

# From high speed data acquisition to edge and cloud computing platform

ing. Dries Boone

# 360° Transparency of your Process



Troubleshooting



Process Analysis



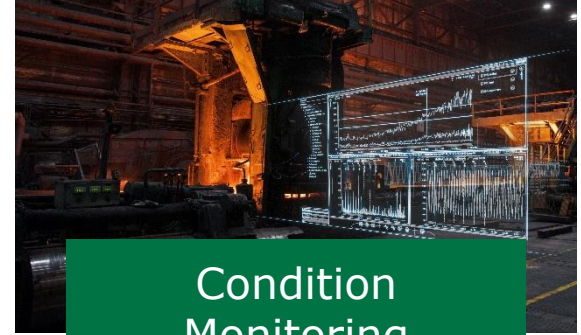
Quality Documentation



Digitalization



Power Quality



Condition Monitoring



## Requirements of Production

- Troubleshooting / Process understanding
- Process analysis
- Process optimization
- Quality documentation and quality improvement
- Product traceability (track & trace)
- Benchmark lines

## Requirements of Machine and Line Builders

- Commissioning (local or remote)
- Document compliance with contract
- Plant optimization
- Optimize energy and resource consumption
- Support plant life cycle (warranty)
- Digital services

## Demand for Data

# The iba System – Holistic View of your Process



## Key Features

- Holistic view by comprehensive connectivity
- Consistent results by using one data platform only
- Multiple usage of data by acquisition of high-resolution data
- Root-cause analysis by drill-down from KPIs to raw data

## Data

Operation Data

Production Data

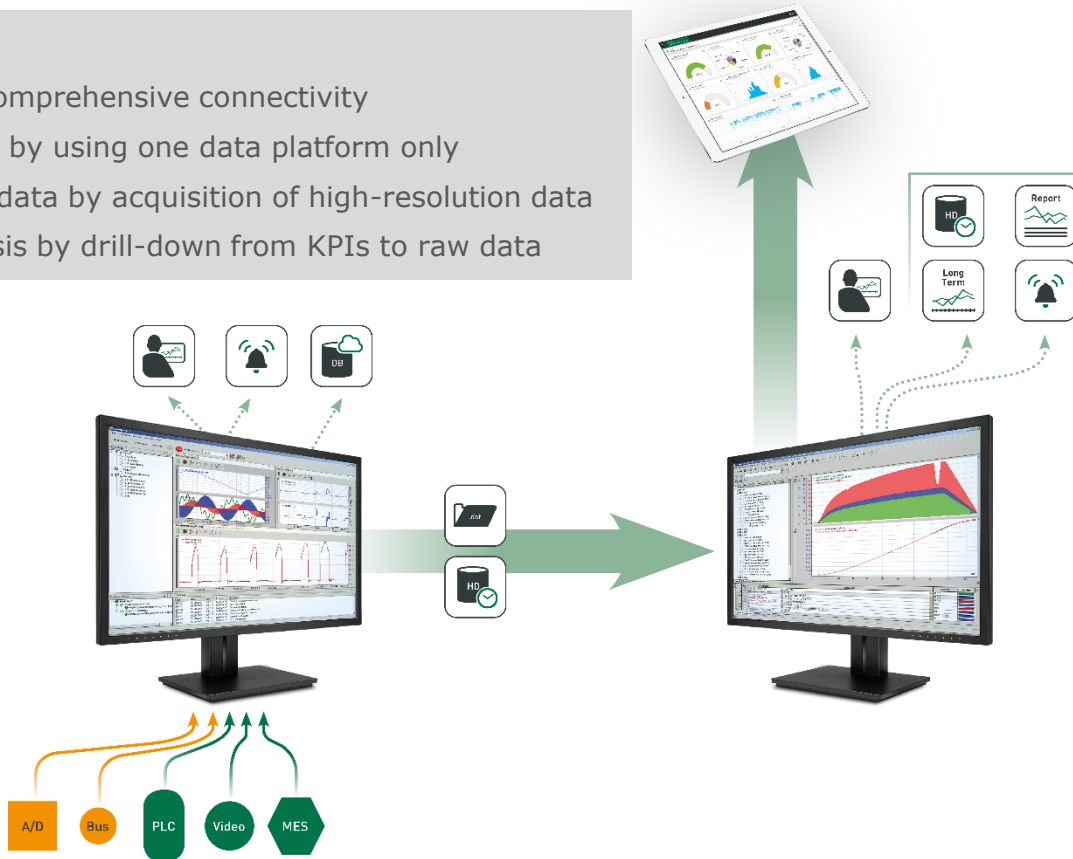
Process Data

PLC Data

Machine Data

Energy Data

Vibration Data



## Stakeholders

Maintenance

Quality Management

Production

Process Technology

R&D / Engineering

Plant Builders



Centralized data acquisition with global time stamping.

Online visualization with customized views.

Flexible recording to measurement files or ibaHD-Server.

