Contextualizing your data: the best first decision for your digital transformation

Denis Gauder

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Outline

- About IPCOS
- Industrial digitalization and the importance of data context
- Why do I need to contextualize my data?
  - Structure your data
  - Enrich your data
  - Identify process events
- Success factors in data contextualization
- Key takeaways

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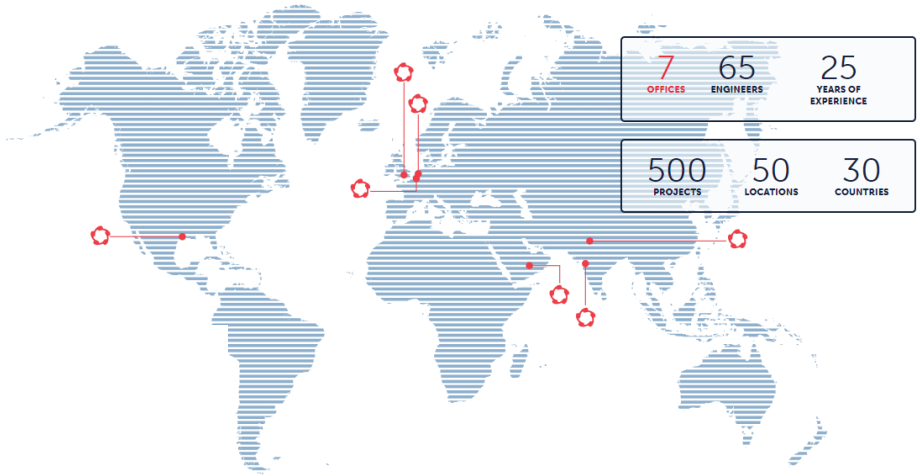
About IPCOS

IPCOS is a technology independent service provider for industrial digitalization in energy and process industry



Advanced control room solutions

Industrial IT architecture

Advanced Analytics

Business Process Automation

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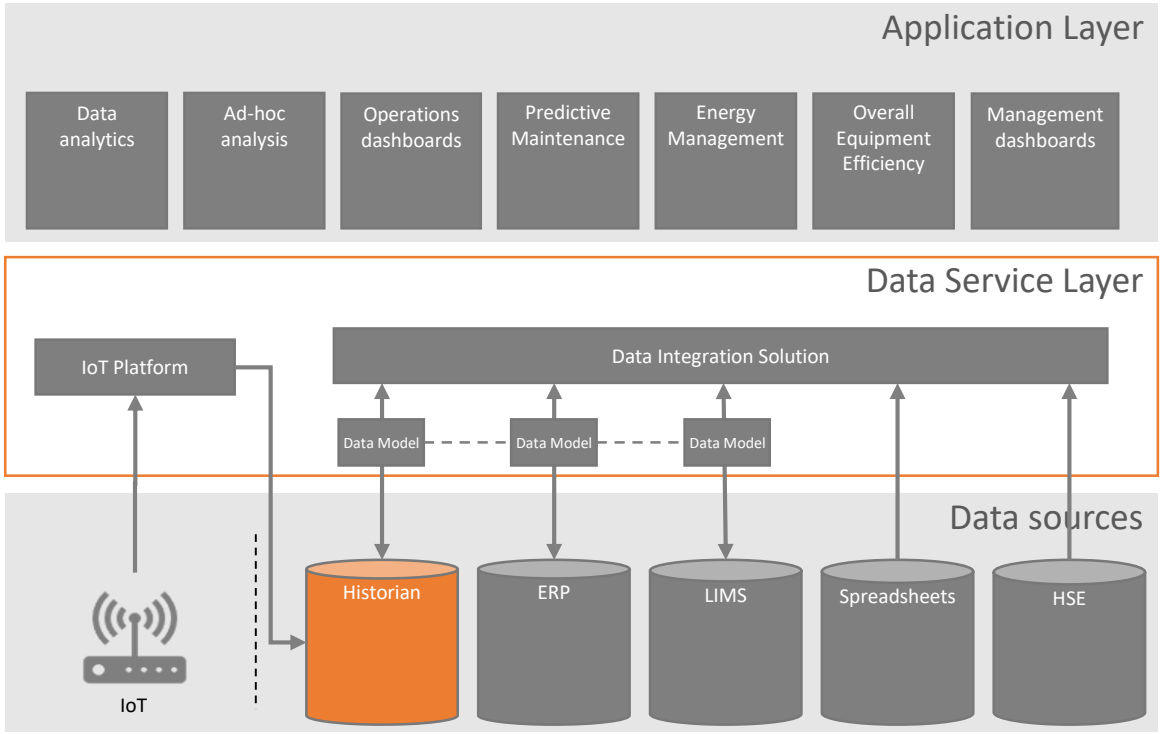
Industrial digitalization and data context

