



# LIVEXORX

A NEW ERA IN PRODUCT LIFECYCLE INNOVATION

**SESSION ID: PL1114B**

## LEVERAGING THE DIGITAL THREAD FOR IMPROVED ENGINEERING TO MANUFACTURING TO SERVICE COLLABORATION

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Lufthansa Technik

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**With our passion for aviation  
we make the world take off.**



**Lufthansa Technik**



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# ABOUT THE SPEAKERS



**Dr. Severin Todt**



*Senior Director IT  
Design, Completion &  
Manufacturing  
Lufthansa Technik*



**Ivan Maretic**



*Senior Project Manager IT  
Product Lifecycle  
Management  
Lufthansa Technik*



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*Senior Project Manager IT  
Internet of Things &  
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# LUFTHANSA TECHNIK BUSINESS LINES



**Engine  
Services**



**Aircraft  
Component  
Services**



**Aircraft  
Maintenance  
Services**



**Orig. Equipment  
& Special A/C  
Services**



**Digital Fleet  
Services**



# Lufthansa Technik

## AT A GLANCE

**800+**

customers worldwide



**5,6 bn**

billion euros revenue



**20,411**

employees worldwide

More than

**4,242**

aircraft under  
exclusive contract



**Hamburg**

headquarters



**>30**

Subsidiaries and  
affiliates worldwide



**5.2%**

Adjusted EBIT Margin  
in 2021



# FOUR-POINT LANDING FOR COMPETENCE

We are certified around the globe as a maintenance (Part 145), design (Part 21/J), production (Part 21/G) and CAMO organization.

## 1. Maintenance



Lufthansa Technik holds maintenance organization approvals by EU authorities and authorities of more than 40 further countries.

## 2. Design



Holding Design Organisation Approvals (DOA) allows Lufthansa Technik e.g. to perform changes or repairs on aeroplanes for which Lufthansa Technik is not type-certificate-holder.

## 3. Production



Holding production approvals allows Lufthansa Technik to manufacture components for the construction of aircraft.

## 4. CAMO



With our CAMO (Continuing Airworthiness Management Organization) team, we are able to offer services supporting aircraft owners – in particular lessors and banks as well as VIP aircraft owners – in meeting these requirements.

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# EXCELLENCE IN MAINTENANCE, REPAIR AND OVERHAUL



Aircrafts



Engines



Components



# PAVING THE WAY TO SUSTAINABLE AVIATION



AeroSHARK and Cycleclean help to reduce an aircraft's fuel burn and emissions



## AeroSHARK

Optimization of the aerodynamics on flow-related parts.

Using nature as a role model, Lufthansa Technik and BASF have jointly developed AeroSHARK, a bionic surface film that can easily be applied to large portions of commercial aircraft's surfaces.



## Cycleclean

Fuel reduction by engine wash.

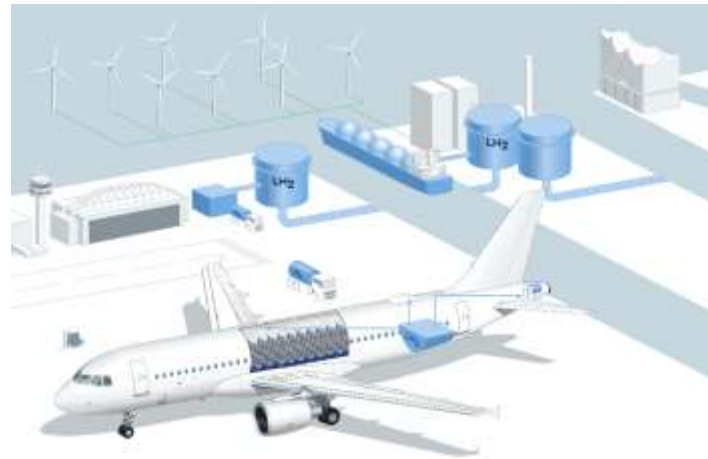
Lufthansa Technik's Cycleclean® Engine Wash system injects vaporized hot water directly into the core engine to remove combustion residues and other contamination.



# PAVING THE WAY TO SUSTAINABLE AVIATION



Hydrogen Aviation Lab provides impulses for a carbon-neutral future.



## Hydrogen Aviation Lab

Operate a LH2 field laboratory.

Liquid hydrogen (LH2) is increasingly being envisaged as a key to future carbon-neutral aircraft generations.



In order to provide valuable impulses for the designers of future aircraft Lufthansa Technik is partnering with renown research and industry institutions and will jointly operate a comprehensive LH2 field laboratory based on an Airbus A320.