„We can get along with (almost) everybody!“

## Your Benefits at a Glance:



Combination of various signal sources, data types and vendors



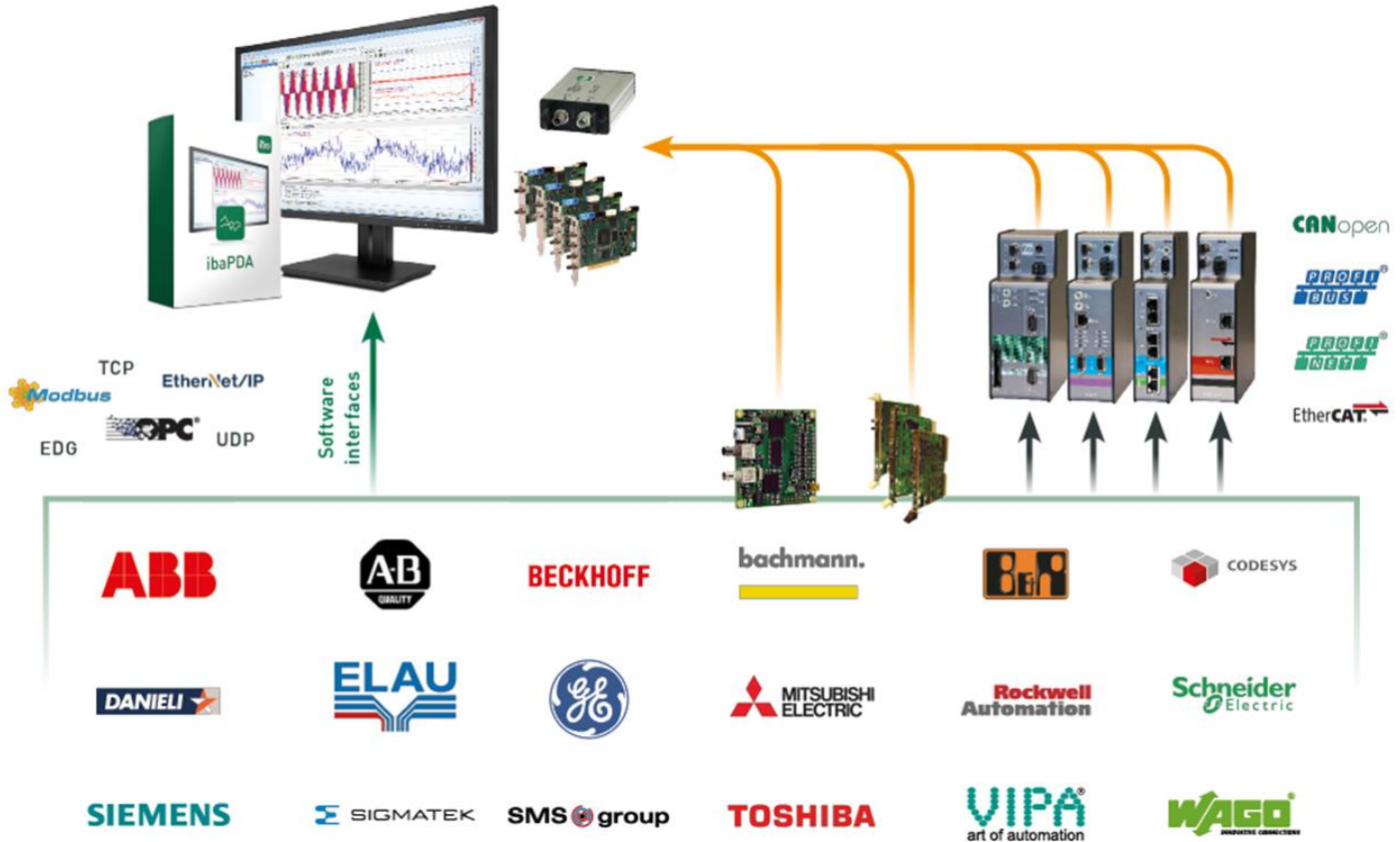
Time-synchronous acquisition of all relevant data



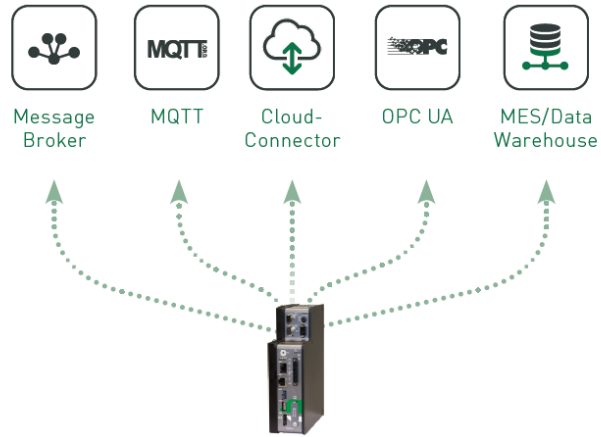
Different acquisition rates up to 100 kHz