- All companies in the process industry have launched some sort of digital transformation
- Real-time sensor data is the foundation of most technical applications
- Being able to extract insight from the historian requires context in addition to data



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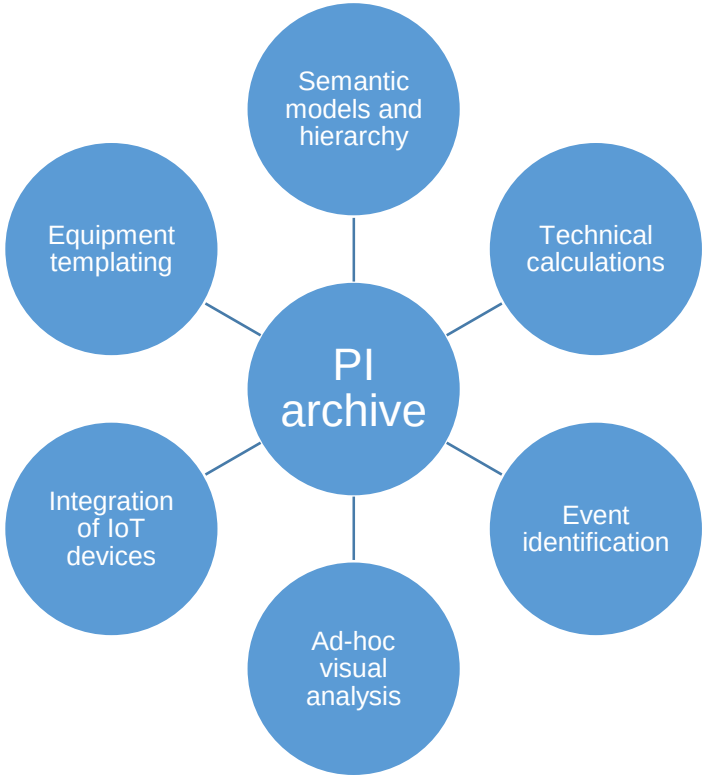
Industrial digitalization and data context

- The amount of captured data is ever increasing
- The raw data needs to be processed for efficient analysis
- Data needs to be organized, templated, augmented with technical calculations and event detection
- Business applications increasingly expect this context to be available



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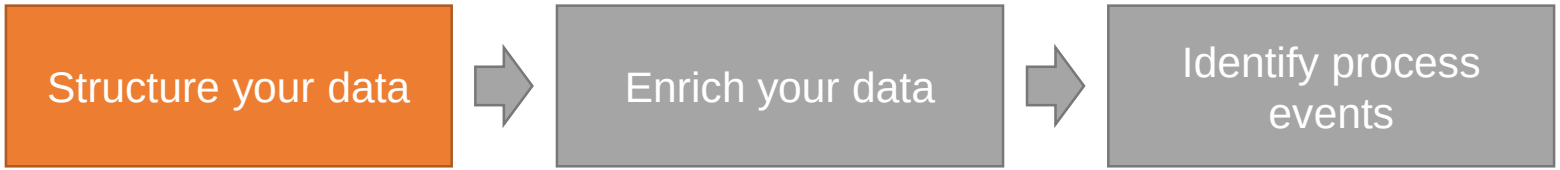
Why do I need to contextualize my data?

A series of examples from basic to advanced



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Structure your data
Empower users with self-service data access

CHALLENGES

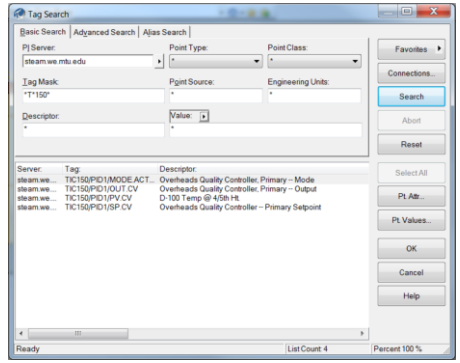
- Identification of relevant information takes time
- Naming convention not rigorous
- No templating
- Tag identification exercise done again and again

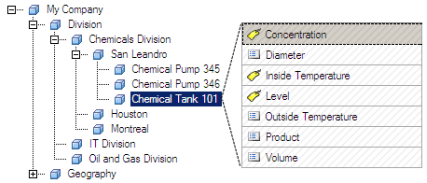
SOLUTION

- Asset framework structure
- Equipment templates
- Self-service data access (PI Vision, TrendMiner, Seeq, etc.)

