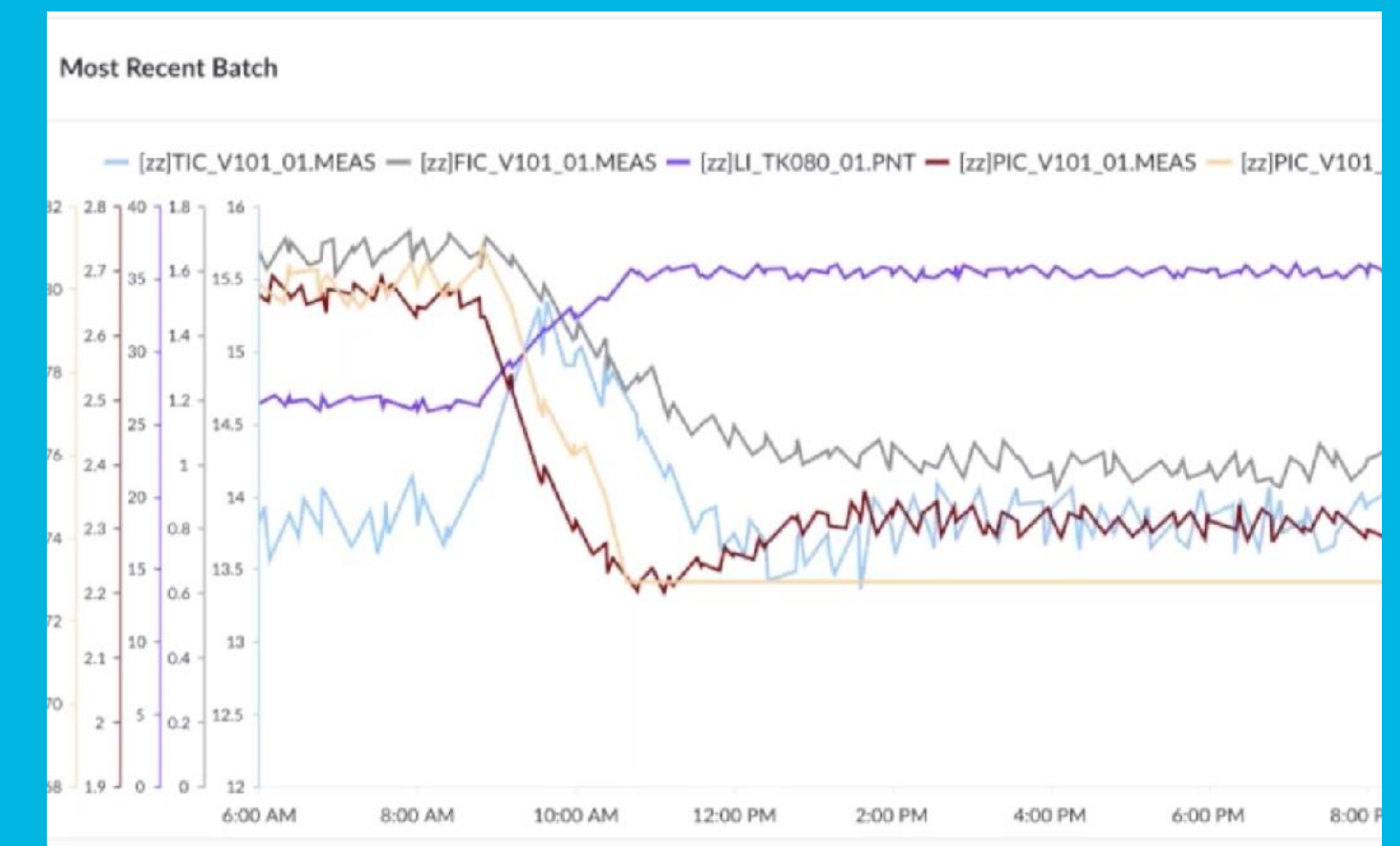
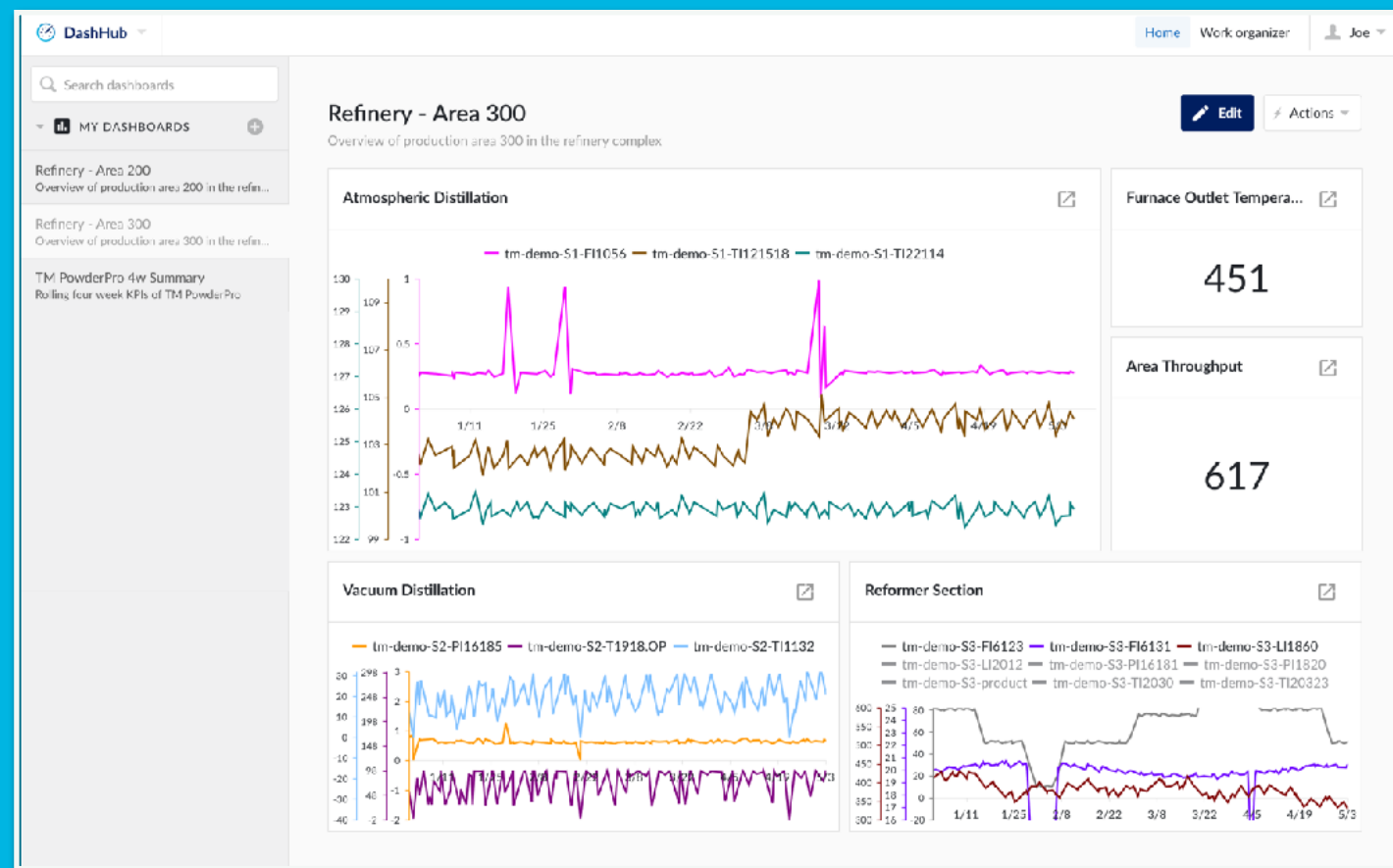


