Kontron AIS GmbH

kontron
S&T Group

NEW PV TECHNOLOGIES, NEW DATA NEEDS: HOW MES SOFTWARE TRENDS CAN OPTIMISE PV MANUFACTURING

SECURE QUALITY. IMPROVE PROCESSES. SAVE COSTS.

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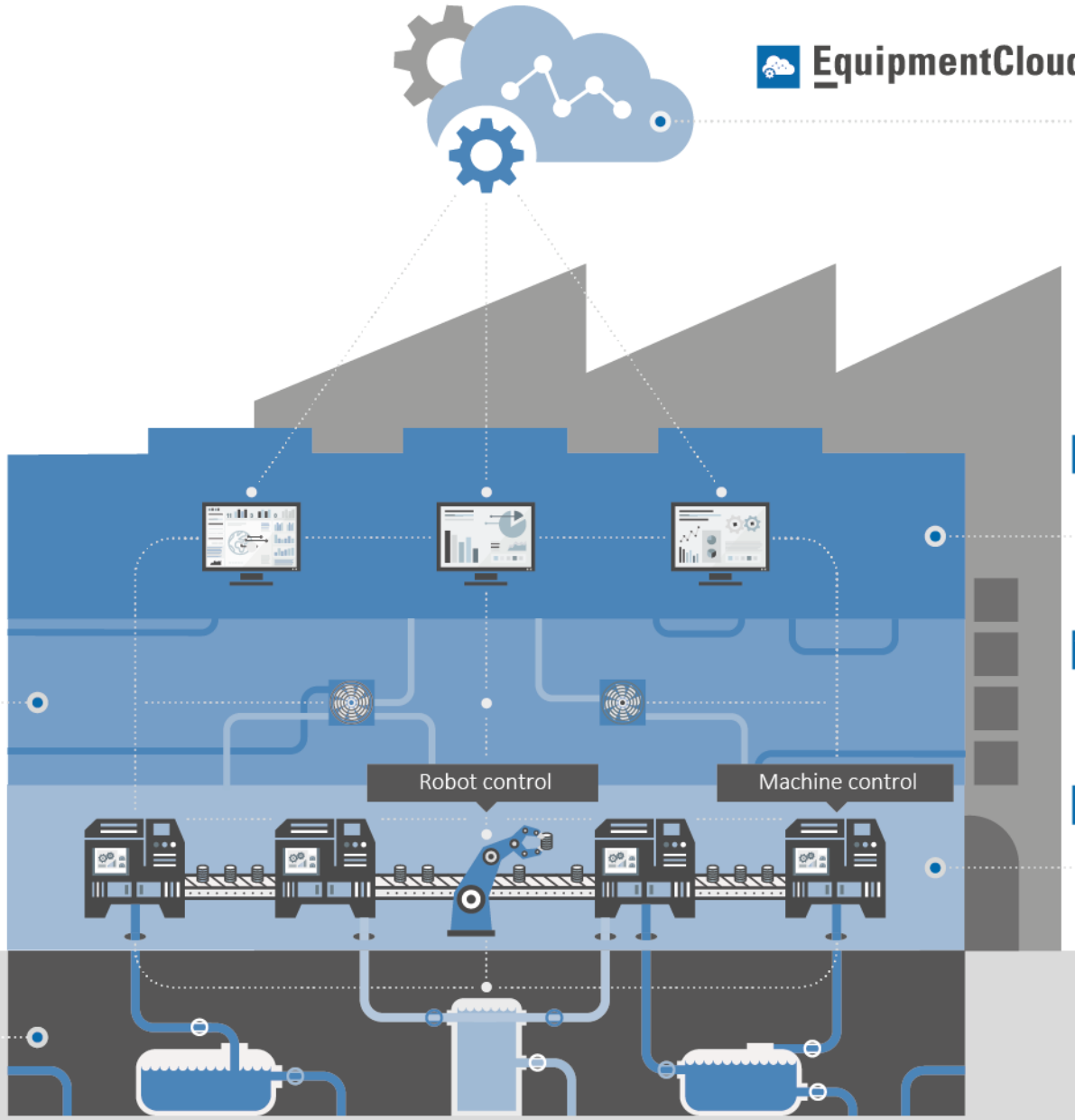
Kontron AIS GmbH

PVTECH TECHTalk Product Series

KONTRON AIS – SMART FACTORY



EquipmentCloud®

IIoT Platform

FabEagle® MES

FabEagle® Monitoring

FabEagle® LC

Factory monitoring, line controller & production control

FabEagle® Connect

FabLink

Integration solutions

ToolCommander®

Production automation

Building automation

Process control systems & Controls for supply systems

KONTRON AIS – PV CUSTOMERS

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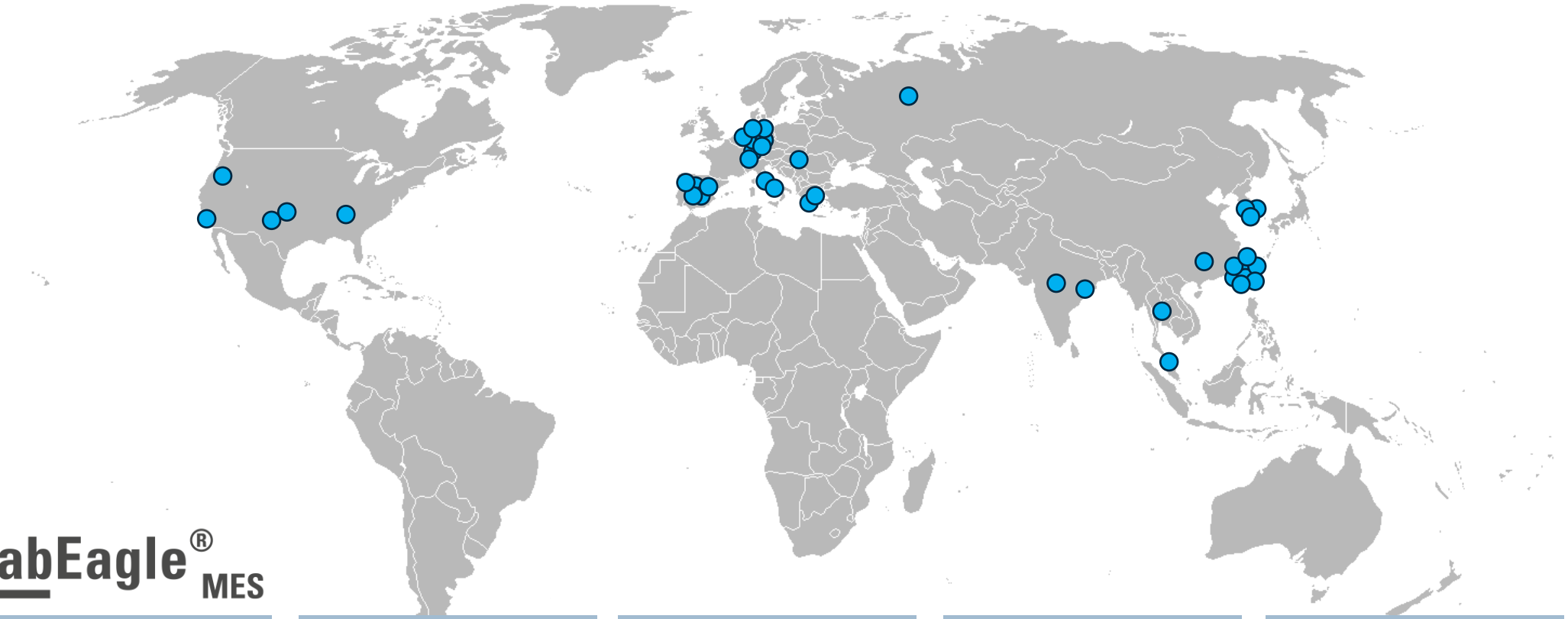


FabEagle® MES

Crystallization Growing Wafering	Thin film production	Silicon based cell manufacturing	Module manufacturing	Solar receiver production
10 x	14 x	48 x	18 x	2 x