BENEFITS

- Agility in accessing data leads to efficiency and new insights
- Central functions diagnostic much easier
- On-boarding new personnel





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Structure your data
Enable scale-up and evergreening

CHALLENGES

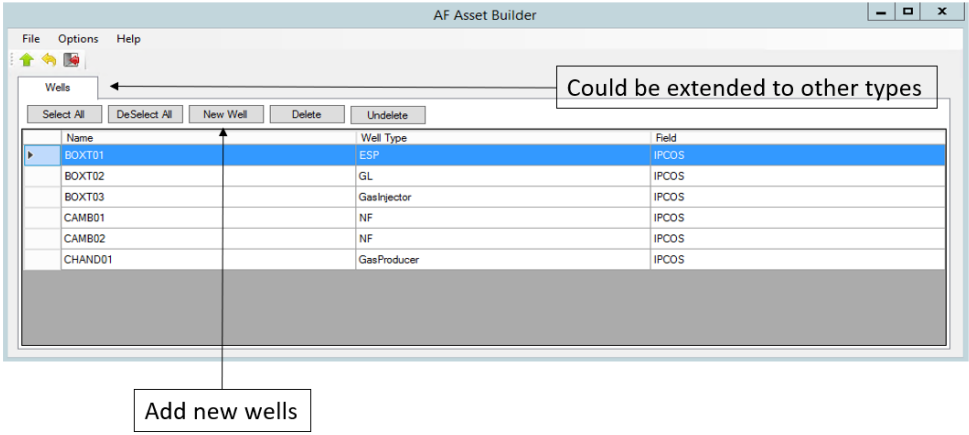
- Solutions and methods are reinvented for every site
- New equipment and information are not integrated fast enough
- No economy of scale

SOLUTION

- Asset framework structure
- Equipment templates
- Equipment-specific performance calculations
- Automated data model creation / synchronization

BENEFITS

- Automatically integrate new pieces of equipment through templating
- Ability to scale-up solutions promoting best practices



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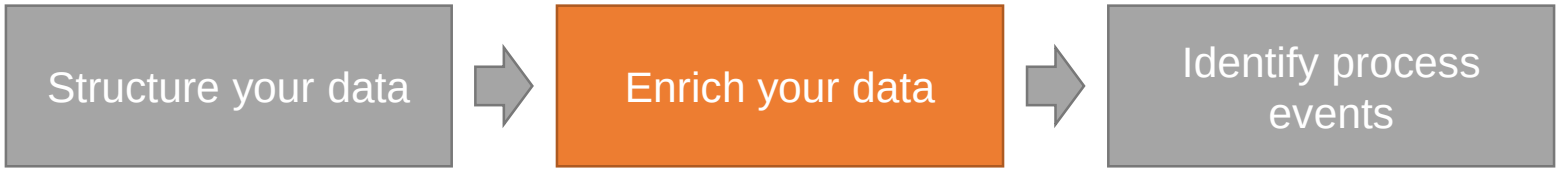

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Enrich your data
Integrate your data

CHALLENGES

- Site personnel needs to cross check information from different data sources
- The information is not integrated and several tools need to be used independently
- Corporate KPI's need to integrate several data sources

SOLUTION

- Alignment of data models between several data sources
- Tactical: integration of data using PI AF (linked tables, custom data references)
- Strategic: leverage AF structure within a global data integration strategy (PI Integrators)

BENEFITS

- Efficiency improvement for site personnel
- Pre-integrated information for diagnosis, troubleshooting and advanced analytics

