

pnb Process Data Library

Extract knowledge from your
process data

Status as of April 2023

You have lots of process data...

...but you wonder how to analyze them efficiently for process optimization?

What about the quality of the data?

Can trends in multiple process variables be detected simultaneously?

Who can support you?



pnb Process Data Library

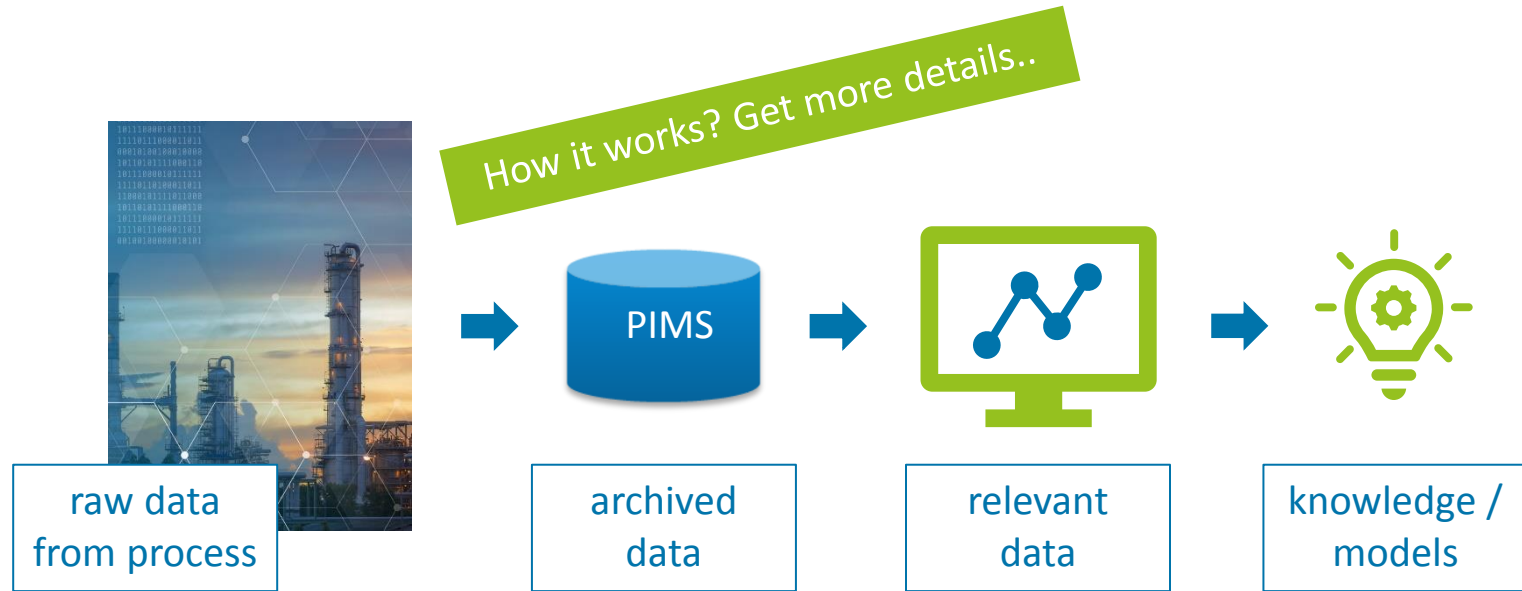
- 64-bit compiled .NET DLL with documented interface (API)
- available functionality
 - automatic tuning of PIMS compression parameters
 - computation of compressed data (result of linear PIMS compression)
- further functionality planned
 - variance estimation
 - denoising
 - trend detection, e.g., steady-state detection
 - etc.



We are happy to support you
with software, services, and consulting!