Visualize

\$\$\$ Prioritize



Investigate



Flexible, personalized views



Multiple trendviews in the dashboard



Mix trendviews with context data



Create multiple dashboards



Visualize performance of (parts of) the production line or specific assets



Switch between multiple dashboards



Use context data & trendviews to prioritize



Have counted items to see where action is needed



Prioritize by asset performance



Directly access the trendview



Directly access the context item listing



Assign trendview to colleague

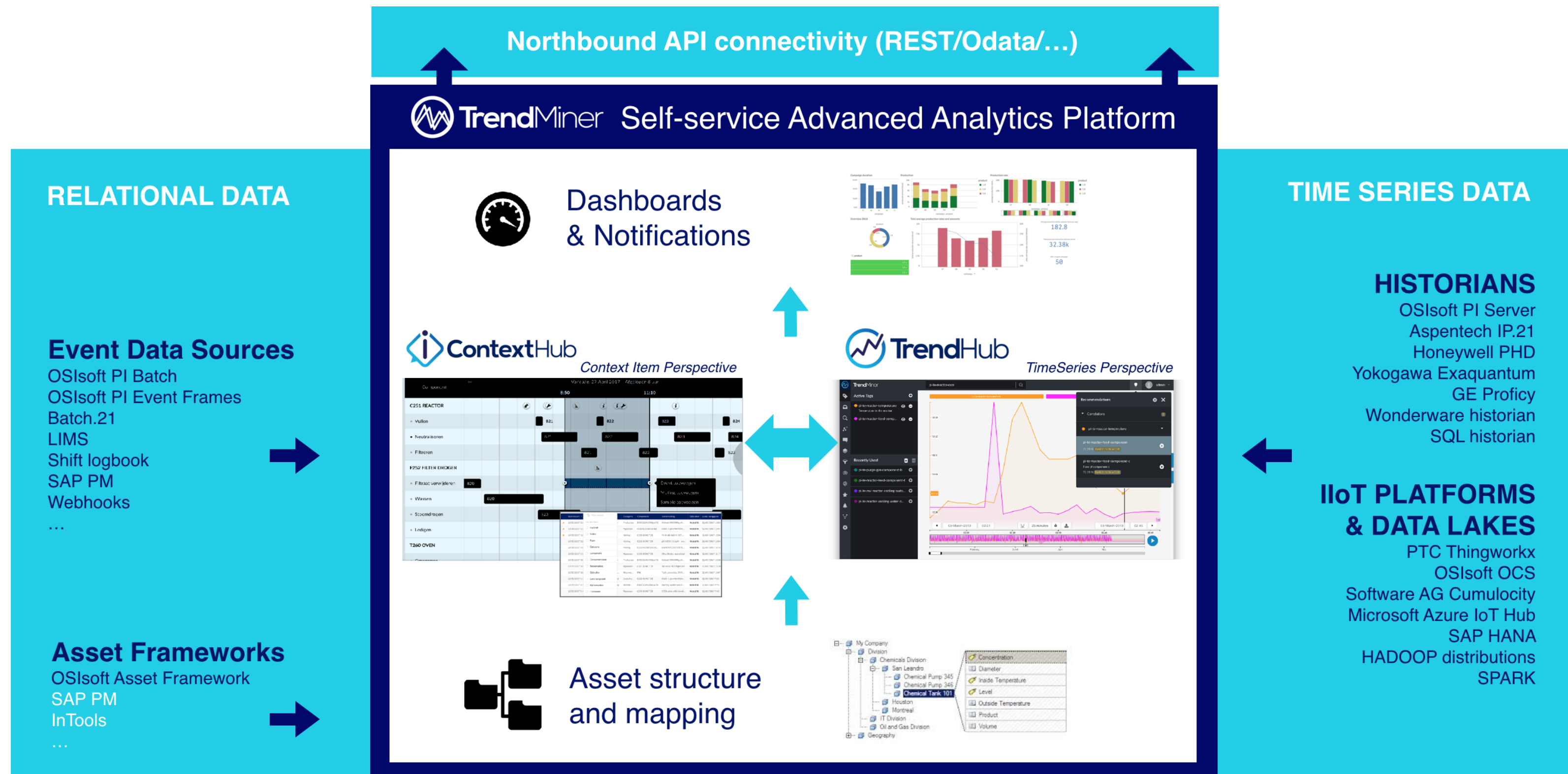


Collaborate via context items to further investigate










## Platform

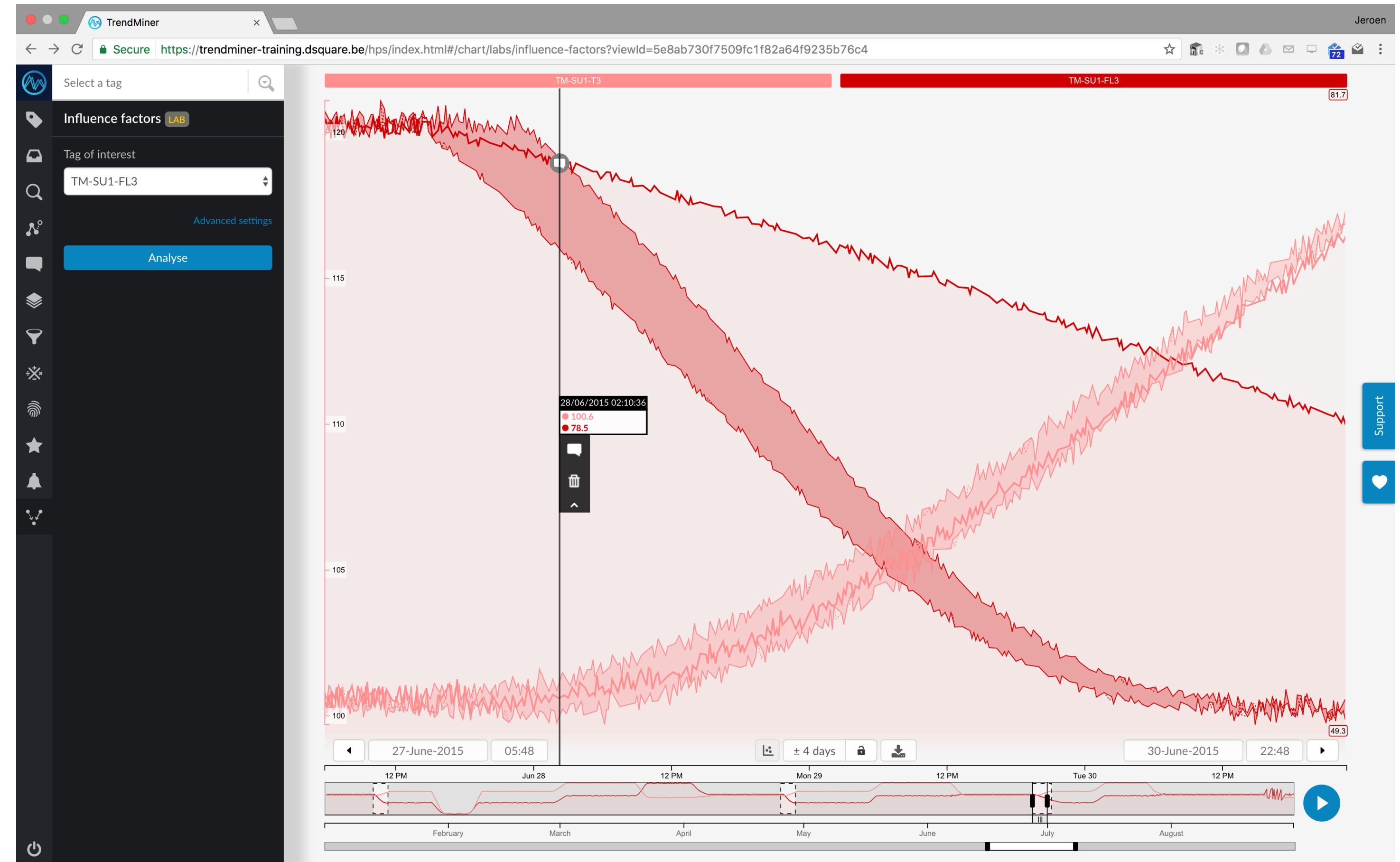
- Flexible & scalable
- Plug & play PIMS connection
- Vendor neutral advanced analytics
- Flexible deployment options
- Seamless integration
- Data import & Export
- Asset Framework support





## Analyze

-  Google like search
-  Filtering & Overlays
-  Pattern recognition
-  Layer Compare
-  Recommended Root Causes
-  Automatic shift detection
-  Advanced Calculations