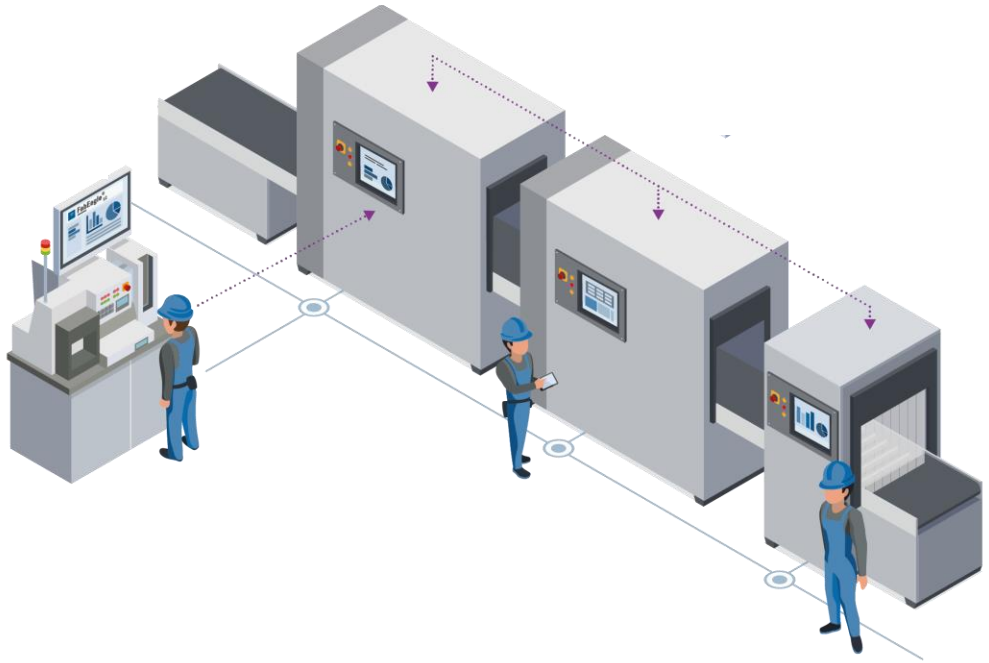
AGENDA

01
VALUE OF DATA AND SOFTWARE TODAY

02
PV TRENDS AND THEIR SIGNIFICANCE FOR SOFTWARE

03
MES FUNCTIONS THAT ARE NEEDED TODAY

04
A LOOK AT MES PRACTICE



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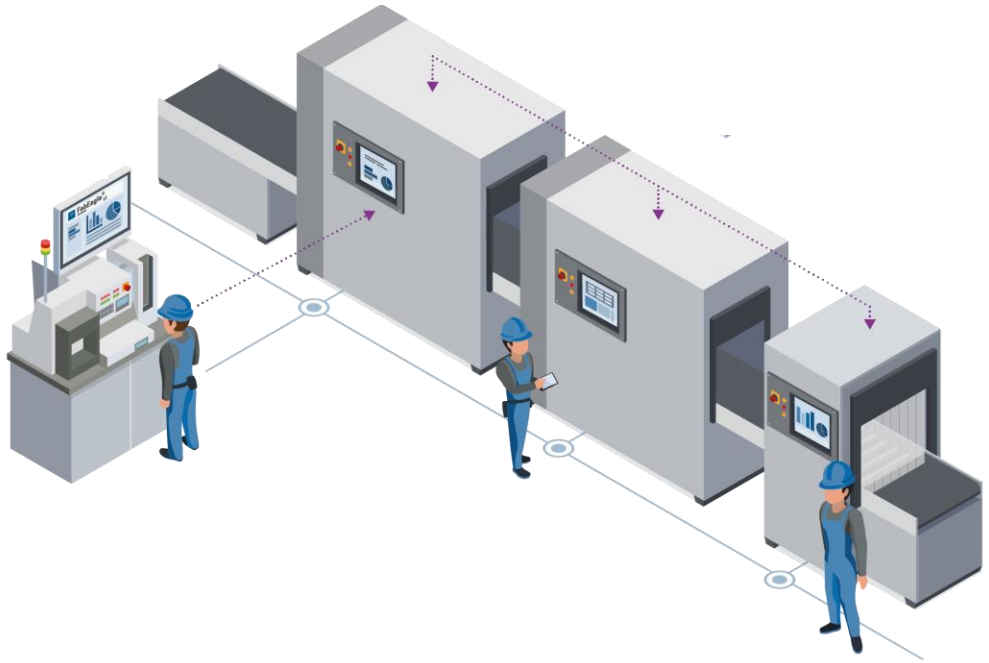

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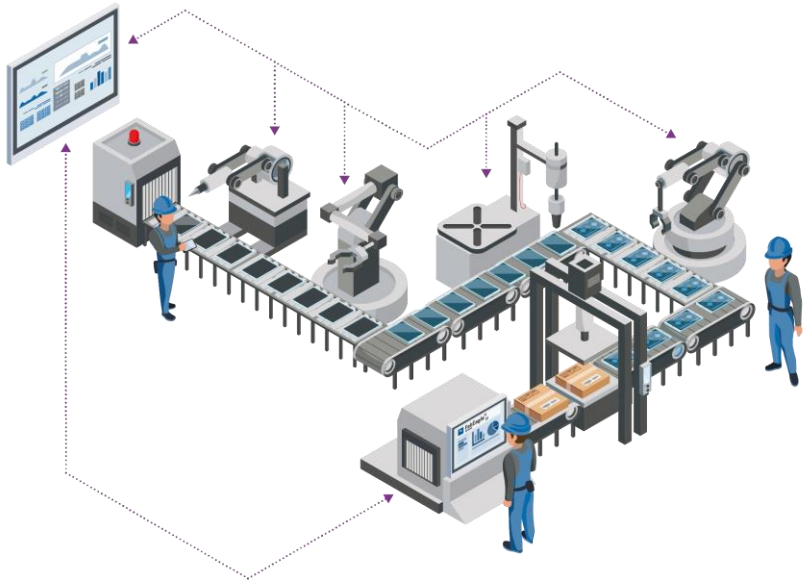

- Big data sets enable detecting small process dependencies
- Data analysis improve quality and throughput
- Identify maintenance needs early to avoid downtime
- Personalised visualization of equipment data for improved workflow

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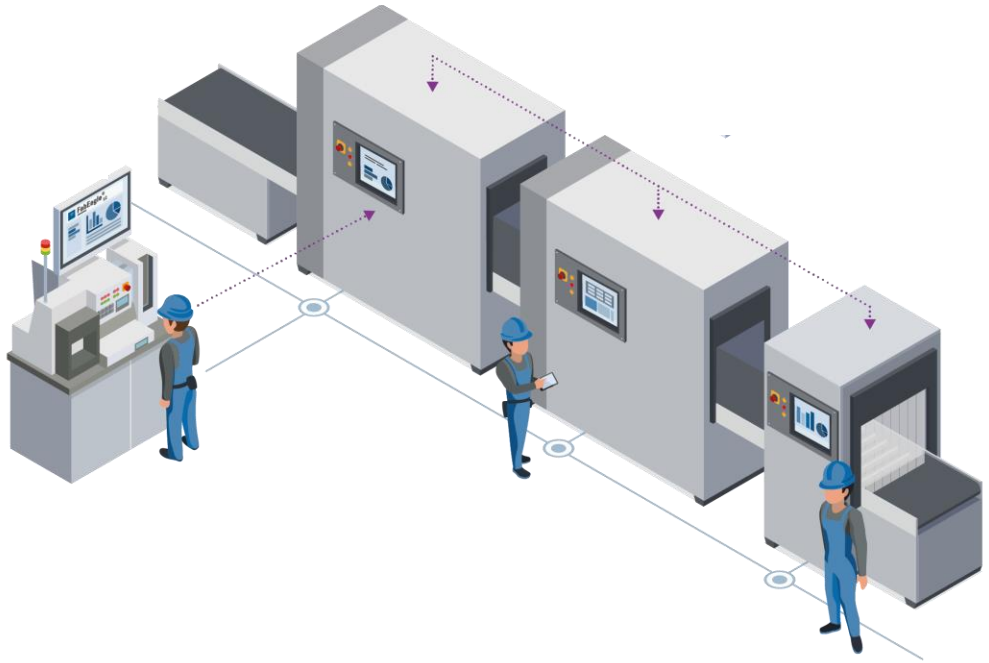