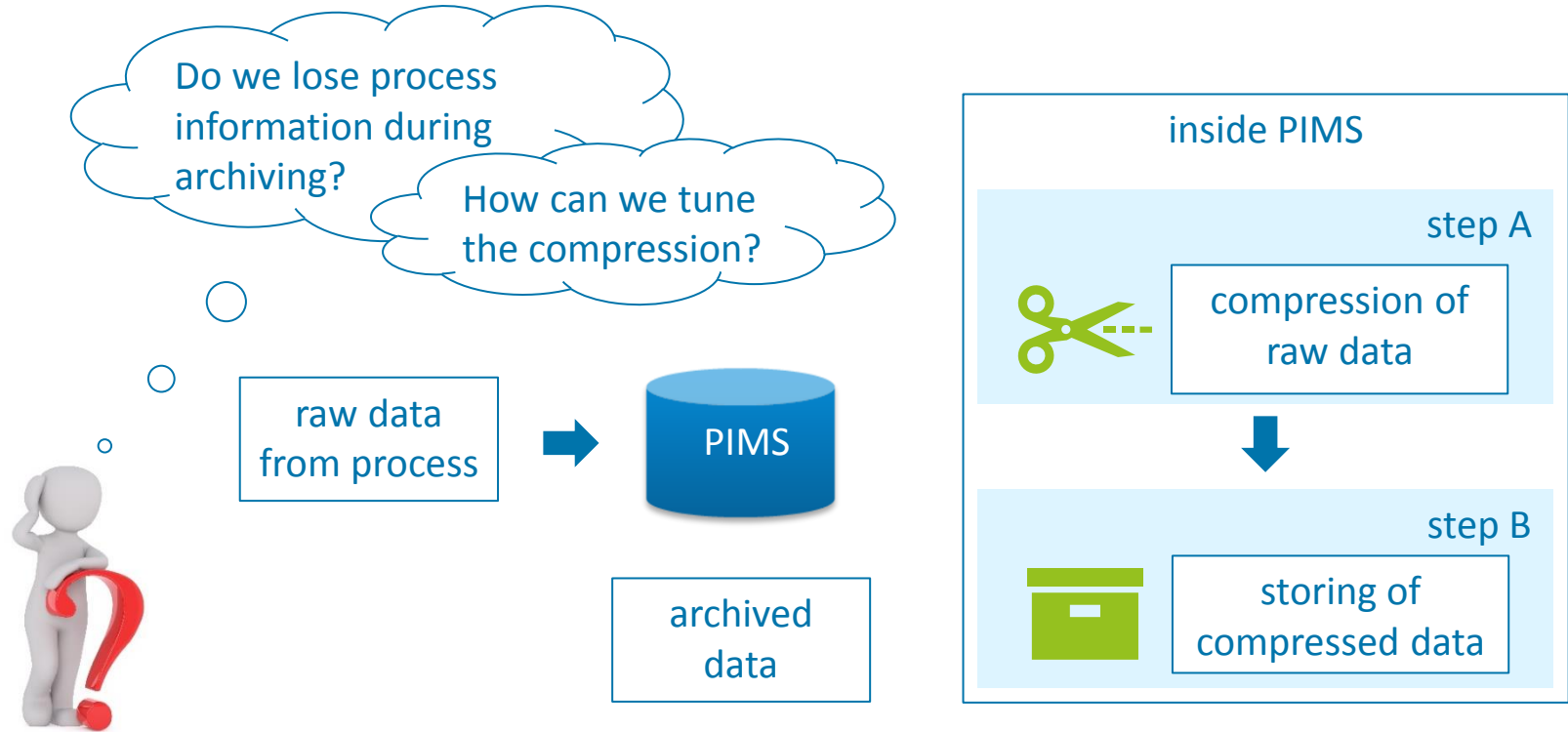
for more details see also: <https://www.plants-and-bytes.de/process-data-analysis>

Process data flow – from raw data to knowledge



PIMS: Process Information Management System

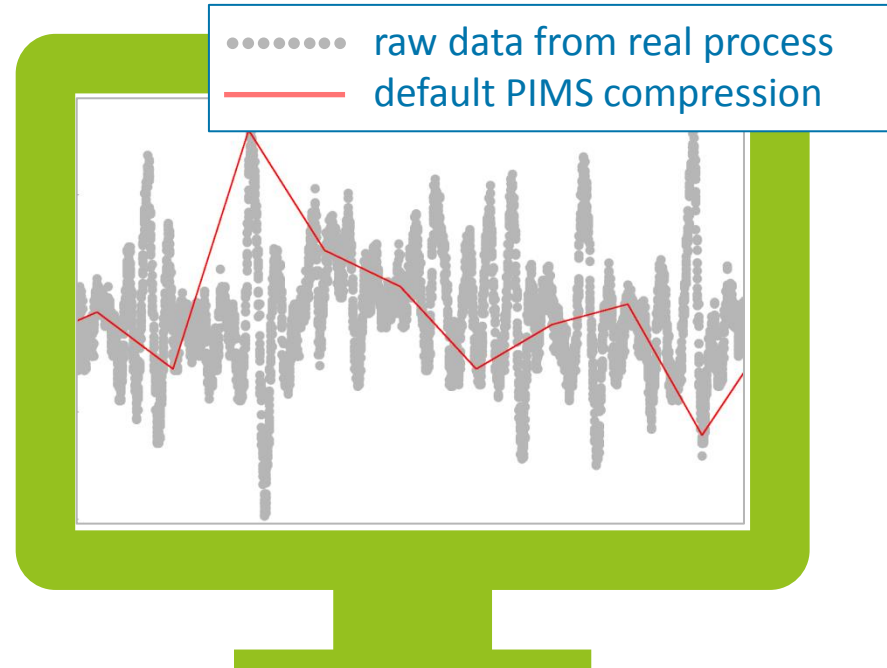
Process data archiving – a look inside



Consequences of bad compression

- manual correction of compression parameters
- repeated collection of data at suboptimal process conditions
- postponed knowledge extraction
- loss of time & money

bottom line: no direct access to relevant data!