# Comprehensive Process Connectivity



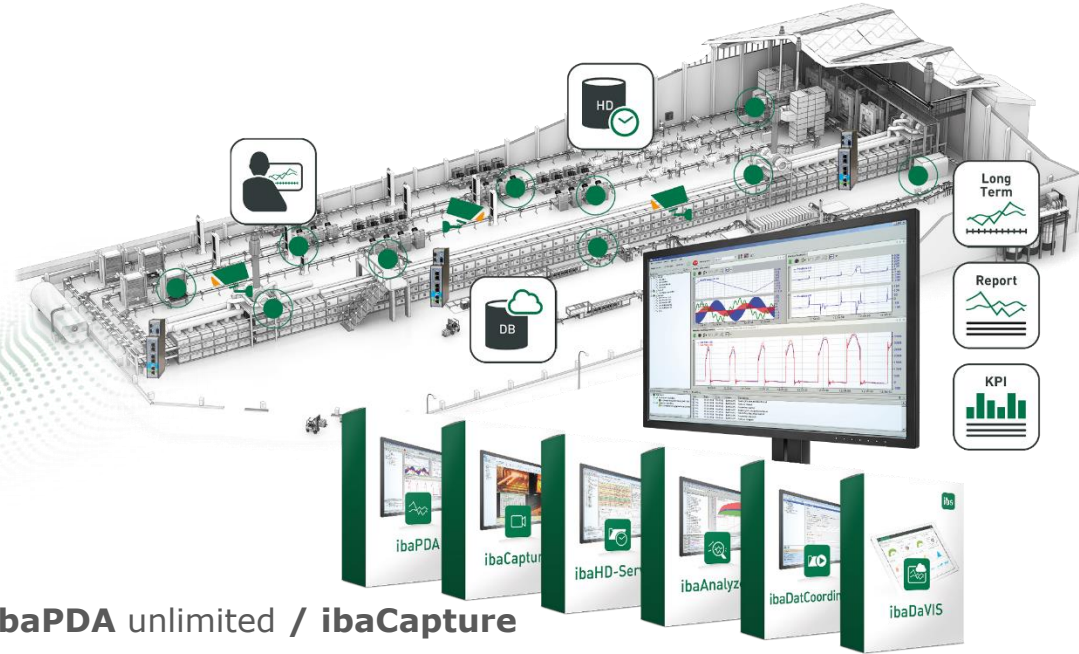
# Northbound Connectivity





## ibaPDA-PLC-Xplorer 64 signals

- One recorder
- Ethernet interface
- Interactive analysis



## ibaPDA unlimited / ibaCapture

- Comprehensive connectivity (Ethernet, Fiber Optic)
- Several recorders in parallel
- Long-term data store using ibaHD-Server
- Online-Visualization with several clients
- Automatic data evaluation using ibaDatCoordinator



Data Analysis suite  
- easy to use  
- free license

Create insight and  
reduce complexity.

Calculate KPIs  
automatically

# KPIs – Reducing Complexity & Gain Insight



### Physical signals (raw data)

Number of signals: 5000

Sampling rate:  
100msec - .01msec

Values per second:  
1.000.000 samples/sec  
(5 msec average example)

Memory usage per day:  
320 Gbyte  
(uncompressed)

Storage period:  
2 weeks - 6 months

### Quality data / Process data

Number of values: 300

Data rate:  
3/s (1/m, 180 m/min)

Values per second:  
900/s

Memory usage per day:  
297 MByte

Storage period:  
1-5 years

### Operational data / KPIs

Number of KPIs: 300

Date rate:  
1/5 min (5 min product/batch)

