

17-NOV-2022

Accelerating R&D and Manufacturing with Real-Time PAT Data

Dr Ernst Holger Amort

AVEVA

About Cognizant – TQS Integration

TQS Integration

- Unrivalled knowledge of PI product suite, existing & new products
- Sound understanding of Predicate Rules (GCP, GLP and GMP) to implement in processes
- Global Data driven solutions company
- Premier Global Partner for AVEVA PI
- Global EA Partner with AVEVA
- Acquired by Cognizant in July 2021

Cognizant

- Helps modernise technology, reimagine processes and transform
- Our consultative approach helps clients envision, build and run innovative and efficient businesses
- Headquartered in the US, Cognizant is ranked 185 on the Fortune 500



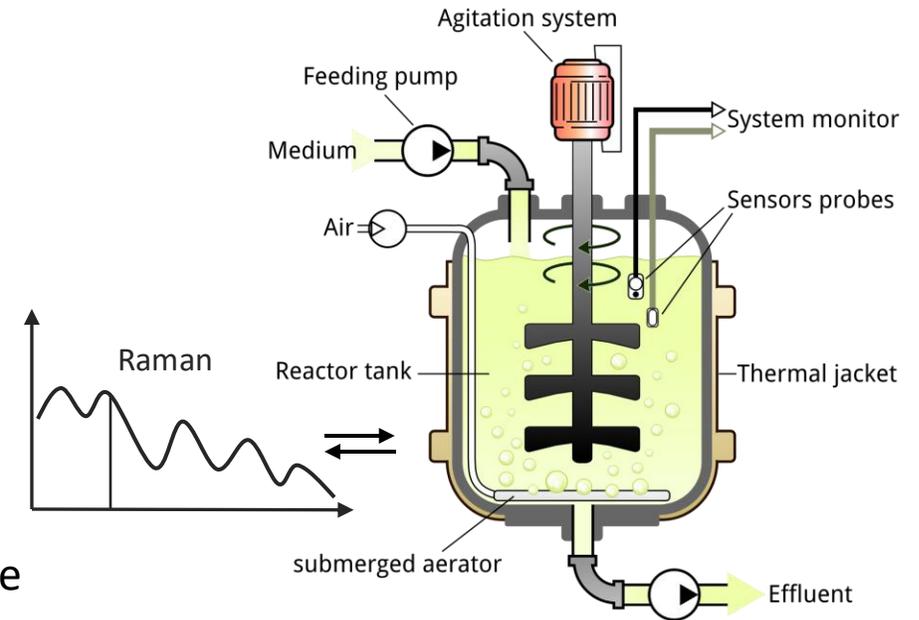
About Me

- Originally from Germany, now living in Tallahassee, Florida
- Studied Analytical and Physical Chemistry in Hamburg, Germany
- Worked in Germany, Italy, France and then moved to US
- Changed to data consulting over 10 years ago
- Interests: Programming, Machine Learning, MVA, Blogs, ...



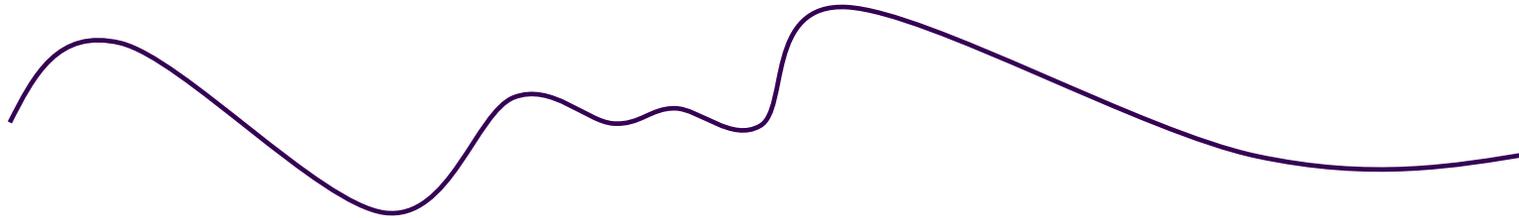
PAT Spectroscopy – Online Measurement

- Typical instrumentation on Pharma or Bio Reactor are:
 - Temperature
 - Pressure
 - Agitation
 - pH
 - Flow,
- Which result in a typical time series: (time stamp + value)
- More and more use online spectroscopy such as:
 - Raman
 - FTIR
 - Vibrational
- The data shape creates a large amount of table and data that must be stored, archived and processed