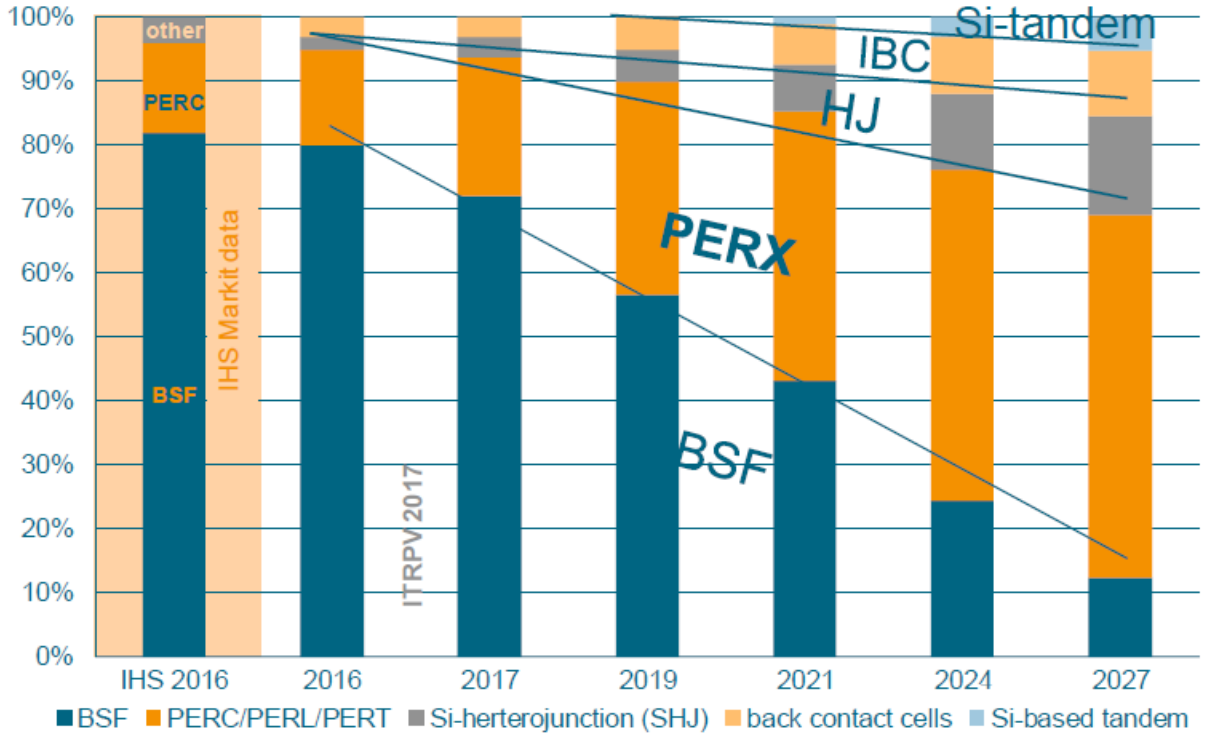
PV TRENDS AND THEIR SIGNIFICANCE FOR SOFTWARE

1. Factor production complexity

- Increasing complexity causes extensive data sets which need to be analysed
- More inline equipment is used to test quality
- New advanced equipment provides high data output with high resolution

Cell products: cell technologies

(Source: VDMA, ITRPV)



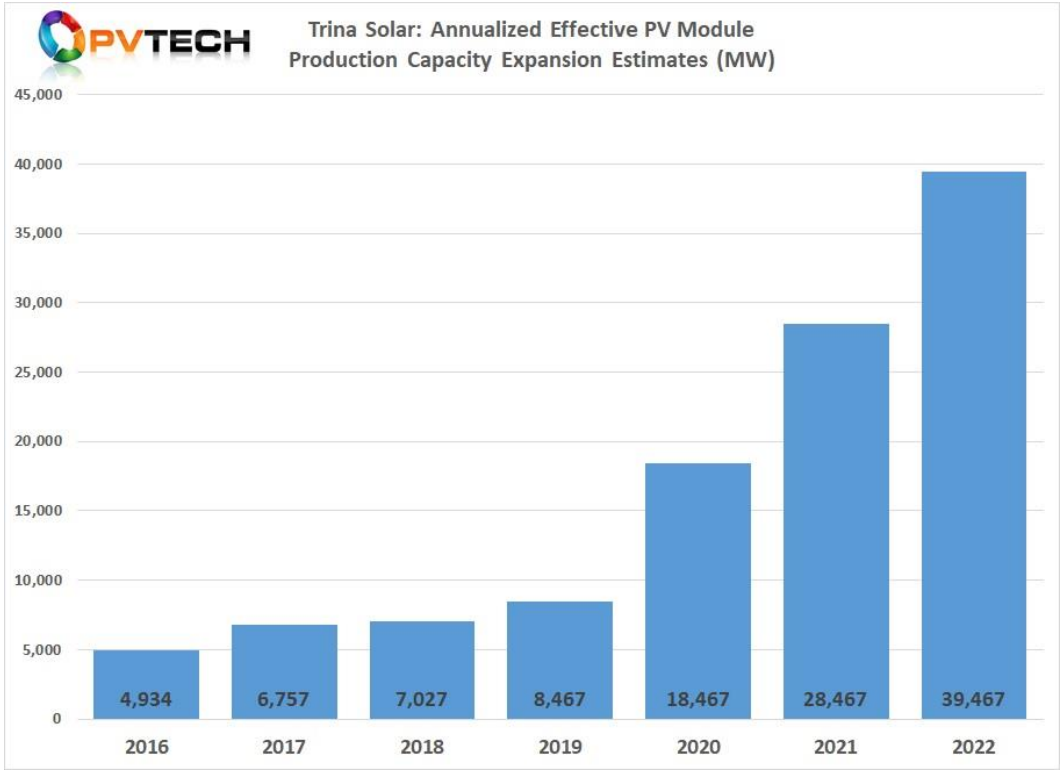
PV TRENDS AND THEIR SIGNIFICANCE FOR SOFTWARE

2. Factor production capacity

- Data volumes increase proportionally to production volumes
- With higher throughput per factory, the risks increase (e.g., cost of downtime)
- Requirement for comparability between several company locations

Trina Solar: Annualized effective PV module

(Source: pv-tech.org)



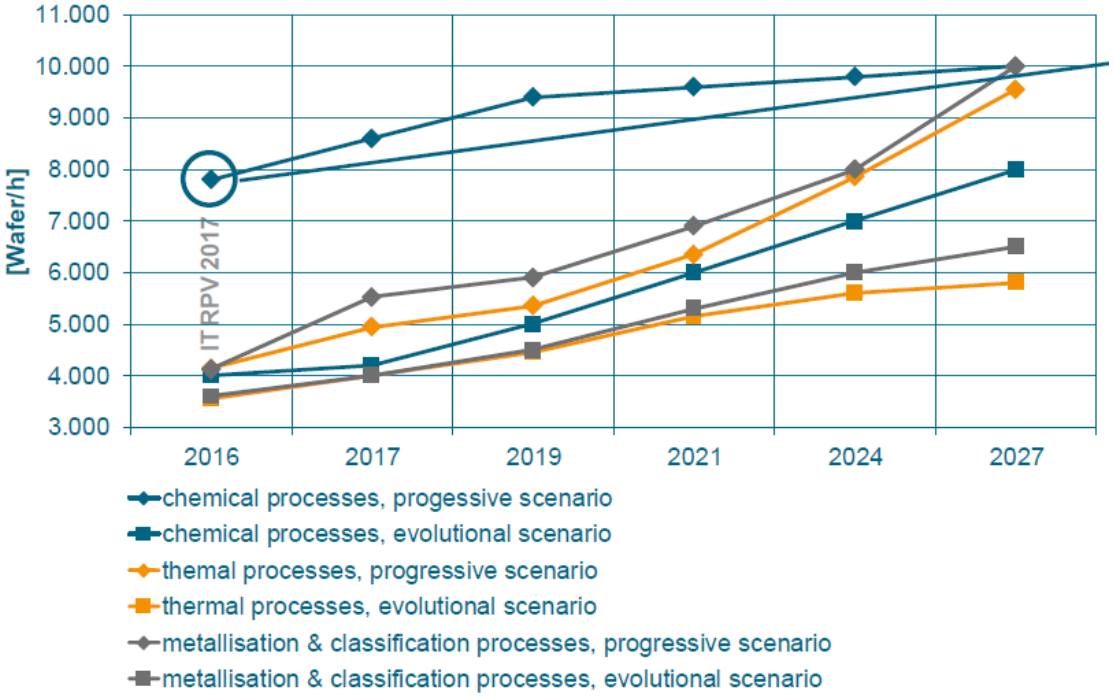
PV TRENDS AND THEIR SIGNIFICANCE FOR SOFTWARE

3. Factor maintenance and uptime

- High-cost pressure requires preparation of planned and unplanned downtime
- Information on handling complex equipment must be available immediately
- Support through digital documentation of equipment data and maintenance to optimize service calls

Cell products: cell production tool throughputs

(Source: VDMA, ITRPV)