Values per second:  
1/s

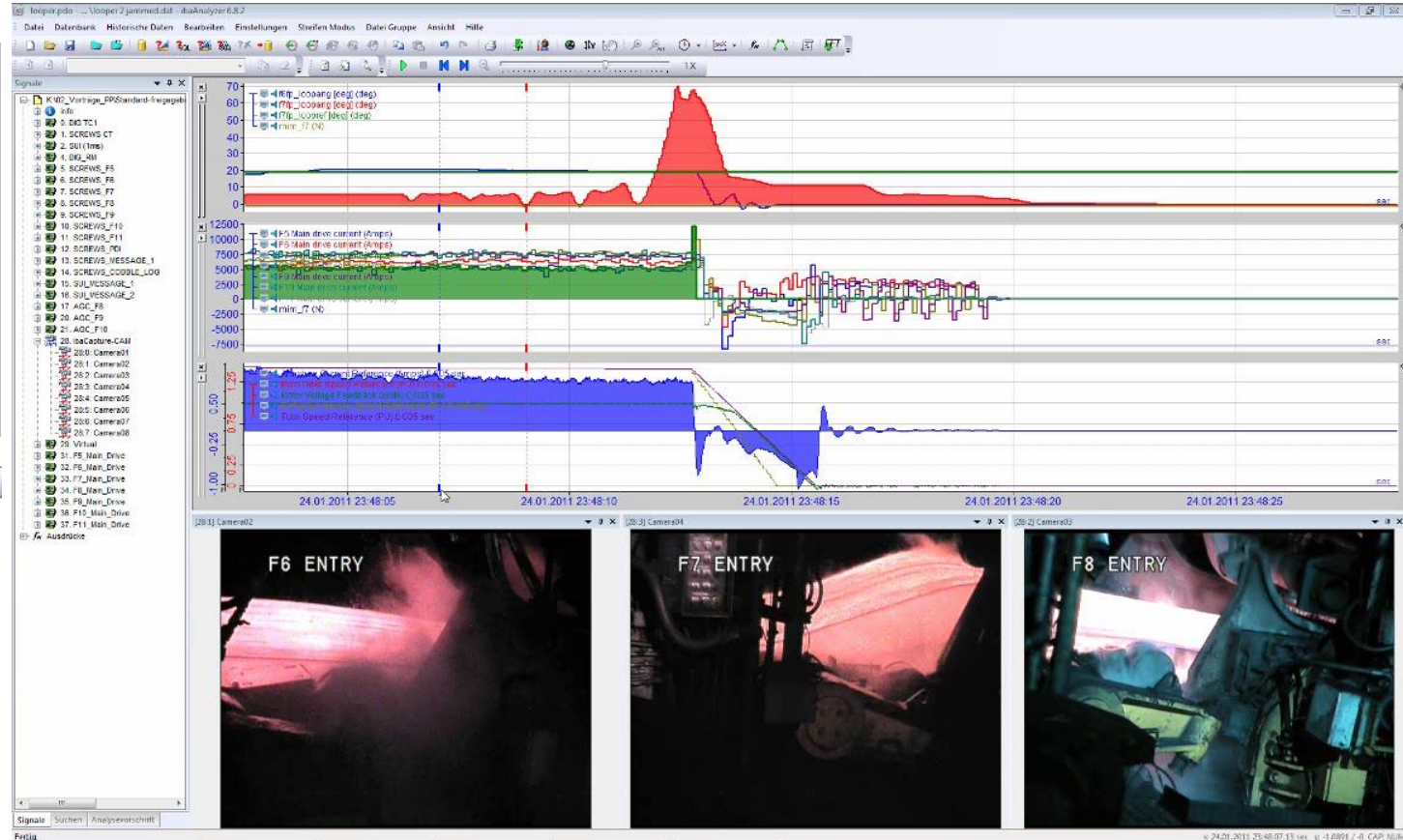
Memory usage per day:  
84 kByte

Storage period:  
10 years

# Offline analysis of measurement and video data



- Continuous playback of video via play button at adjustable speeds
- Marker will run and display the current time
- Interactive control via marker control or fwd/backwd

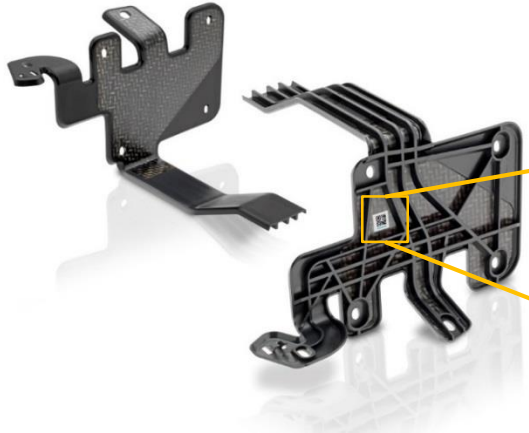



# Example of Industry 4.0 Track & Trace



## Customer Benefits with iba

- Automatic report creation
- Information is available everywhere
- Quality documentation
- Traceability
- Root-cause analysis



In cooperation with  [www.iba-ag.com](http://www.iba-ag.com) [www.kraussmaffei.com](http://www.kraussmaffei.com)

### Prototype for a holder

Cycle Number 1084  
Date / Time 21.09.2016 / 09:45:44 DataXplorer

Information		Name		Value	
Application	Prototype for a holder	Mean heating rate zone 1 [°C/s]		9,70	
Material	Polyamide 6, DURETHAN BKV 55 TPX	Heating time [s]		25,16	
Organo sheet	Glass fibre reinforced polyamide	Transfer time [s]		5,37	
	TEPEX® dynamite 102-RG600(2)47%	Melting temperature [°C]		221	
Clamping force	3000 tN	Plasticizing flow rate [g/s]		39,00	
Screw diameter	50 mm	Maximum melt pressure [bar]		1175	

**Infrared oven heating**


**Injection process**

**Simplified FiberForm process:**  
The new generation of heating up

- Preheating program for shortened start-up processes
- Synchronous heating up of the individual heating zones by using a control algorithm developed in-house
- Highly dynamic controller prevents the set temperature from being exceeded
- Quality monitoring of the entire heating curve graphically displayed in the MCS

**DataXplorer:**  
Collection, analysis and documentation of process data

- Uninterrupted monitoring and documentation of processes
- Tuning and optimization of processes
- Easier troubleshooting and diagnosis
- Quality data analysis, troubleshooting, and other evaluations from wherever you are located and beyond corporate boundaries

Engineering Passion




Synchronized recording of measurement data and video and HMI

The camera sees more than what's available in the PLC.

A picture is worth more than 1,000 values.