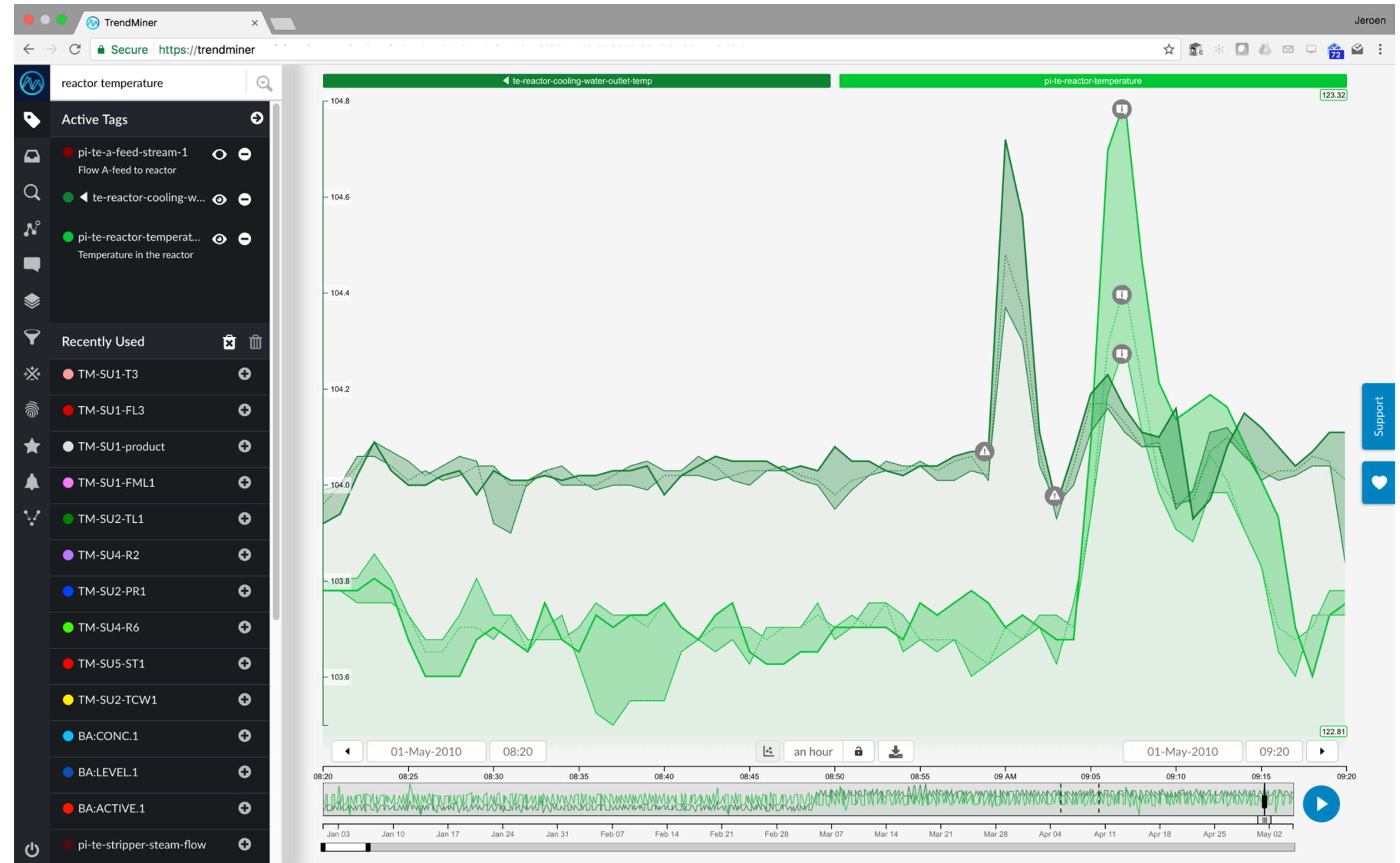


“ Have I seen similar behaviour in the past? ”



## Monitor

- Golden batch or transition
- Startup fingerprints
- Alerts & Notifications
- Automatically label events
- Detect production losses
- Monitor best operating zones
- Active learning