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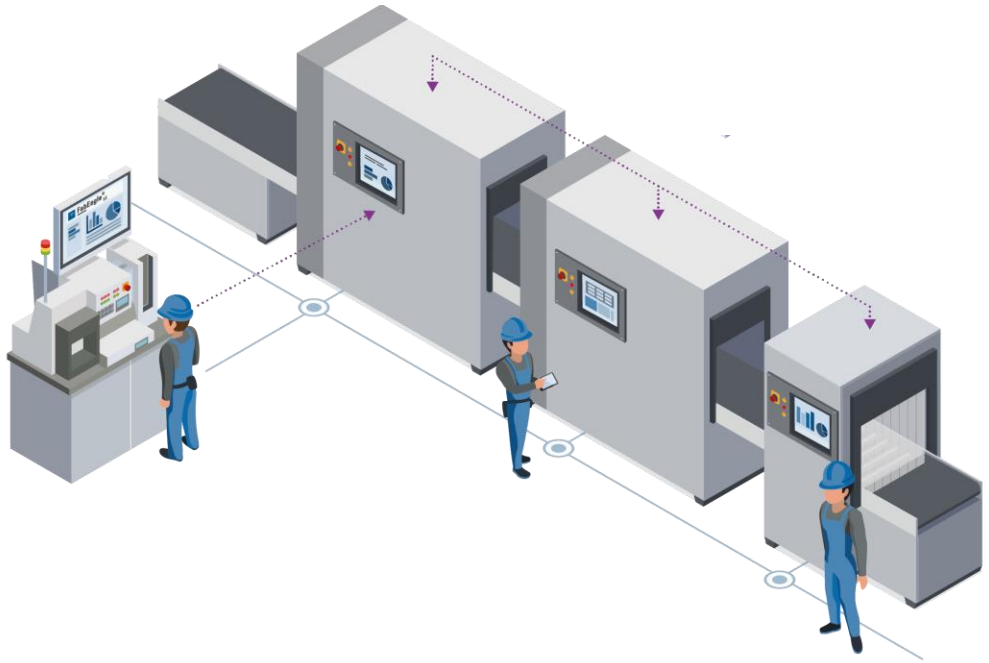

MES FUNCTIONS THAT ARE NEEDED TODAY

INCREASED TRANSPARENCY

- Online Process Visualization
- Manufacturing Visualization
- Trends / Reporting
- Logbook / Machine Log

TRACEABILITY

- Material and Carrier Tracking & Interlock
- Equipment Data Acquisition
- Process Data Acquisition
- Long-term Archiving

PRODUCTION CONTROL

- Order Management
- Workflow Management
- Maintenance Management
- Online-SPC
- Event Manager

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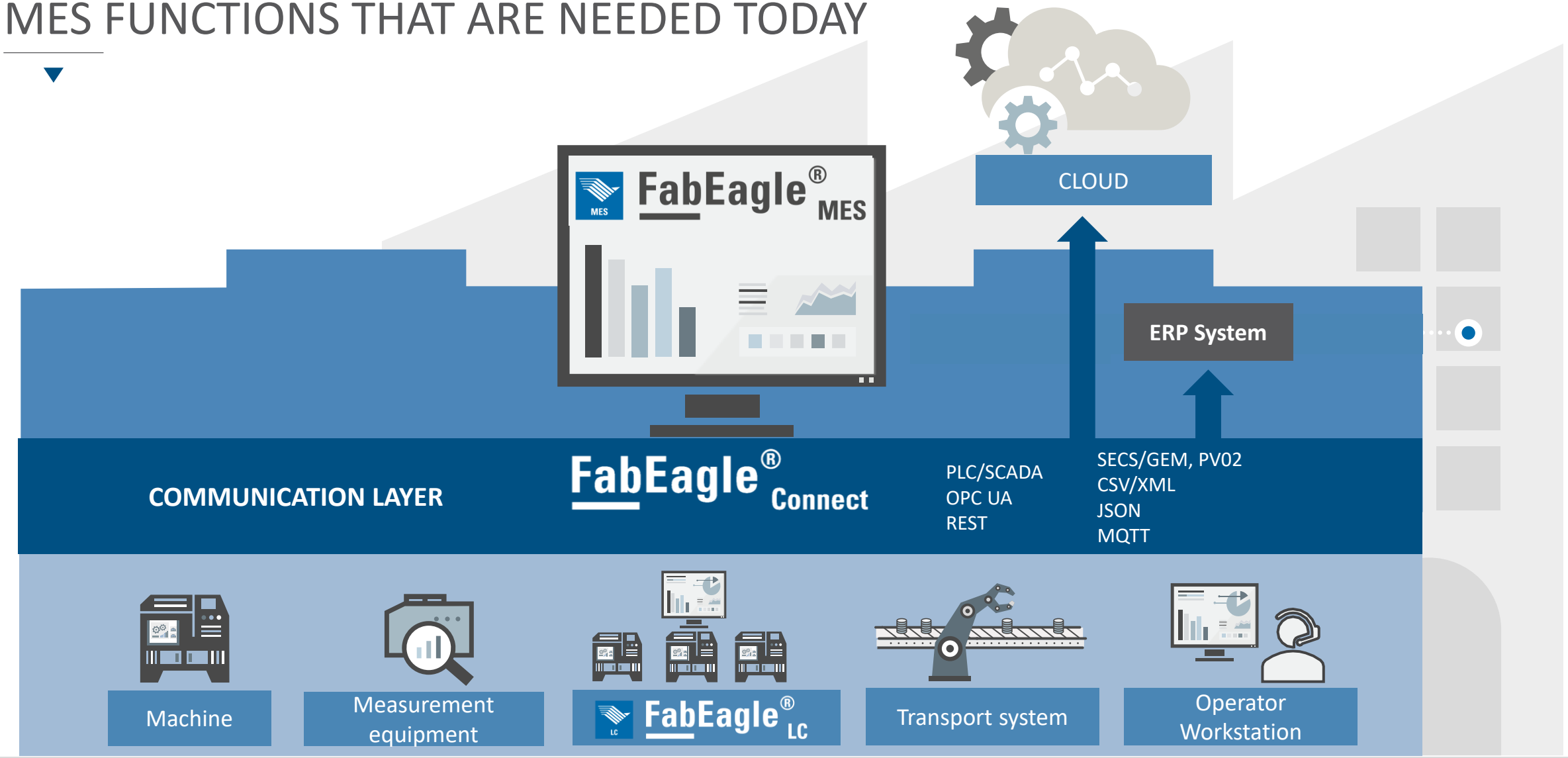

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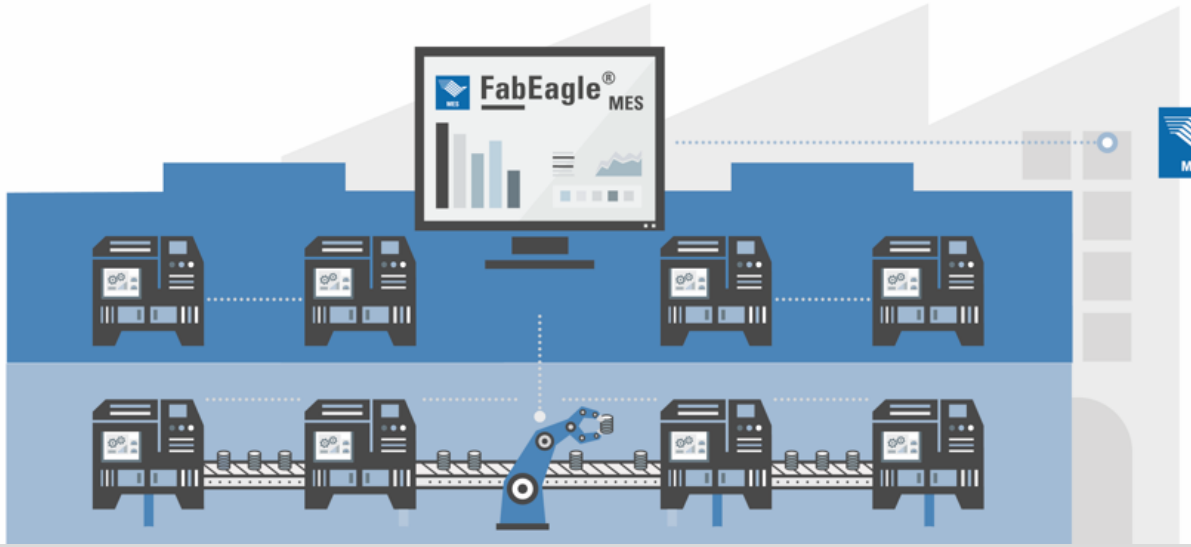
MES FUNCTIONS THAT ARE NEEDED TODAY