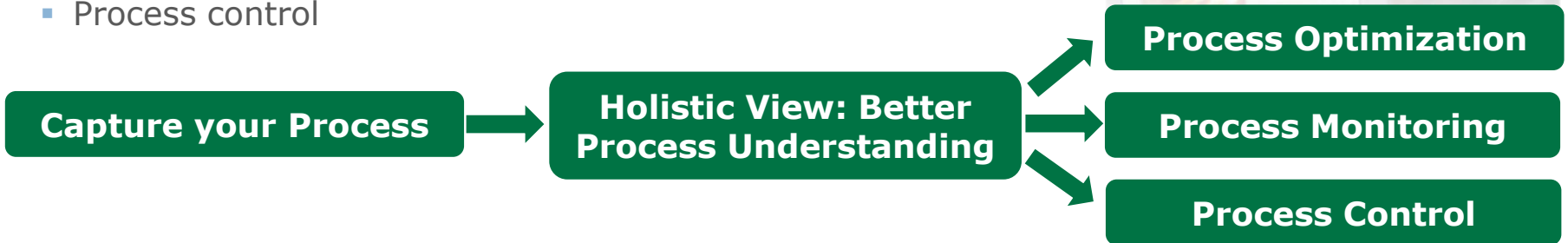
Enriching information in real time using ibaVision.

## ▪ Synchronized Acquisition

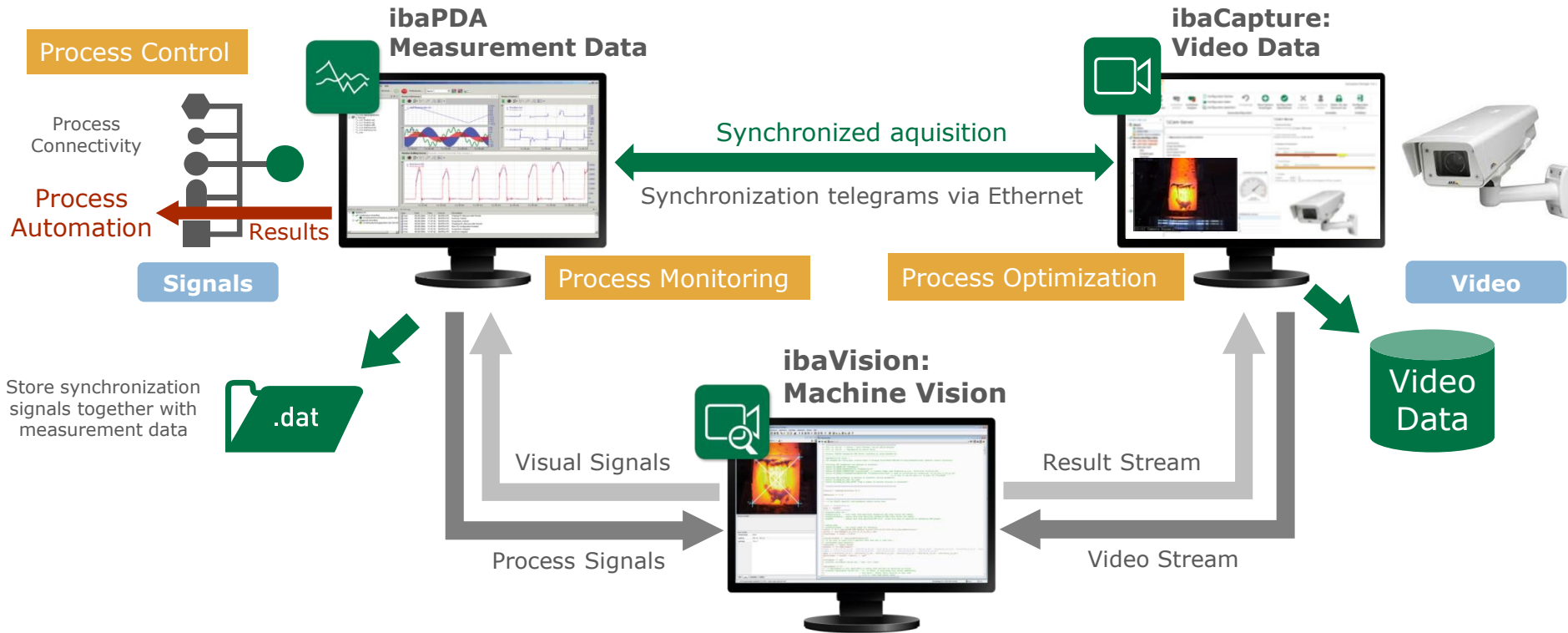
- Holistic view with online visualization at one screen
- Measurement signals can control recording and camera display
- Interactive offline analysis

## ▪ Machine Vision

- Online calculation of visual signals in real time
- Automated process monitoring and alarming
- Process control



# Optimize, Monitor and Control your Process







Web-based data visualization and analysis.