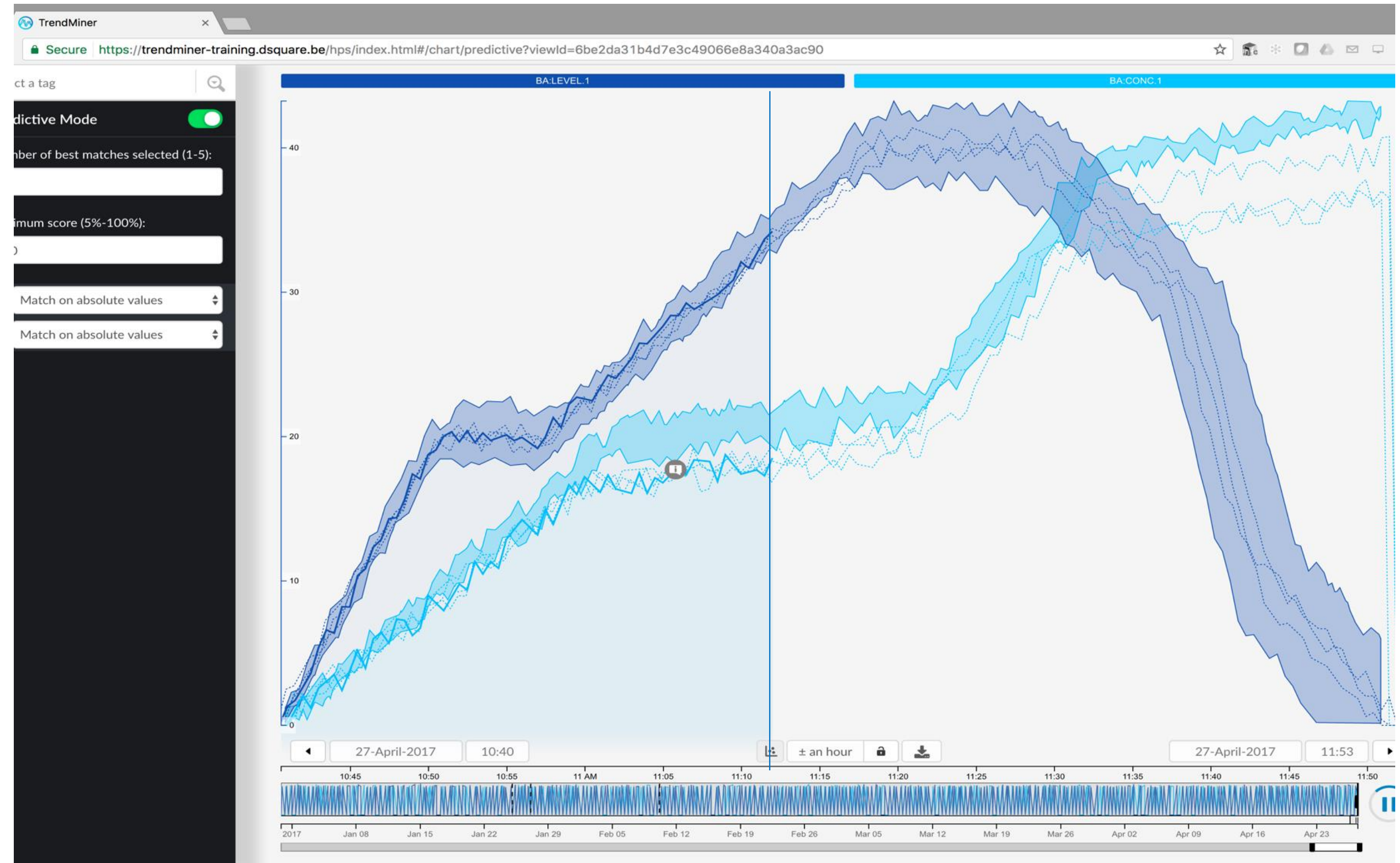


“ Fingerprints, Active learning and Notifications ”



## Predict

-  Capture events
-  Early warnings
-  Soft sensor design
-  Predictive maintenance
-  Interact with control room
-  Model free predictive mode
-  Notifications with recommendations



“ Early warnings before an event is expected to happen ”