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Equipment overview

Navigation

Energy Analysis

- Shut-down analysis
- Product analysis
- Energy optimisation

Equipment analysis

- Overview and events
- Risk profile
- Performance and anomalies

Production analysis

- Loss analysis

Equipment selection

Heating

- BOIL-001 | Boiler
- CP-H-001 | Compressor
- PU-H-001 | Pump
- PU-H-002 | Pump

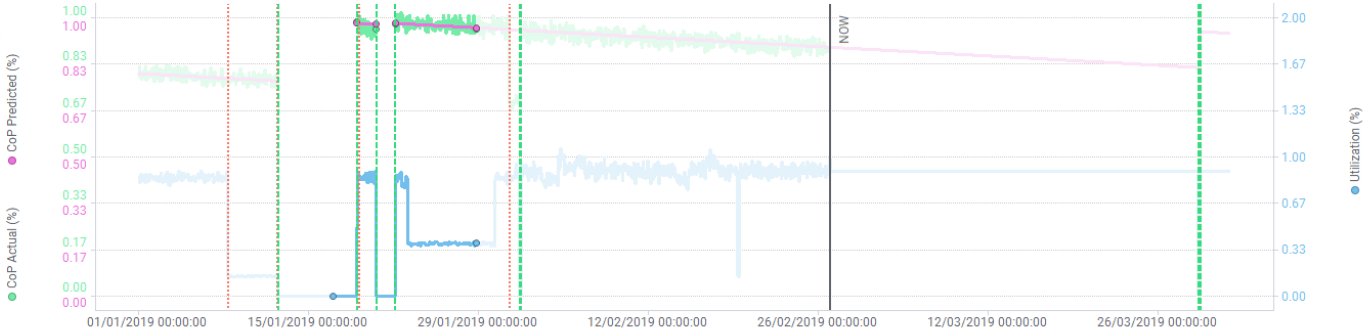
Skin Pass

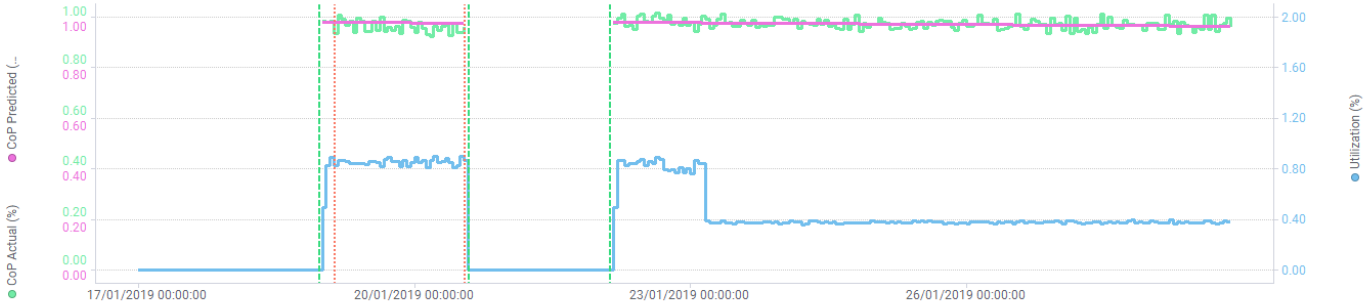
- PU-SK-001 | Pump
- PU-SK-002 | Pump
- SKPA-001 | Skin pass mill
- TR-SK-001 | Transformer

Cooling

- CP-F-001 | Compressor
- PU-F-001 | Pump

Performance overview and forecast





Event log

Milestone type	Date	BOIL - Event ...	BOIL - event c...
Start	19/01/2019 0...	Fast CoP decr...	Performance i...
End	20/01/2019 1...	Fast CoP decr...	Performance i...
Start	20/01/2019 1...	Shut down	Operating mo...
End	22/01/2019 0...	Shut down	Operating mo...
Start	31/01/2019 1...	Sudden CoP d...	Performance i...

Maintenance log

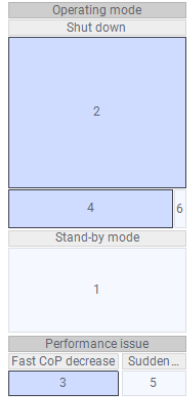
Milestone type	Date	MAIN - Activity
Start	12/01/2019 11:00:00	Cleaning boiler
End	18/01/2019 23:00:00	Cleaning boiler
Start	20/01/2019 14:00:00	Remove residues after boiler cle...
End	22/01/2019 03:00:00	Remove residues after boiler cle...
Start	01/02/2019 10:00:00	Fix failure in BFW input

Related documents

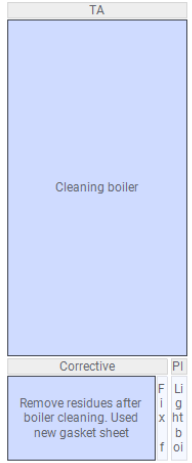
Equipment	Document name	Link
BOIL-001	Manufacturer data sheet	https://company.sharepoint....
BOIL-001	Inspection report 2/8/2017	https://company.sharepoint....
BOIL-001	Inspection report 5/10/2017	https://company.sharepoint....
BOIL-001	Incident investigation	https://company.sharepoint....