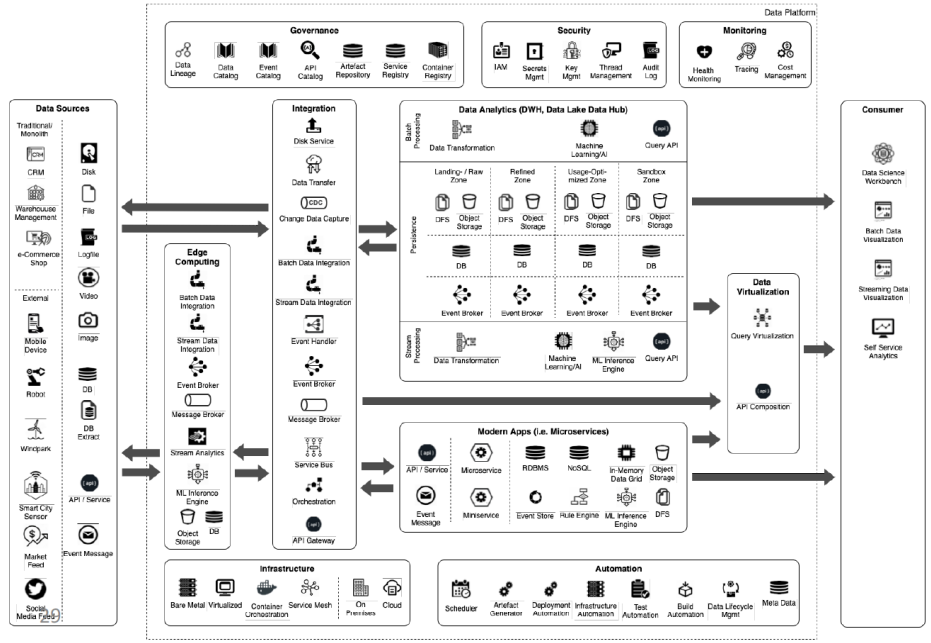
- Production visualization
- Order manager
- Work plans
- Recipe management
- Production control
- Material tracking
- Machine and production data acquisition
- Product data acquisition
- Reporting & Online SPC
- Archiving
- Operator Workstation
- User management



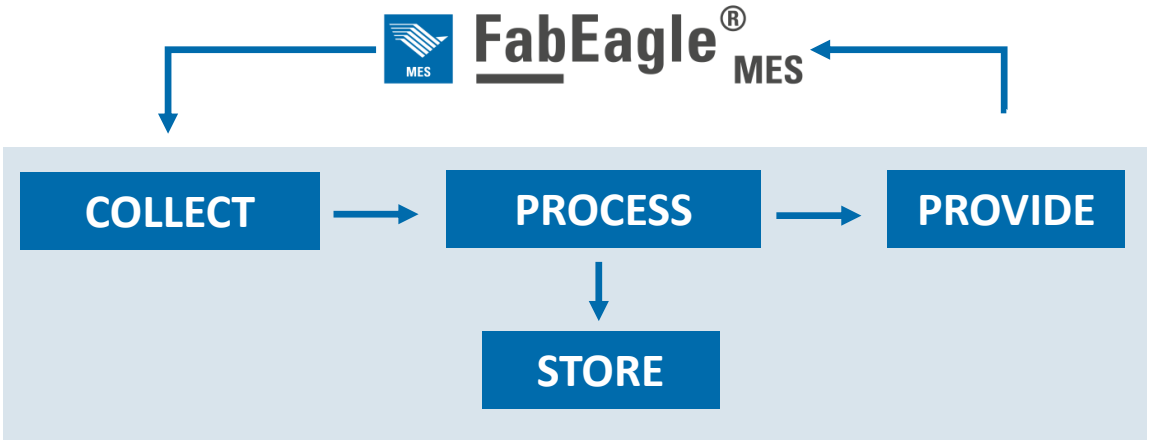
FabEagle® MES

BLUEPRINT FOR MODERN DATA ARCHITECTURE

- Event based
- Separation of storage and compute
- Automation over manual coding and processes
- Keep raw data in central place with potential storage tiering