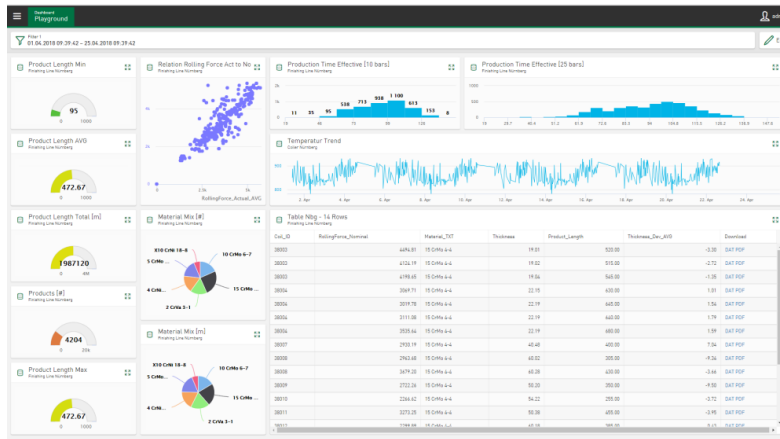
Information is ubiquitously available.

Flexible configuration of customized dashboards.

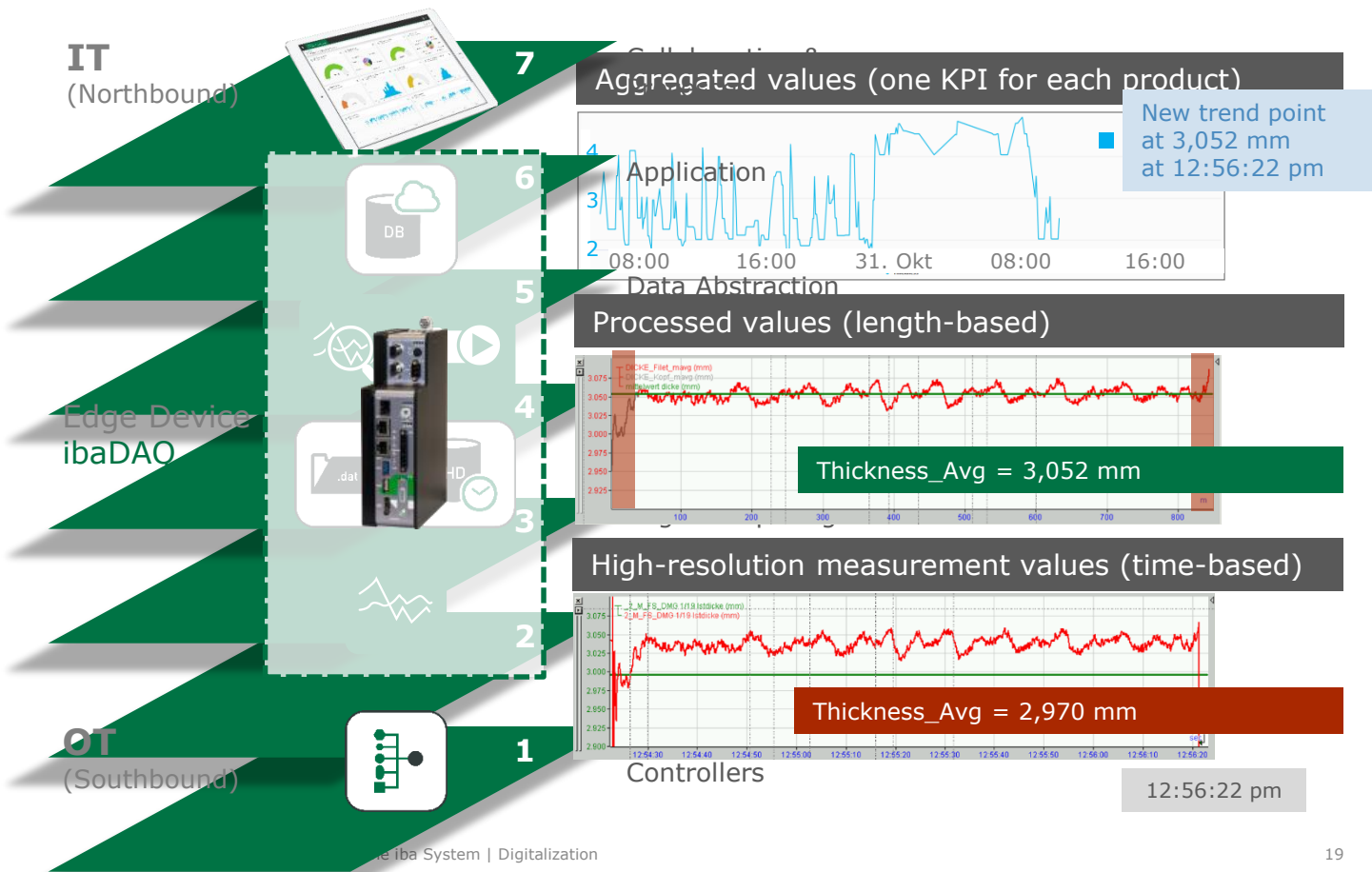
Visualization of KPIs and drill-down to raw measurement data.