01/01/2019 00:00:00 — 01/04/2019 00:00:00

Events



Maintenance



Enrich your data
Manage your operating envelopes

CHALLENGES

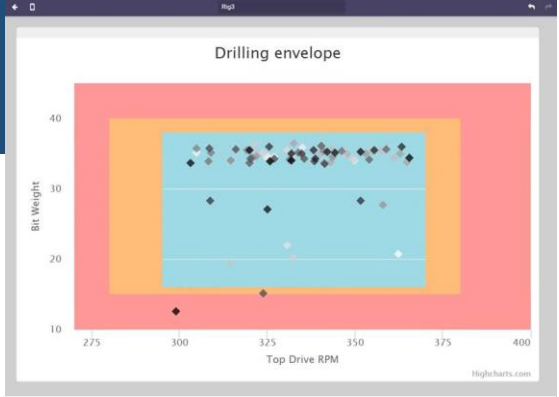
- The operating region of critical equipment is unclear in real-time
- The safety limits are managed but not the best efficiency limits
- Management of multi-dimensional limits is uneasy or impossible

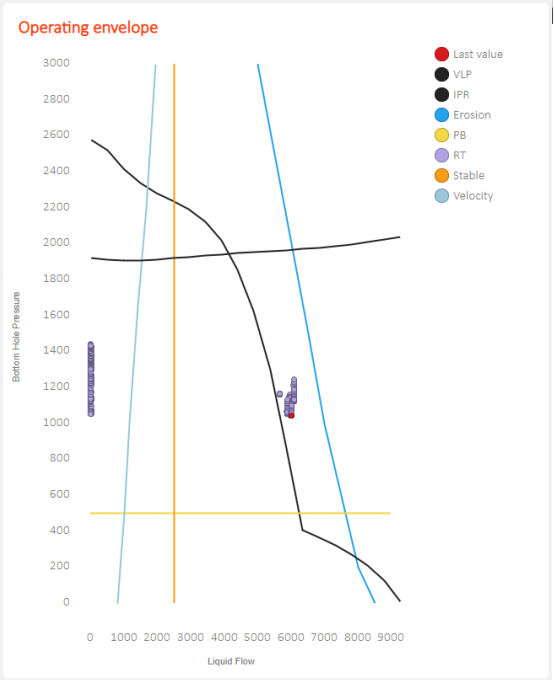
SOLUTION

- Integration of limits within PI AF (static or dynamic)
- Custom PI Vision components or use of third-party visualization
- Web-based displays for use in control room and offices
- Warnings using PI Analysis + PI Notifications

BENEFITS

- Real-time health indication for operations
- Early warning and prediction of performance degradation
- Long term performance history for process optimization





https://pisquare.osisoft.com/people/Mikhail_Koloskov/blog/2018/04/15/test

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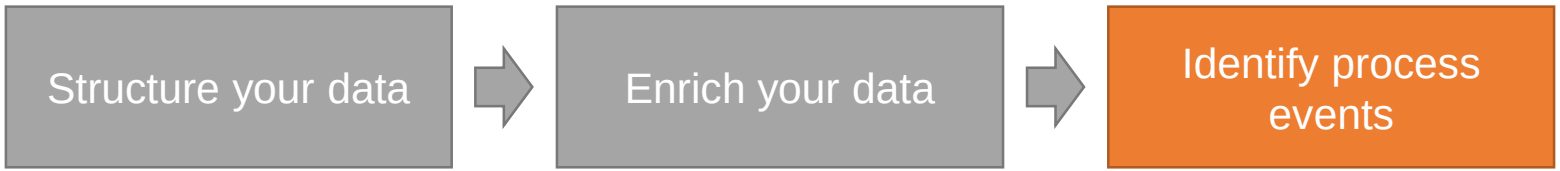