default compression (here over-compression)
indicates misleading trend

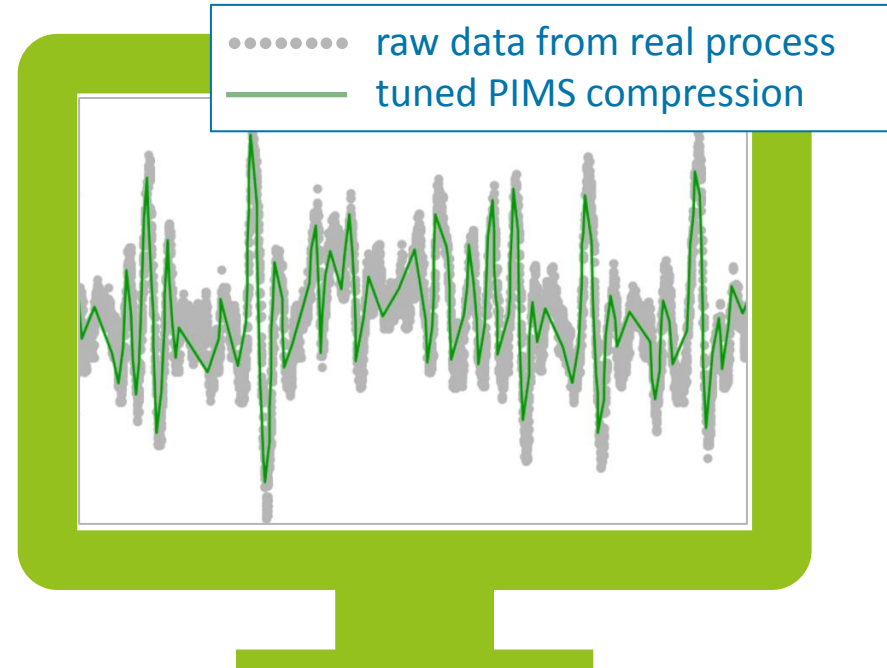
source: AixCAPE e.V., see also: [https://doi.org/10.1016/S1570-7946\(06\)80265-8](https://doi.org/10.1016/S1570-7946(06)80265-8)

pnb Process Data Library – compression tuning

- automatic tuning of compression parameters based on Wavelets
- computation of compressed data
- applicable to OSI PI (swinging door) and IP.21 (modified boxcar-backslope) systems



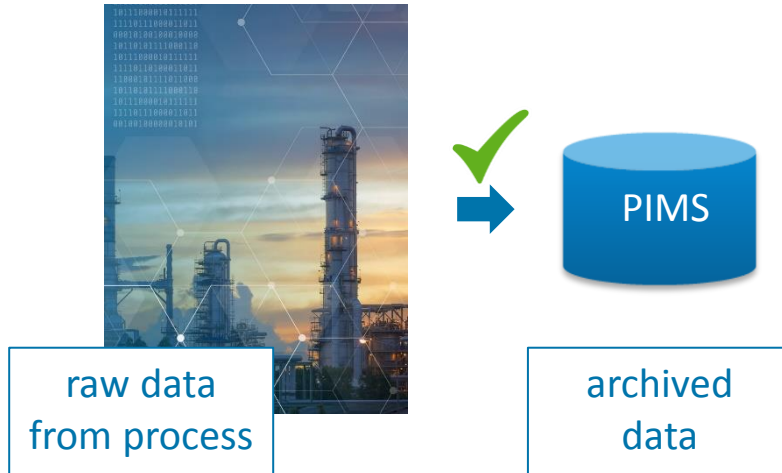
get the compression right!



automatically tuned compression based on Wavelets reflecting the process characteristics adequately

source: AixCAPE e.V.

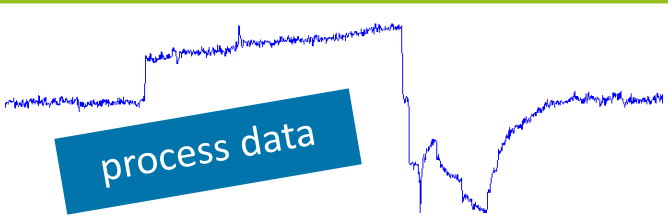
Process data flow – from raw data to knowledge



Process data analysis – extract relevant data

How can we identify relevant data?