# TrendMiner - Process & Asset Analytics



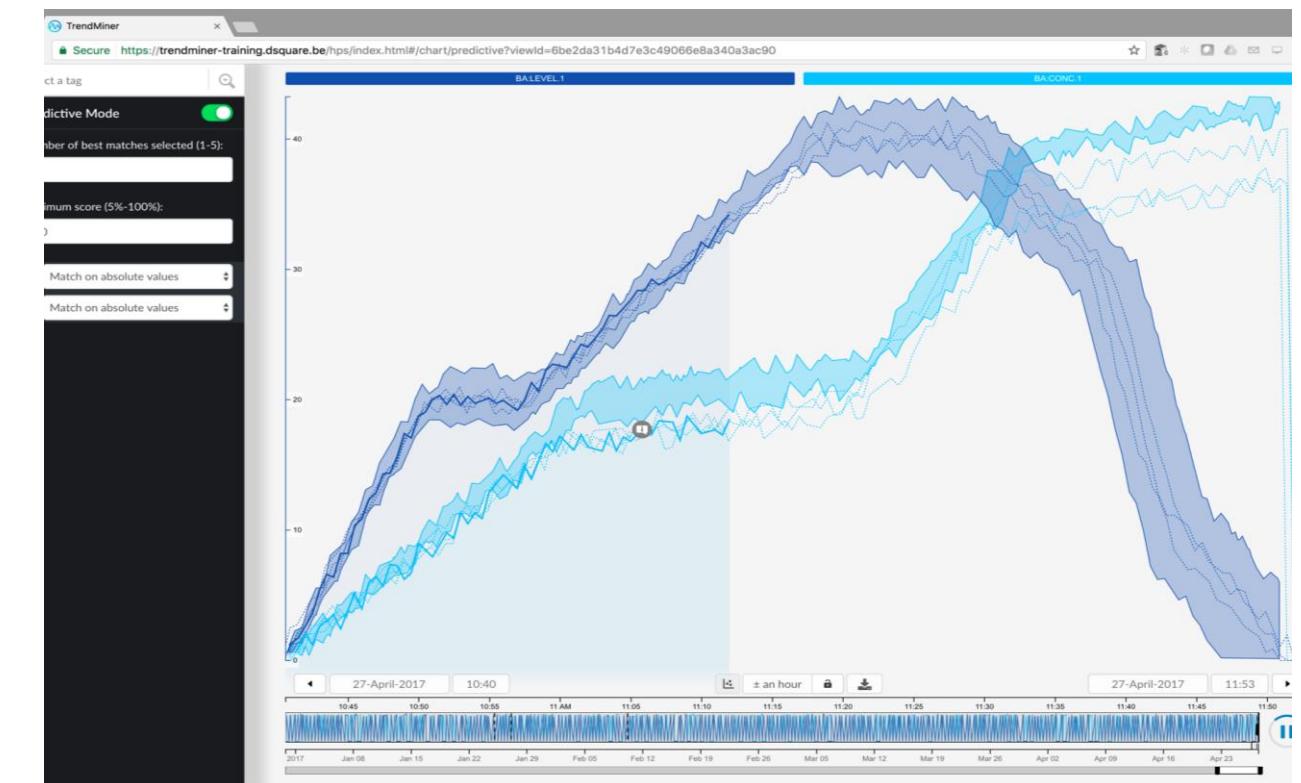
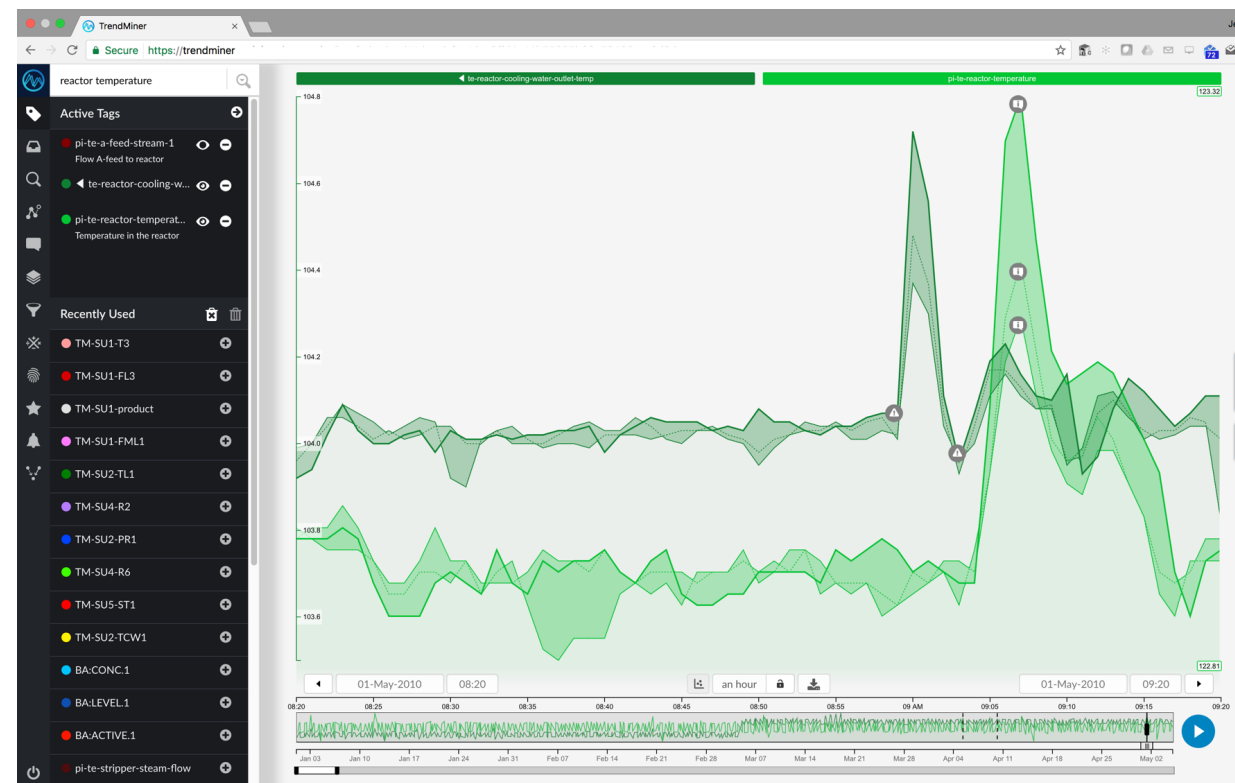