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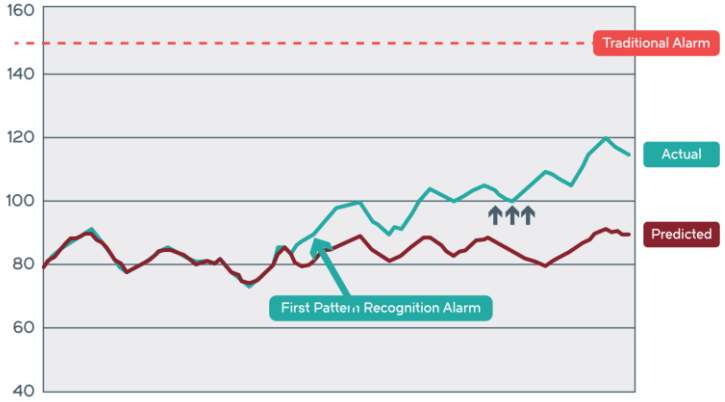
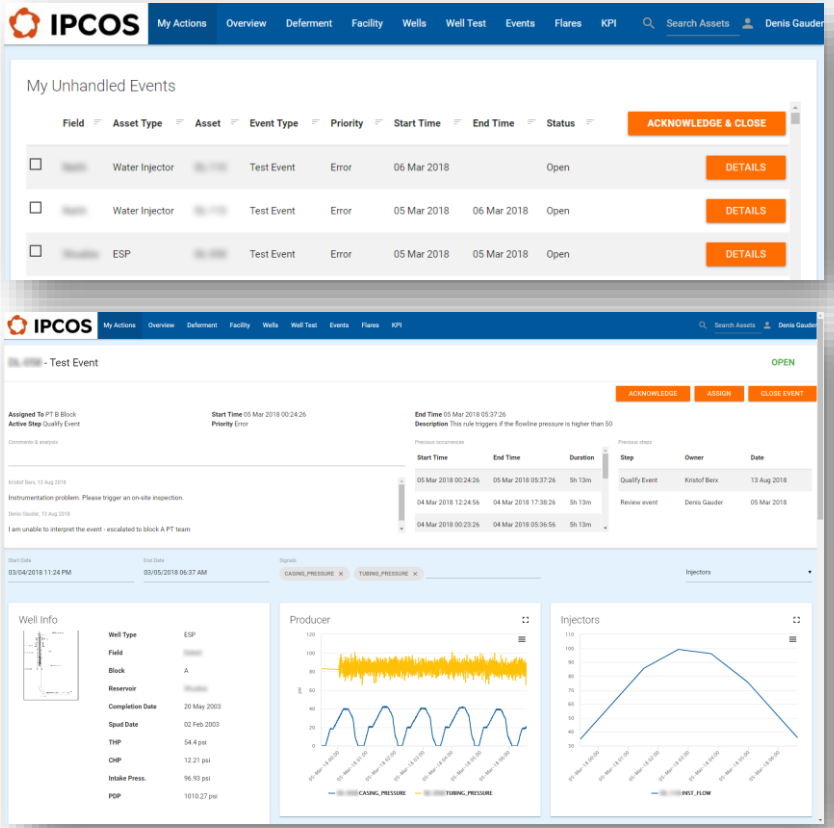
Identify process events
Monitor your assets by exception

Parameter/Scenario	Freq (Hz)	Volt (V)	Current (A)	PIP (psi)	Pd (psi)	Surf Rate (stb/d)	Motor Temp	WHP (psi)	WHT (°F)
Normal increase frec.	↑	↑	↑	↓	↑	↑	↑	↑	↑
Choke well back	⟷	⟷	↓	↑	↑	↓	↓	↑	↓
DHSV closes	⟷	⟷	↓	↑	↑	↓	↑	↓	↓
By pass plug leaking	⟷	⟷	⟷	↑	↓	↓	↑	⟷	↓
Increase in water cut	⟷	⟷	↑	↑	↑	↓	↑	↓	⟷
Gas break out of solutions	⟷	⟷	↑ ↓	↑ ↓	↓	↓	↓	↓	↓
Tubing leak to annulus	⟷	⟷	↑	↑	↓	↓	↑	↓	↓
Flow line valve close	⟷	⟷	↓	↑	↑	↓	↑	↑	↓
Reduce frec. below minimum recommend	↓	↓	↓	↑	↓	↓	↑	↓	↓
Solid or viscous fluid integrated into pump	⟷	⟷	↑	↑	↑	↓	↑	↓	↓



PI AF
PI Analysis
Event Frames
PI Web API



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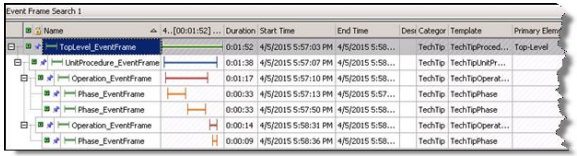
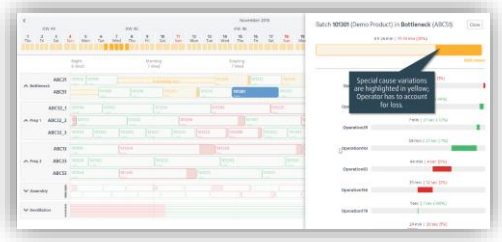
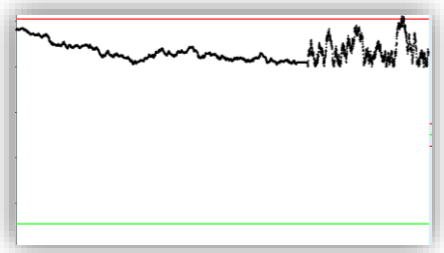
Identify process events
Batch operations