OSIsoft® Data Models

Sensor or time series data (bool, int, double, string) example temperature:

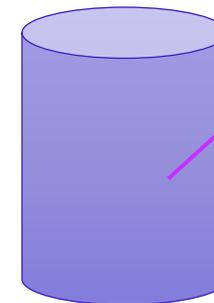


Recipe Model : Time segments with start and end



Physical Model : Time series context

bio reactor



temperature sensor

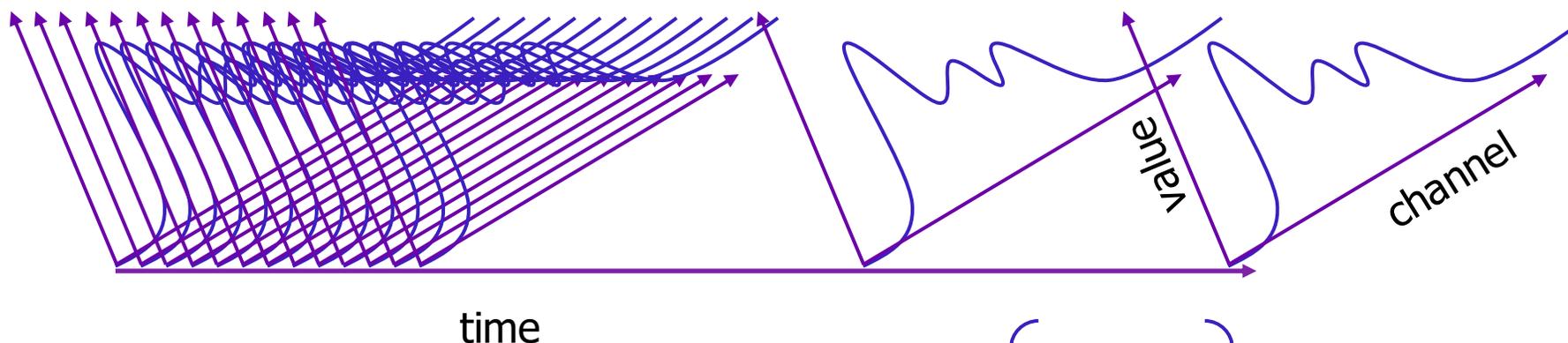
Manufacturing other time series shapes or schemas

- Alarms

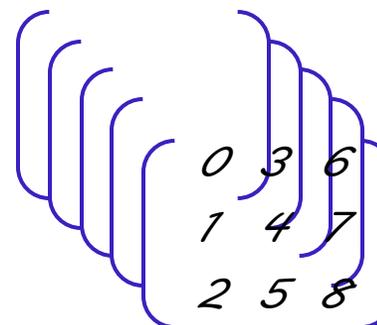


- Message
- Operator
- Severity

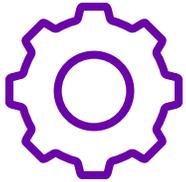
- Sensor or Online Analytics



- Multivariate Analysis and Machine Learning
Time Series Matrix and Tensors



PAT Spectroscopy



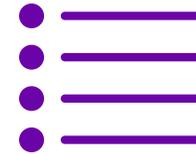
Challenge

- PAT Spectroscopy create a huge amount of data that is stored, analyzed and displayed in separate applications.
- PAT data don't provide time and equipment context and therefore are challenging to use in production.



Solution

- Treat PAT data as complex time series and contextualize the data using OSIsoft® AF.
- Build AF Data Reference to seamlessly integrate PAT Data into PI.
- Build PI Vision symbol to analyze and display the data.



Benefits

- Accelerate R&D by providing contextualized analysis time and asset specific.
- Improve JIT information for production.