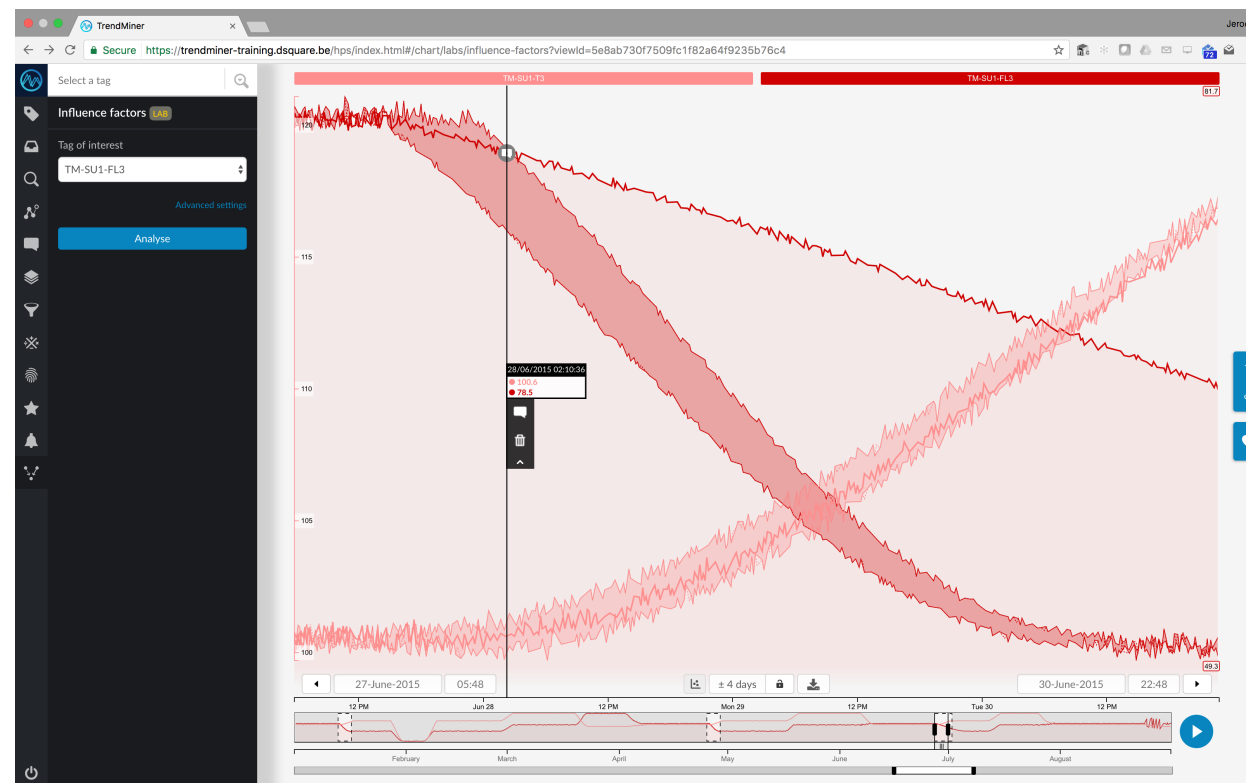
Descriptive Analytics  
Discovery Analytics  
Cross Asset Search