- ibaDaVIS: Data Visualization and Information Service
- Web-based visualization for product and process analysis
- **Applications and Tasks**
  - Interactive product and process analysis
  - Data visualization and filtering
  - Search for products or product classes



- **Features**
  - Web-based – platform-independent – responsive
  - Maintenance-free client
  - Access to several databases
  - Drill-down to raw data
  - Configurable dashboards for different user groups
  - Various tile types for different use cases: time trend, histogram, XY-chart, table, gauge, bar chart, pie chart, signal view

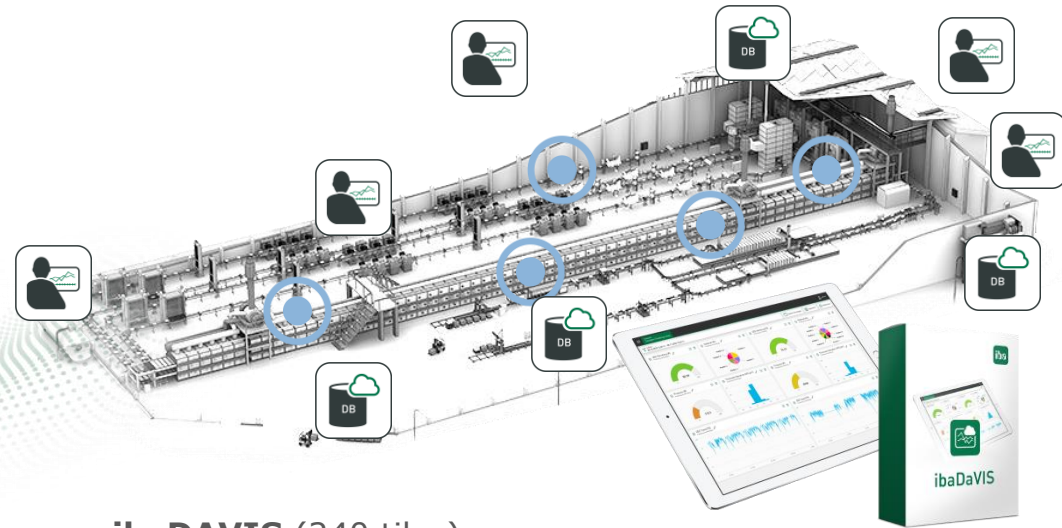


# Scalability of ibaDaVIS



## ibaDaVIS (12 tiles)

- KPIs of one machine
- One ibaPDA system, one database
- Process und product analysis

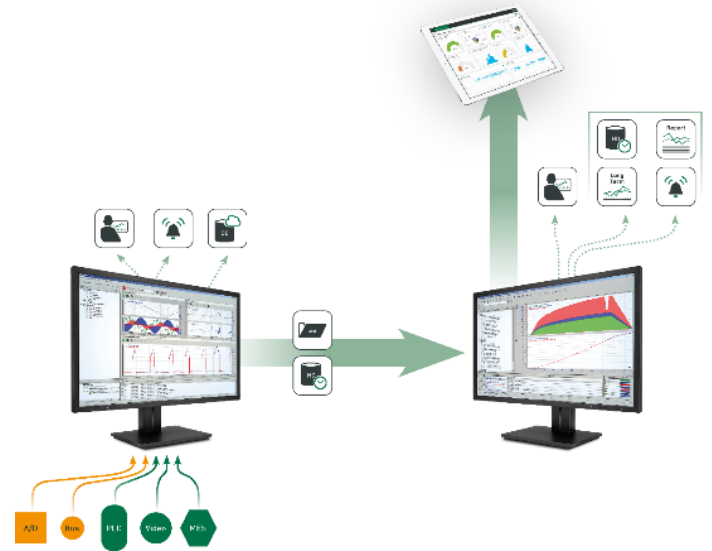


## ibaDAVIS (240 tiles)

- KPIs of a plant
- Several ibaPDA systems, several databases
- Analysis of several products and processes
- Energy consumption of machines
- Visualization of the Overall Equipment Efficiency (OEE) of several machines
- Benchmarking of several machines

## Features

1. Process connectivity
2. Structuring data
3. Assigning data semantics
4. Global time stamping
5. Online visualization
6. Creating events
7. Triggered data recording
8. Storing raw measurement data
9. Calculating KPIs automatically
10. Publishing data
11. Web-server for ibaDaVIS



# The iba System: an open Ecosystem



**Northbound-Connectivity**

SAP HANA  
Apache Kafka  
Siemens MindSphere  
MS Azure (planned)  
MQTT (planned)

**Hot Data**



ORACLE, MS SQL, DB2,  
MySQL, PostgreSQL, ...  
Apache Parquet

**Cold Data**



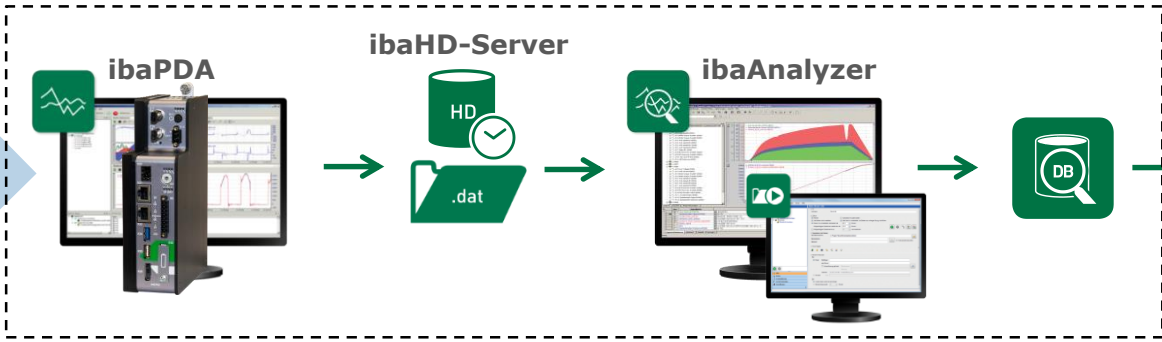
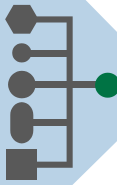
**On Premise IoT Platform  
Data Warehouse**