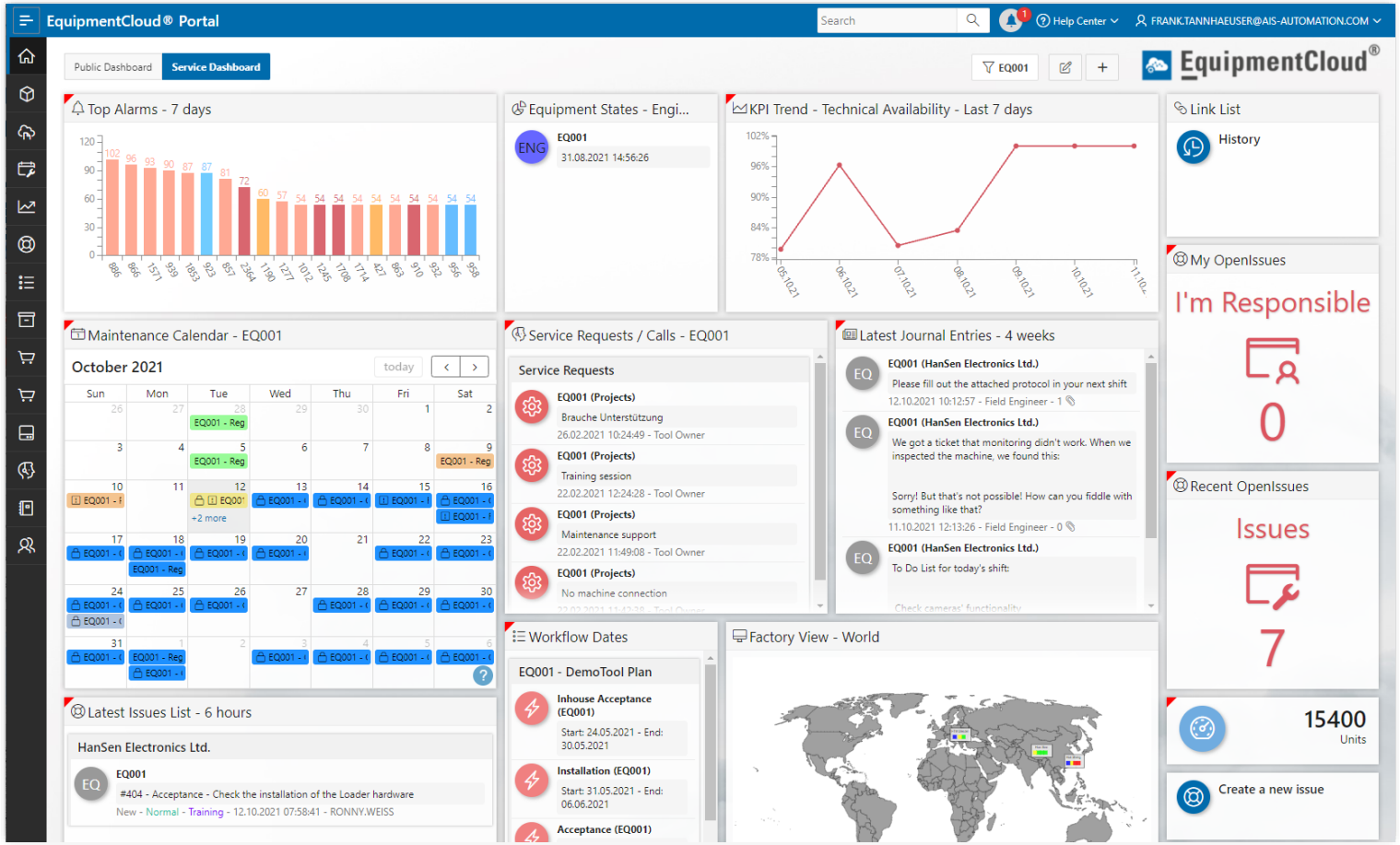


Hybrid solution of MES and Cloud



EquipmentCloud®

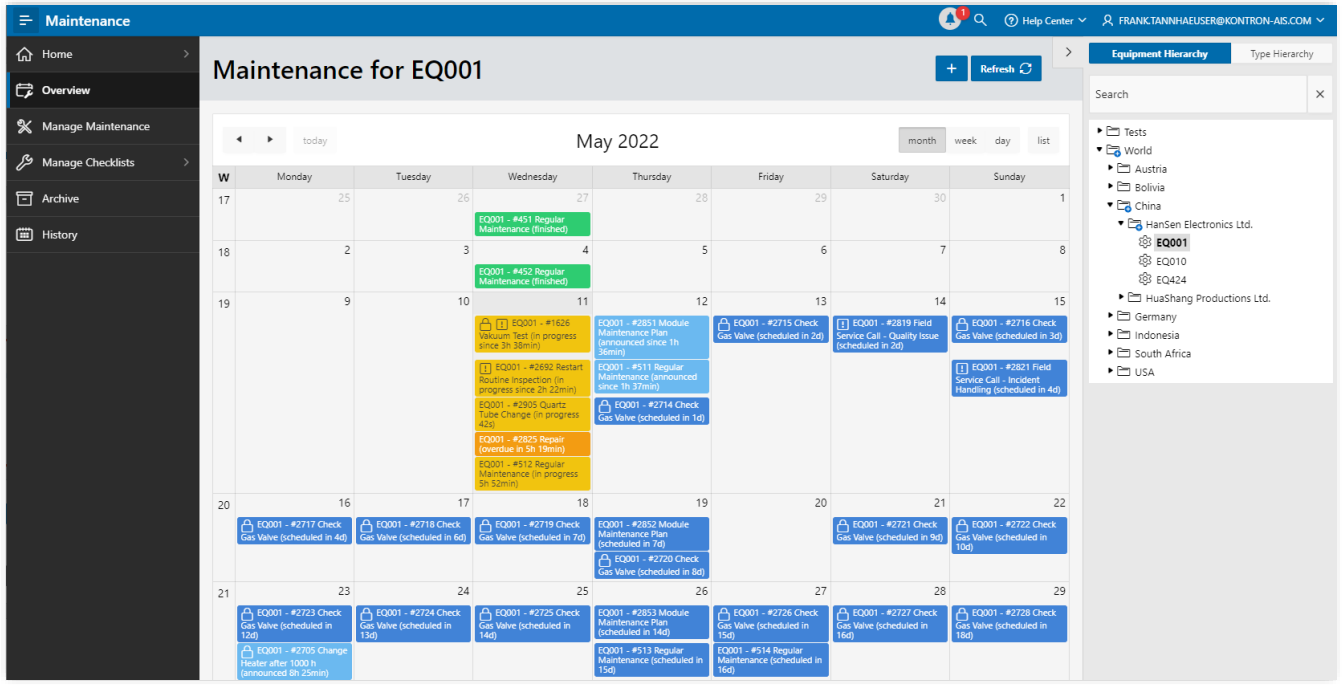
CLOUD-ENABLED MES EXTENSION



Apps to support production:

- Monitoring
- Maintenance
- Documents
- Open Issues
- Knowledge Base
- Spare Parts
- Remote Assistance

CLOUD-BASED MAINTENANCE MANAGEMENT



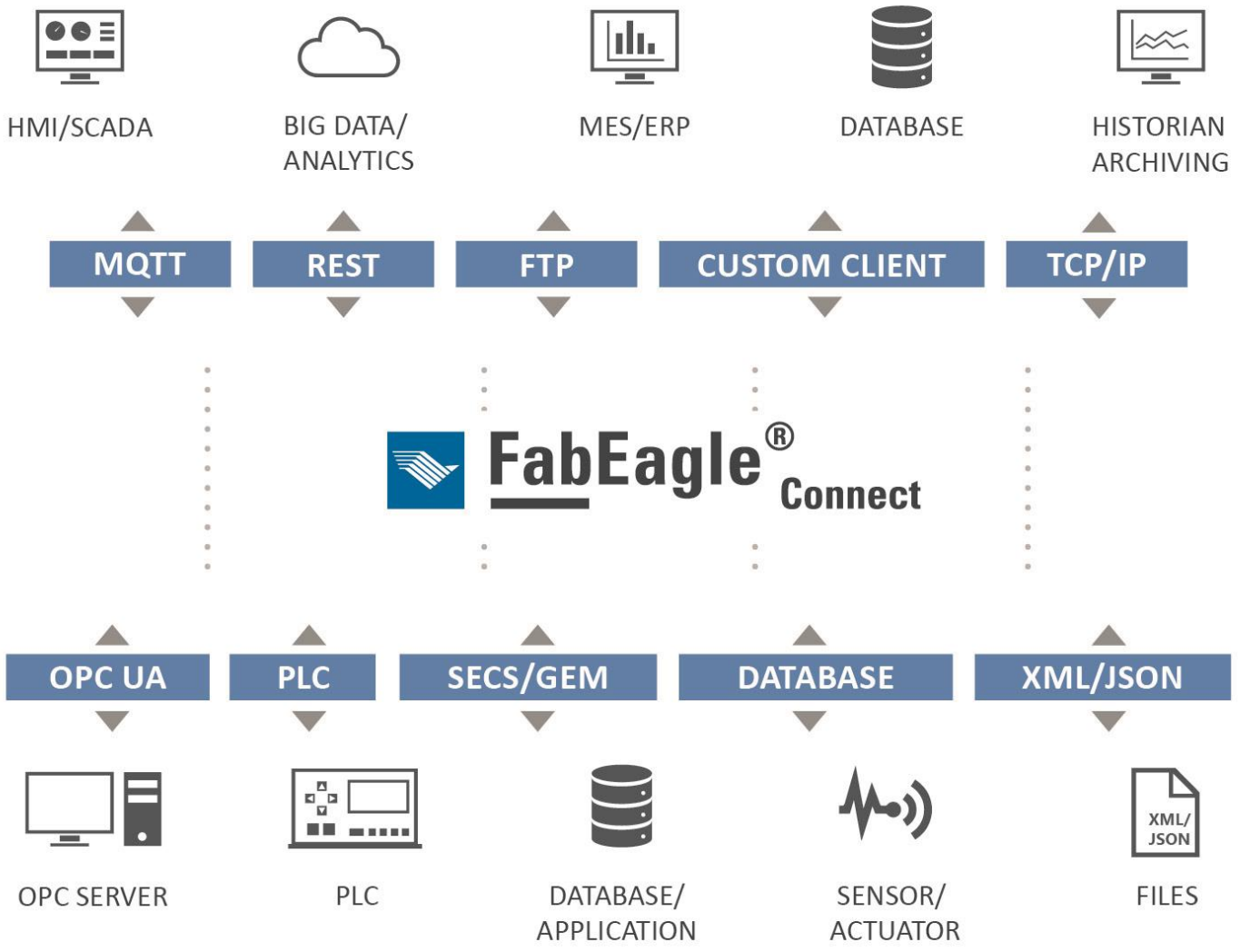
The functions:

- Maintenance calendar
- Cyclic, alarm or condition-based, Process value-based
- Incremental counter maintenance
- Integrated workflows with variable parameters

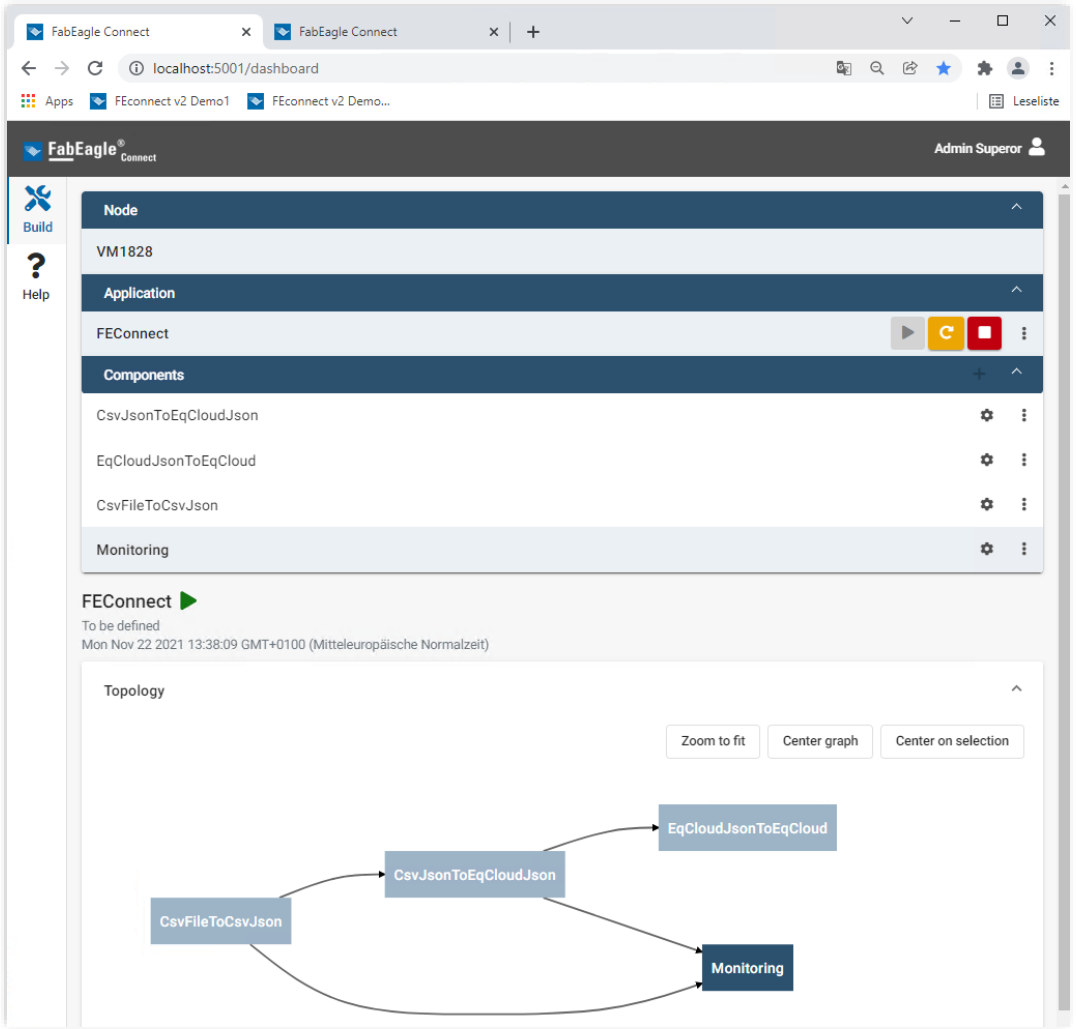
Your benefit:

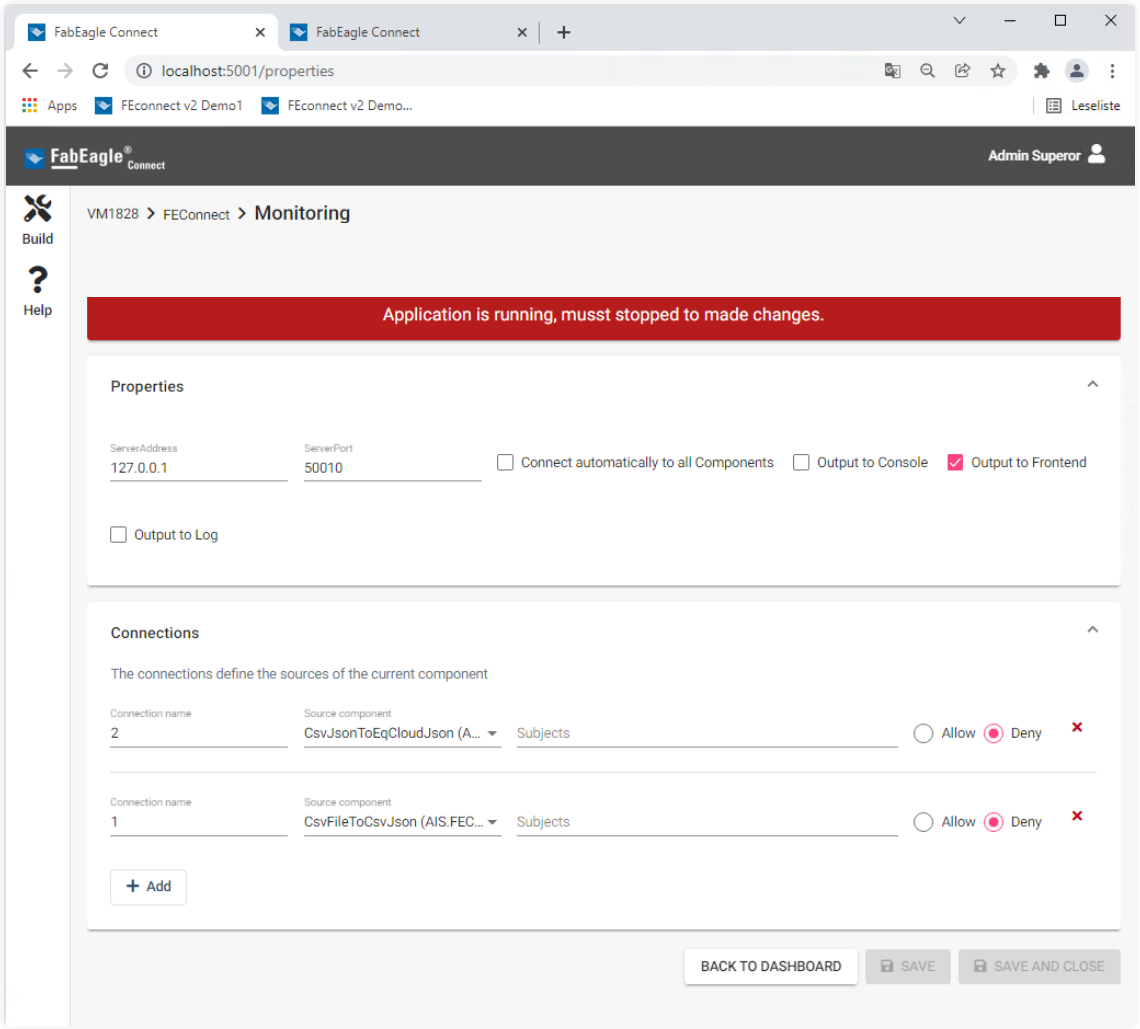
- Planning, documentation (link to workflows) and reminder in one tool