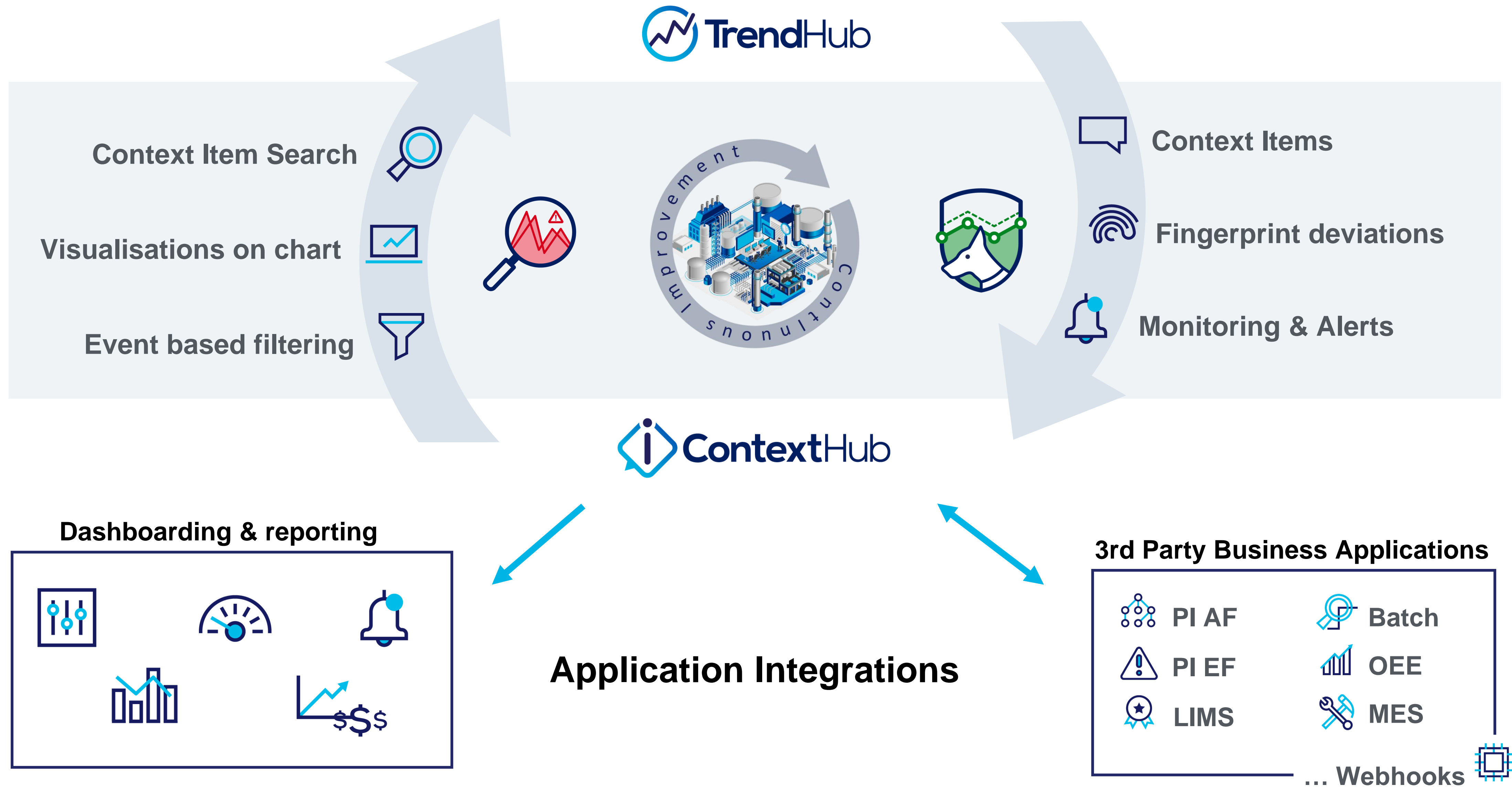


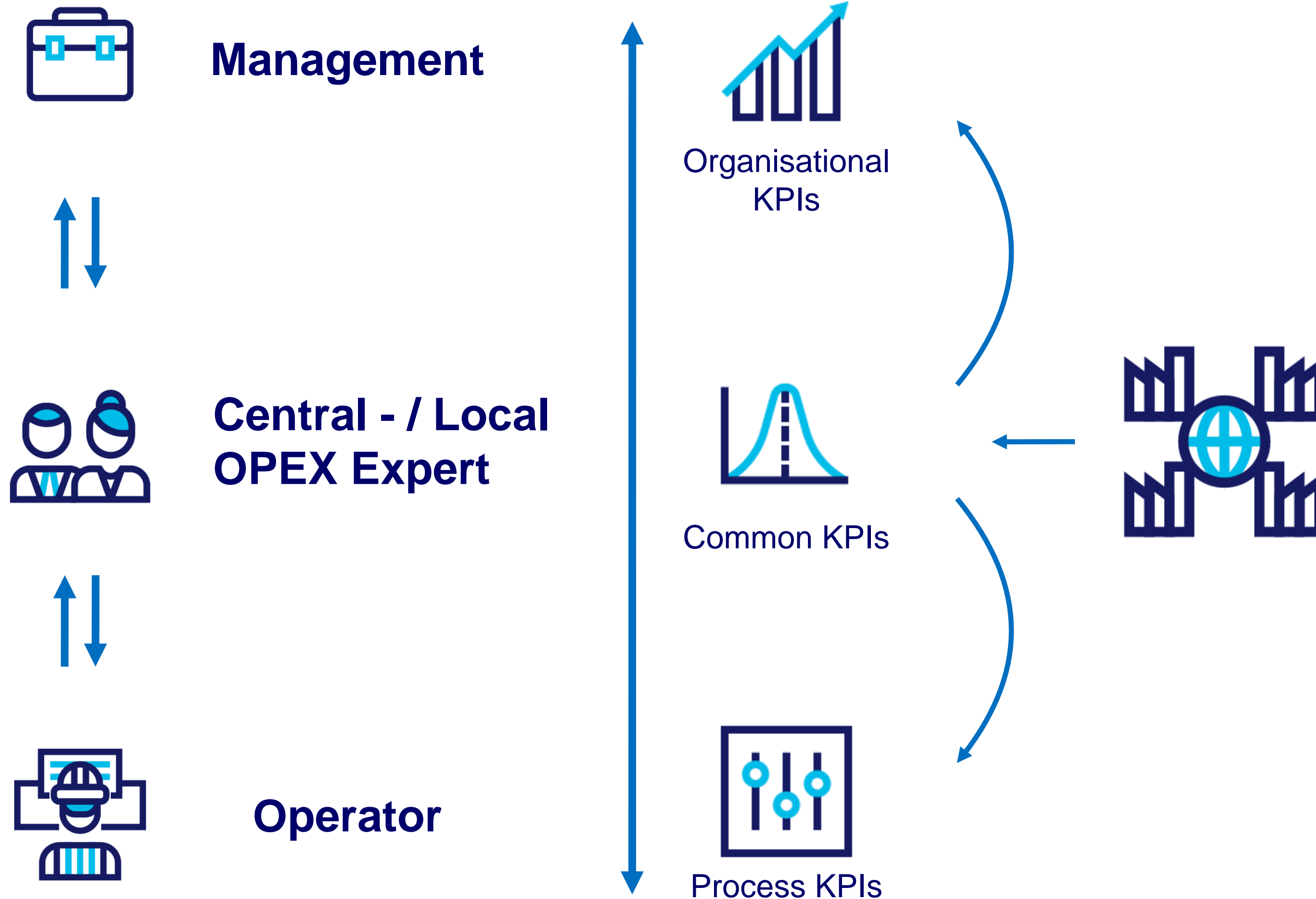
Diagnostic Analytics  
Monitoring  
Active Learning



Early Warnings  
Interact with Control Room  
Predictive Maintenance







- **Enable vertical integration** throughout whole organization starting from operator up to management
- **Enable KPIs as a backbone** to analyze, improve and benchmark globally, as well as locally
- **Empower process experts** to utilise advanced analytics to fuel increase of operating profitability
- Build a **central knowledge platform**



## Digitalization

How can you turn real time data into real time performance optimization?



## Analytics

Is it necessary to build complex data models for every operational case?



## Transformation

Can you empower subject matter experts with analytics to let them help transform your business?



## Acceleration

How can you quickly embed an advanced analytics solutions in your organization and successfully manage the change?



# Use Cases



**Issue:** Through their work in TrendMiner, the team finally determined that there was a dependency between energy consumption and the number of pumps/skids running in parallel. This caused higher energy bills and fines for exceeding energy usage limits

**Result:** They were able to achieve their goal of reducing their energy use. By optimizing the number of reverse osmosis units for a given flow, the team will save energy, reduce fines, and save costs. This is especially impactful during winter months when energy usage limits were exceeded most often.

**Savings - Reduce financial penalties** Through optimization of the production process the energy consumption could be kept below the maximum limit to avoid financial penalties.  