PAT-To-PI Architecture

Several small components that fully integrate into OSIsoft system

Spectral files



SQL type TSDB



OSIsoft AF



PI Vision



TQS PAT-To-PI:

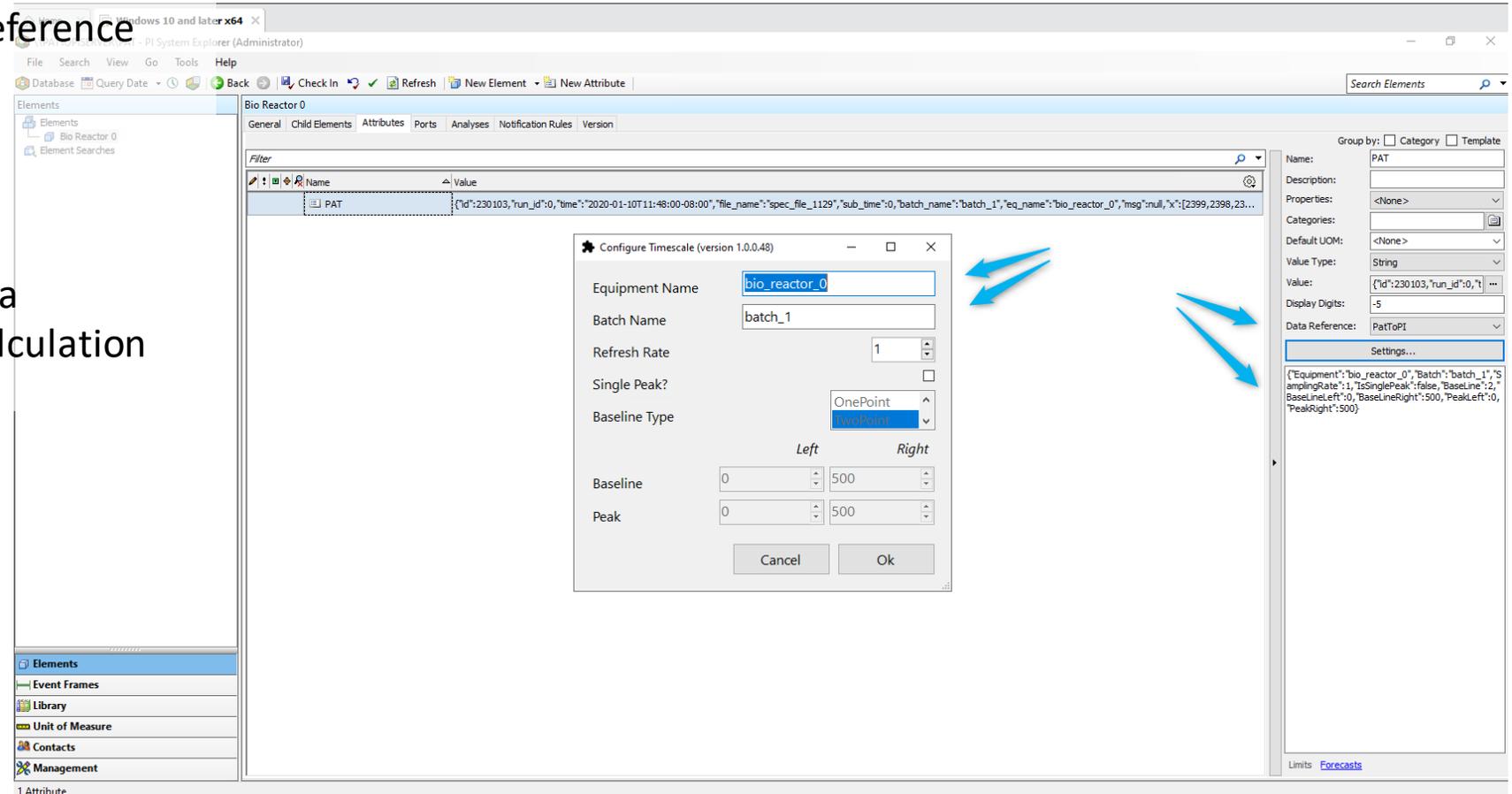
Interface

Data Reference

Symbol

PAT-To-PI: Data Reference

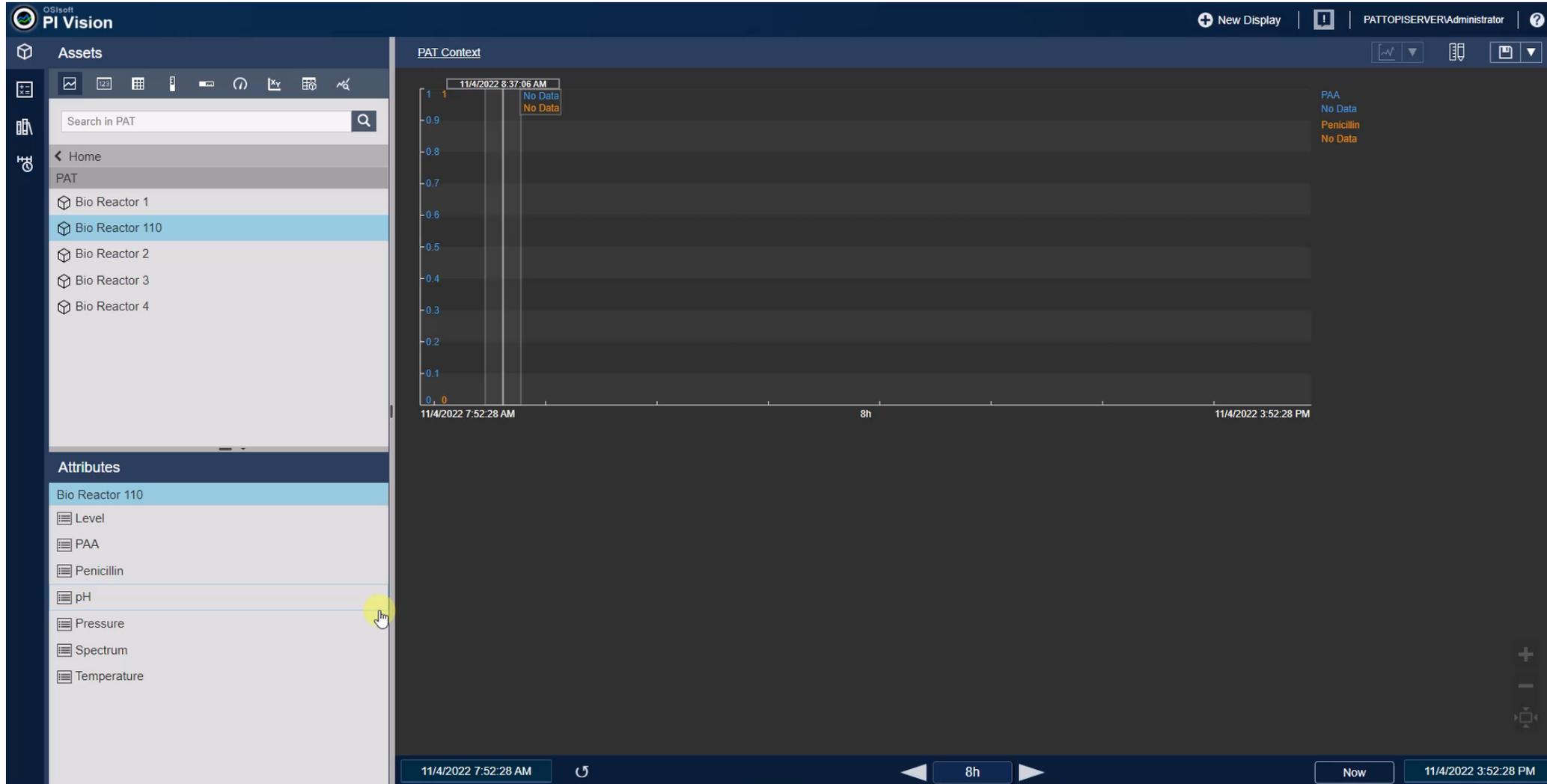
- Works like any other Data Reference
- Think PI Point Configuration
- Provides all the Magic™
- Either returns
 Full Spectrum + Meta
 Single Point after Calculation



PAT-To-PI: PI Vision



PAT-To-PI: Batch Overlay



PAT-To-PI: Summary

- Important to understand industry specific needs, workflow and practices.
- Off-the-shelf\configurable software is always the preferred option.
- Custom software will enhance OTS capabilities but requires:
 - * Unit, Integration and Load testing
 - * Validation\Documentation in case of regulated industries
 - * Internal processes must reflect industry best practices
 - * 24/7 support and long-term maintenance
- Pat-To-PI is fully tested and validated and enhances the capabilities of both PAT and PI Data.



Ernst Holger Amort

Sr Data Scientist (MSAT)

Cognizant (TQS Integration)

hamort@tqsintegration.com

PLS VISIT US AT BOOTH #3

www.TQSintegration.com

Questions?

Please wait for the microphone.
State your name and company.



Please remember to...

Navigate to this session in the mobile app to complete the survey.



Thank you!