Batch phases segmentation

Loss causes capture

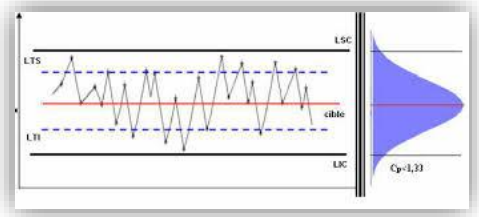
Statistical Quality/process Control

Fingerprinting and golden batch

OEE calculation

Batch monitoring solution

Excursions detection and remediation



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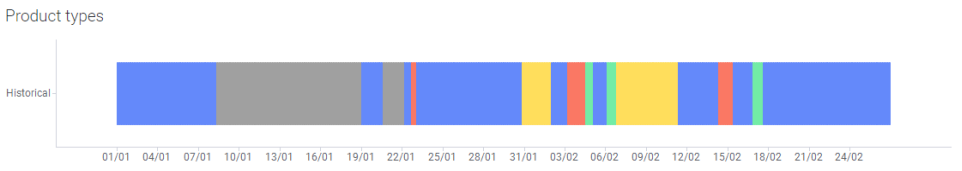
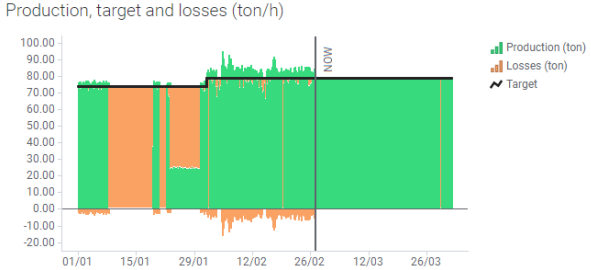
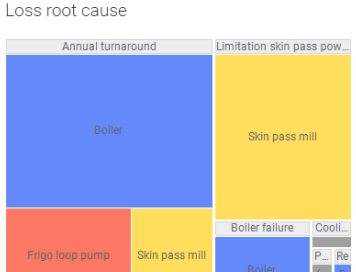
Identify process events
A variety of relevant applications!

Product campaigns

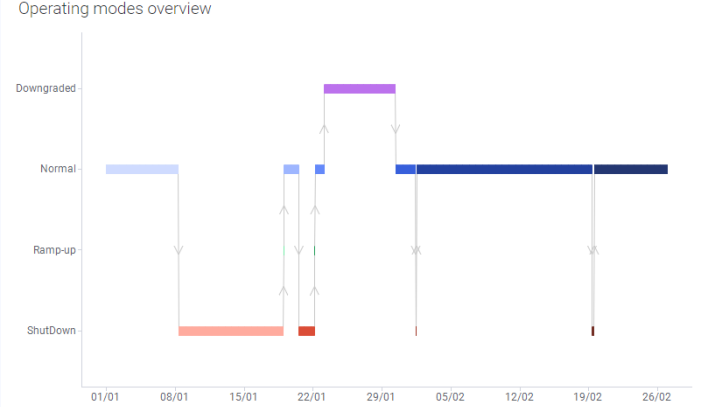


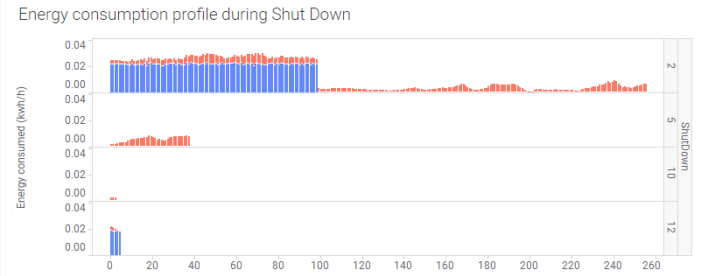
Automated loss classification and reporting





Plant states and energy management





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Success factors in data contextualization

What are the differences between success and failure?