IT Network

OT Network

Edge

- Operation data
- Production data
- Process data
- PLC data
- Machine data
- Energy data
- Vibration data



**Record high-resolution data**

**Store data**

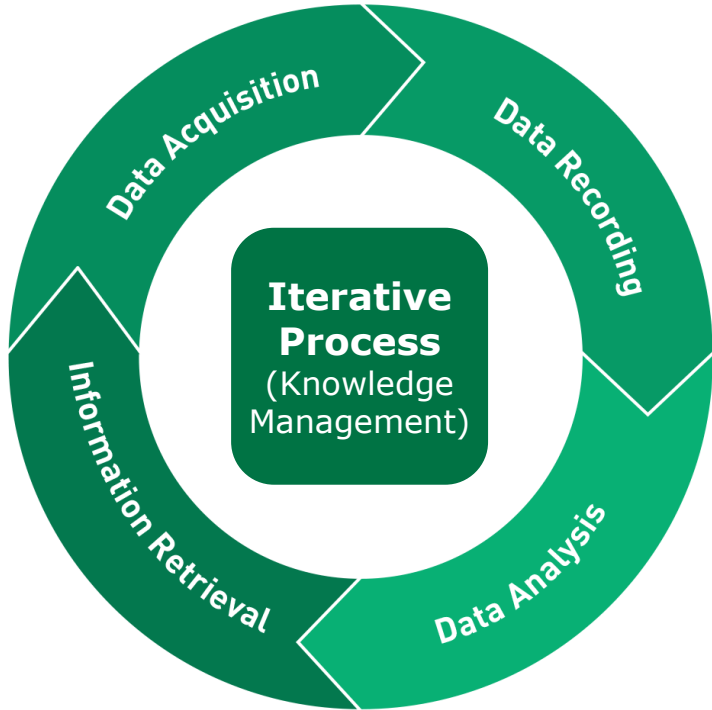
**Calculate KPIs automatically**

**Store KPIs**

**Data Visualization  
Data Analysis**

**Southbound-Connectivity**

- Key Features of the iba-System



## Comprehensive Process Connectivity

See the big picture – build the digital twin of your process.

## Acquisition of Raw Data

Fast data acquisition for root-cause analysis.

## Flexibility

Flexible configuration in all phases.

## Scalability

From one PLC to a Machine or complex systems and plants.

## Consistency

From raw data to information – and back again.

## Gaining Information Automatically

Make big data manageable.

## Open Ecosystem

Publish hot data and cold data to other systems.

# Market Leaders rely on iba



ThyssenKrupp

Rockwell Automation



SIEMENS



ANTHONY VEDER



FUJIFILM



TATA STEEL





# A reliable partner for large companies and SMEs



over **2,000** Customers

over **25.000** Worldwide installations



**20** Regional offices



over **150** Employees worldwide

**80%** Our Employees are Technicians & Engineers

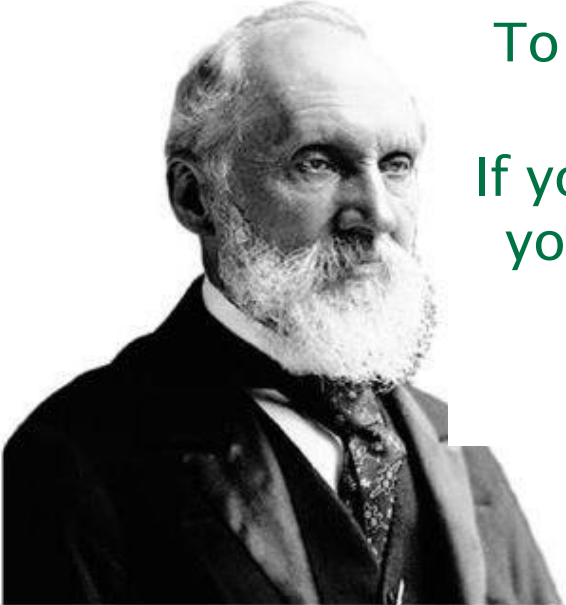


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Ankara
- iba Oceania Pty Ltd.**  
Tomago
- iba S.E.A. PTE Ltd.**  
Singapore

Thank you for attending!

A black and white portrait of Lord Kelvin, an elderly man with a full white beard and mustache, wearing a dark suit and a patterned tie. He is looking slightly to the right of the camera.

To measure is to know.  
If you cannot measure it,  
you cannot improve it.

Lord Kelvin  
(1824 – 1907)