PIMS



measured quantities, e.g., for temperature and flow

practical challenges: stochastic noise, systematic deviations, simultaneously in many variables, trend duration a priori unknown

source: AixCAPE e.V., see also: <https://doi.org/10.3182/20090706-3-FR-2004.00083>

pnb Process Data Library – trend detection

- Wavelet based trend detection, i.e., denoising, trend error calculation, and efficient trend search
- results in few and intuitive free parameters (minimum trend length, error tolerance)

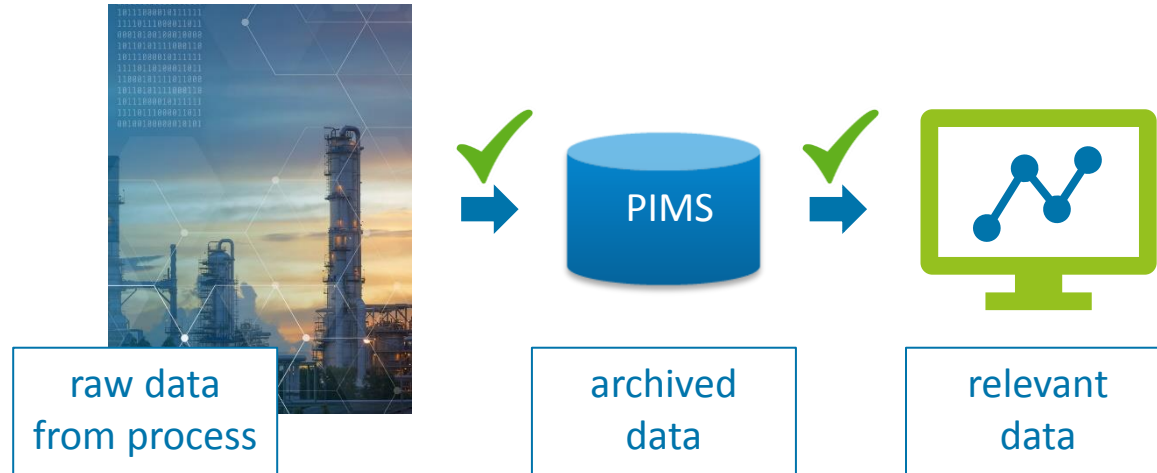
easily identify relevant data!



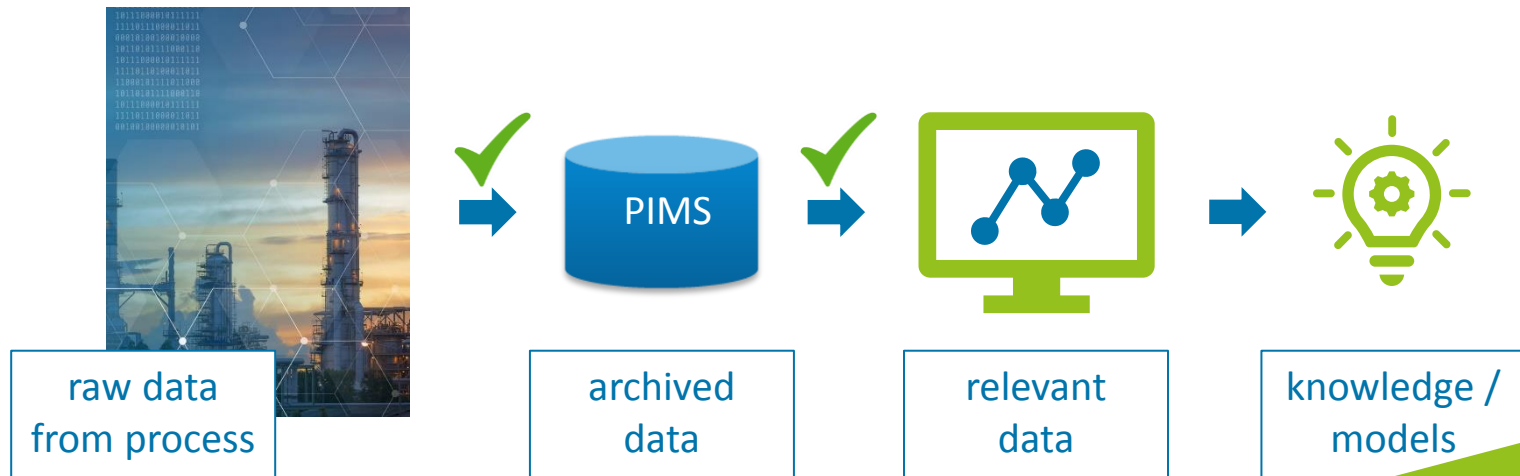
example trend detection (i.e., steady-state and linear trend detection) based on Wavelets

source: RWTH Aachen, Chair of Process Systems Engineering, see also: <https://doi.org/10.1016/j.jprocont.2006.05.004>

Process data flow – from raw data to knowledge



Process data flow – from raw data to knowledge



That's up to you!

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Amtsgericht Aachen – HRB 22784



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