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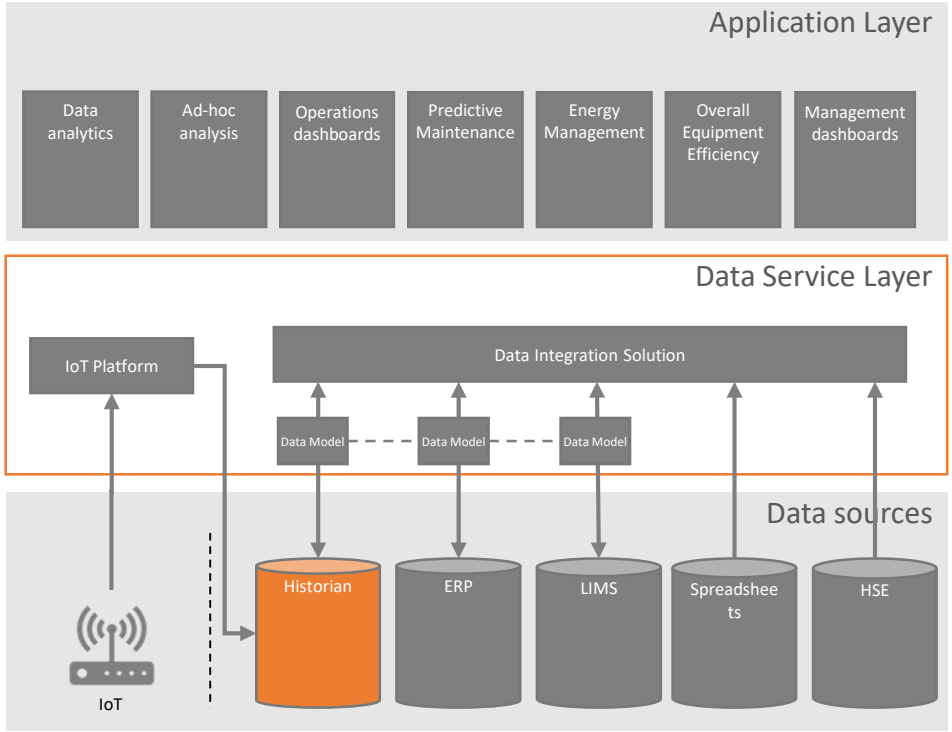
Ensuring success

- Be driven by the end application and the user needs
- Align and leverage your data models
- Ease the maintenance and creation of data models



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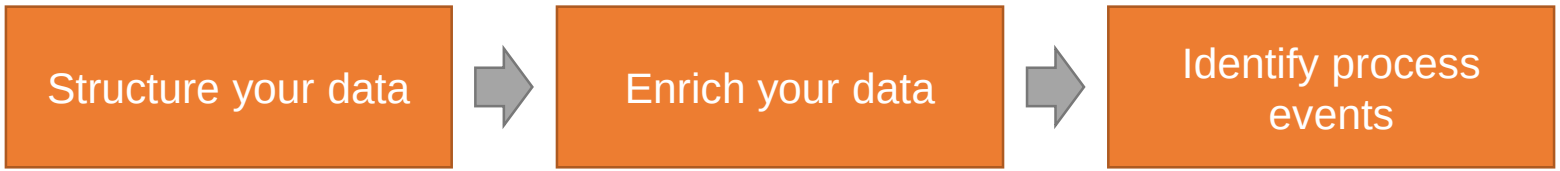
Conclusion

Contextualize your data before it's too late!

Ensure that data contextualization is included in your digital transformation roadmap from the start or you will face great inefficiencies in the future



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How is IPCOS assisting its customers?

Technology

TECHNOLOGY PARTNERSHIPS

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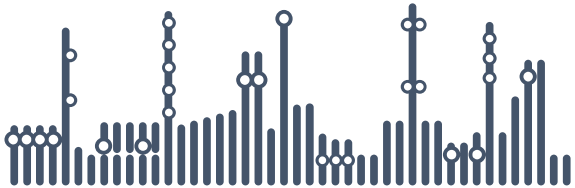

Domain expertise

TEAM COMPOSED OF 60+ ENGINEERS

Data analytics

MATHEMATICAL ENGINEERING

CONSULTANCY

PROJECT INTEGRATION

STRENGTHENING

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Speaker

- Denis Gauder
- Digital Assets Team Lead
- IPCOS
- Denis.gauder@ipcos.com

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State your **name & company**

Please remember to…

Complete Survey!

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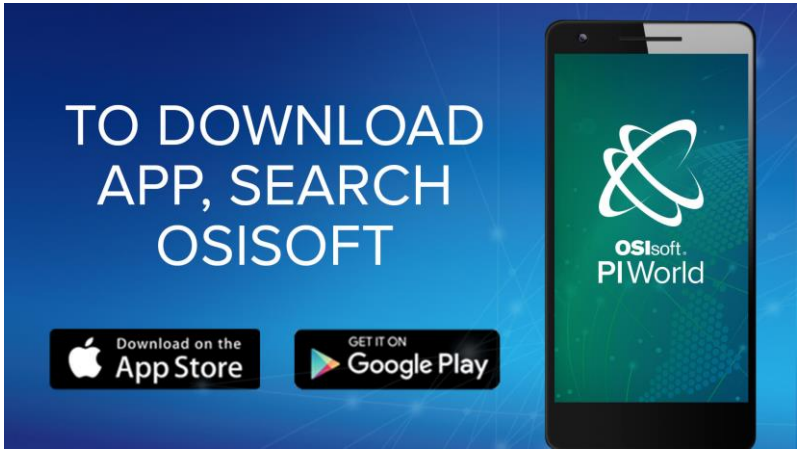

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