**Trendminer features used:** Create digital tags

**Time Spent:** In only 2 hours the engineers gained valuable insight in their operations and improve their production process.



**Issue:** Faced with a complex case of carbon dioxide peaks, plant engineers were previously unable to identify and resolve the issue at hand. With a few simple steps in TrendMiner, however, the plant discovered that steam consumption could be decreased with approximately 165 tons per day.

**Result:** Additionally, due to the more stable operation, the daily ammonia production would increase by 50 tons.

**Savings:** ~\$2.1 million/year Increase in business value due to identification of the root cause for capacity loss.

**Time Spent:** 1 day Spent by the engineers for assessing and solving the use case, which would have cost days without the use of TrendMiner.



# What Customers are Saying...





“TrendMiner is a user-friendly self-service analytics tool that provides us with tremendous time savings and delivers better quality results than data models.”

Fabrice Leclercq  
Rotating Machinery Engineer  
Total Refining & Chemicals

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**“TrendMiner was a key support tool in identifying deviations within our process.”**

“TrendMiner had the functionality and the usability that we needed... It’s very menu-driven and simple for the engineers to pick it up .”

**Norman Ridgley** Senior Manager  
Operational Excellence [CP Kelco](#)



**“It’s my job to improve our processes and prevent system disruptions.”**

“TrendMiner has simplified my job. I can collect information a lot faster, compare it with the past and use it to predict the future.”

**Tim Timmermans** Operational Expert - Covestro



- TrendMiner was designed for Process Experts
- TrendMiner provides a quick contribution to improvement
- You can start small and scale fast



Questions and Thank You!!