EQUIPMENT INTEGRATION



USER INTERFACE FOR CONFIGURATION AND ADMINISTRATION





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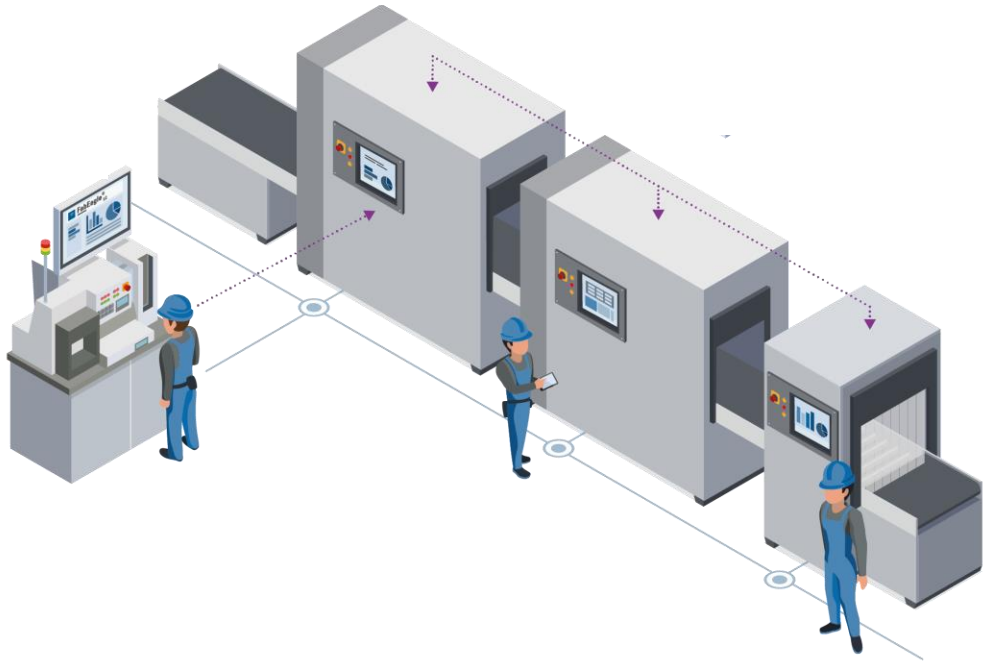
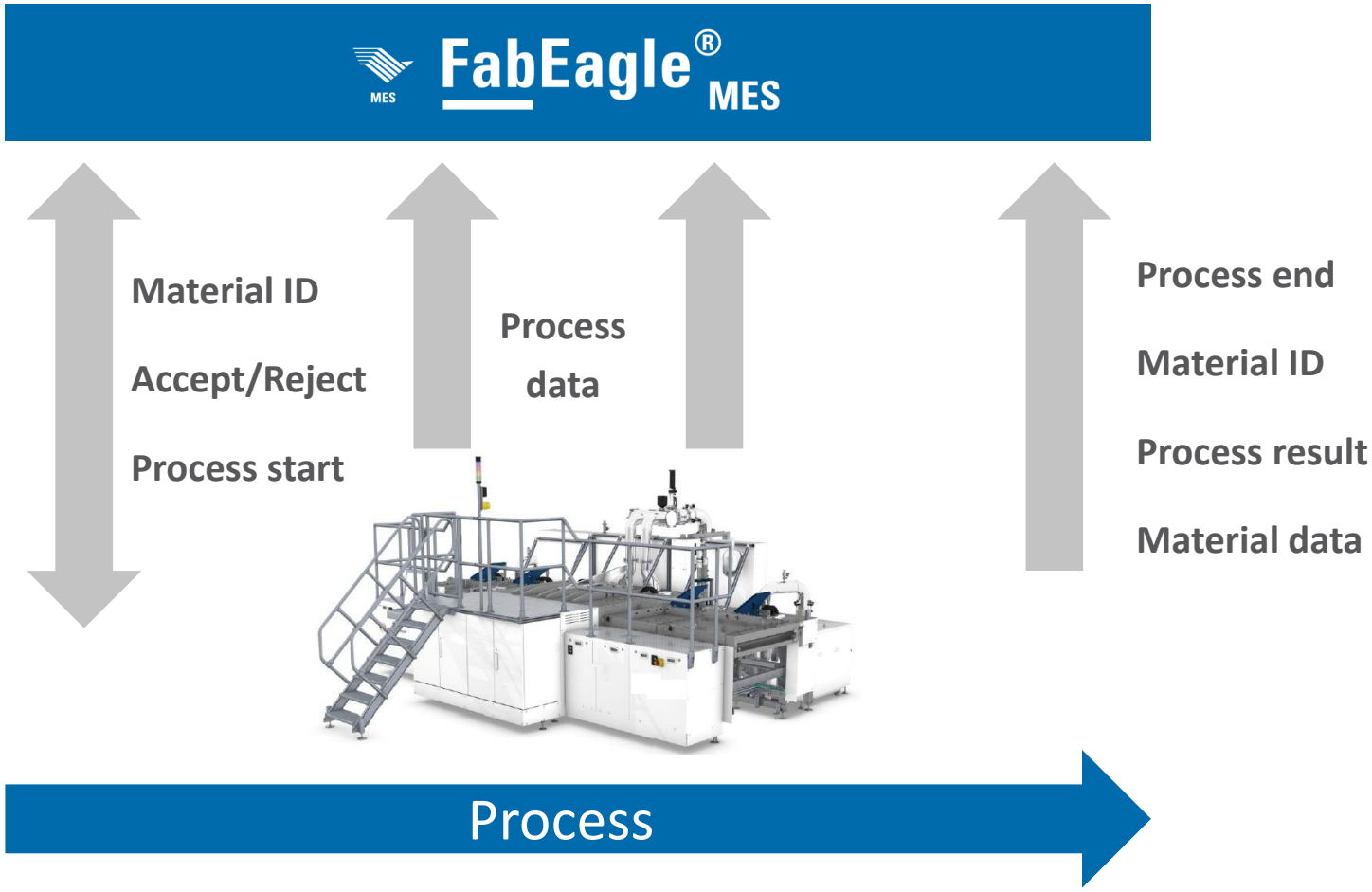
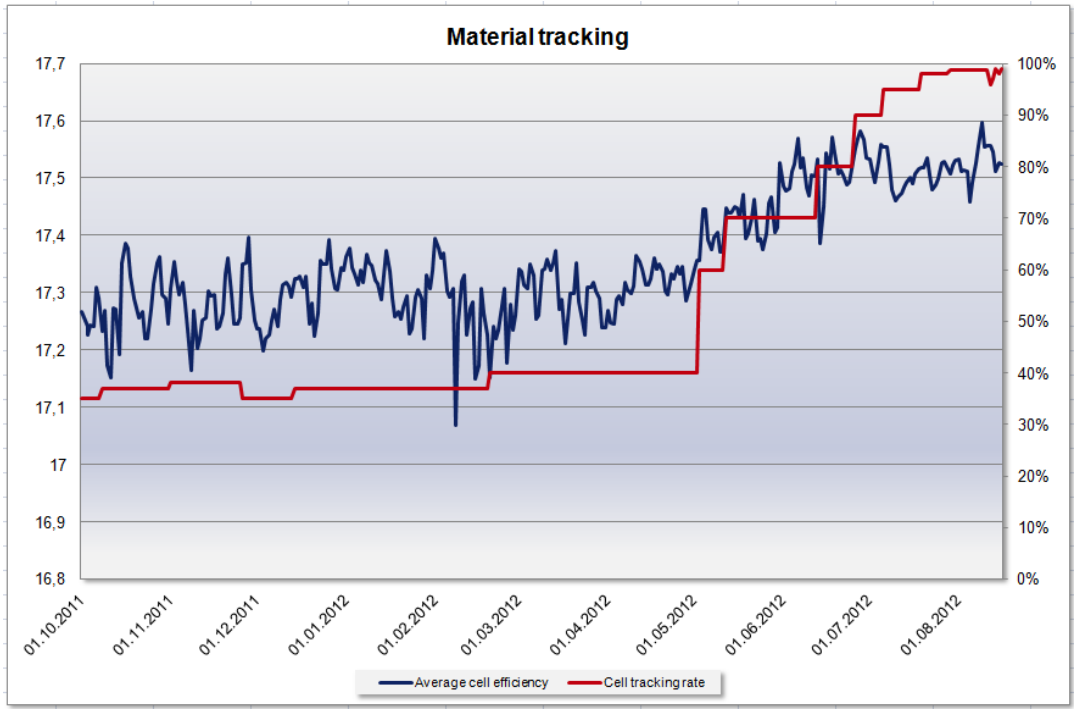


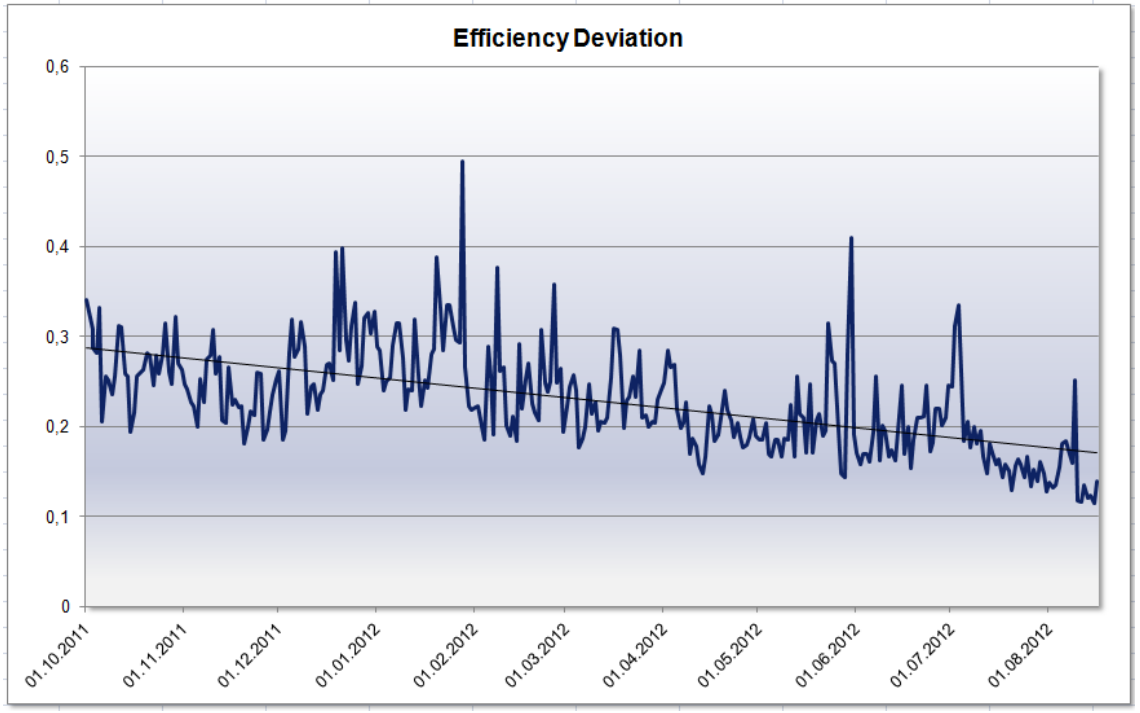
COMMUNICATION MES – EQUIPMENT



BENEFITS OF VIRTUAL TRACKING IN SOLAR CELL PRODUCTION

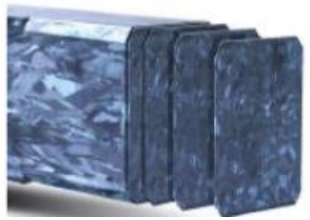
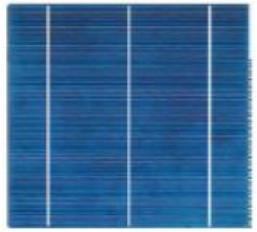
- Increase efficiency by using virtual wafer tracking in solar cell manufacturing
- Reduce efficiency deviations





EXAMPLE OF A SOLAR CELL AND MODULE PRODUCTION

- More than 1000 connected equipment to FabEagle® MES to produce several 100.000 solar cells per day
- Real-time connection to ERP to track finished and semi-finished products
- Process and Equipment data acquisition with Online-SPC
- Material and carrier interlock
- Product Track & Trace
- Monitoring equipment performance

Crystal Growing → Cropping → Wafering → Solar Cell → Solar Module

BENEFITS OF MES FUNCTIONS THAT ARE NEEDED TODAY

INCREASED TRANSPARENCY

- Reduce downtimes and troubleshooting to optimize production
- Motivate employees with feedback on the production state

TRACEABILITY

- Improving product quality by collecting material batches and process data
- Rapid response time to deviations by automated data acquisition

PRODUCTION CONTROL

- Central process control by standardizing interface
- Meet delivery commitments by transparency in the progress of orders

TIME FOR YOUR INPUT

- Please give us your feedback on the Polls
- The results are available in the right bottom corner

Secure quality. Improve processes. Save costs.

FabEagle® MES

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