## Aircraft Completion & Modification

# VIP & SPECIAL MISSION



## SOFIA

Stratospheric Observatory for Infrared Astronomy.



## ZERO G

Parabolic aircraft at the service of space research and technology.



## AeroMedical Solutions

Patient airlift solutions - from single patient to mass medevac



# GOVERNMENTAL AIRCRAFT

# PAVING THE WAY TO ELEVATE LUFTHANSA TECHNIK

Industry Transformation Through Digital

Digitally enabled  
MRO products



Digitally transformed  
production system



## Digitize the Core

Our way to #1 digital MRO

Evolving the efficiency of our  
production system through fully  
digital processes into the future



Digital cabin  
solutions

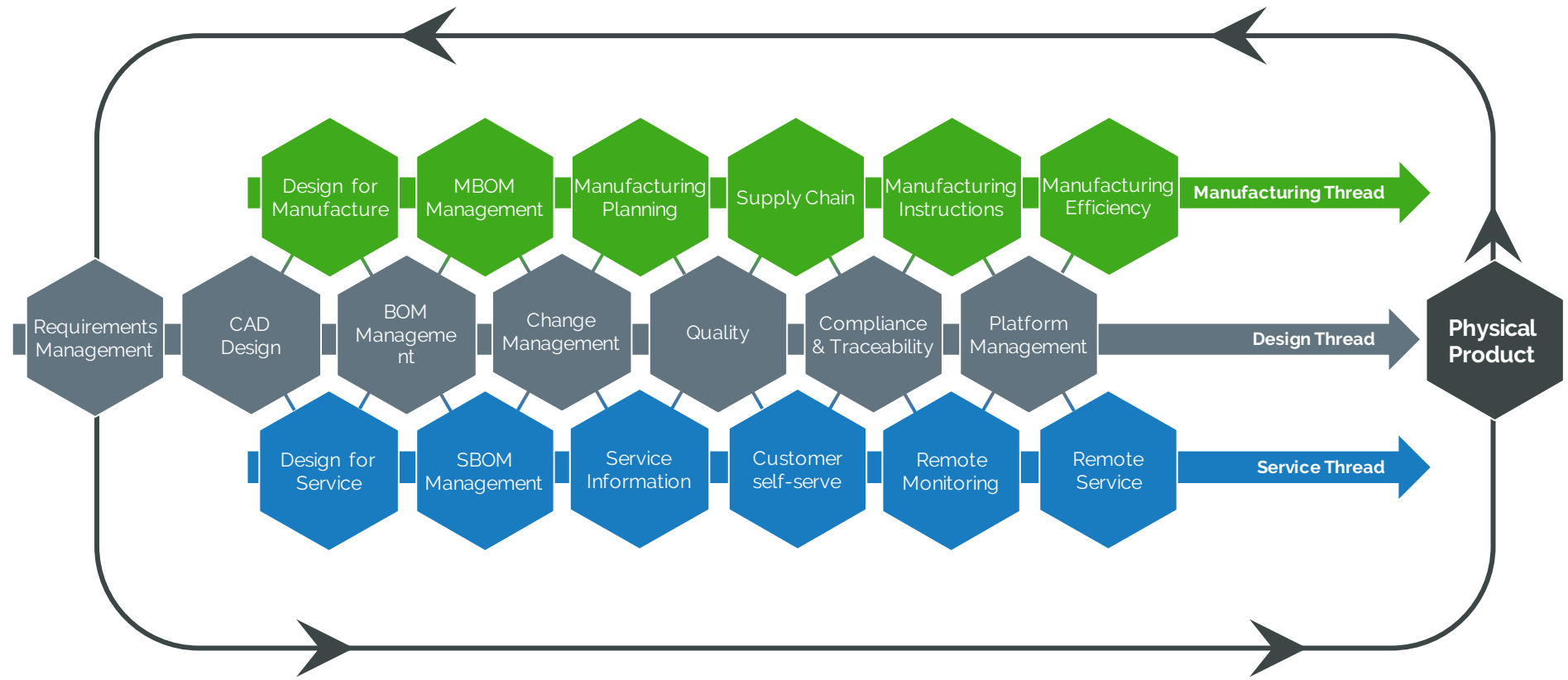


Customer driven  
innovations

# DIGITIZE THE CORE – LEVERAGING THE DIGITAL THREAD

FOR IMPROVED ENGINEERING TO MANUFACTURING TO SERVICE COLLABORATION

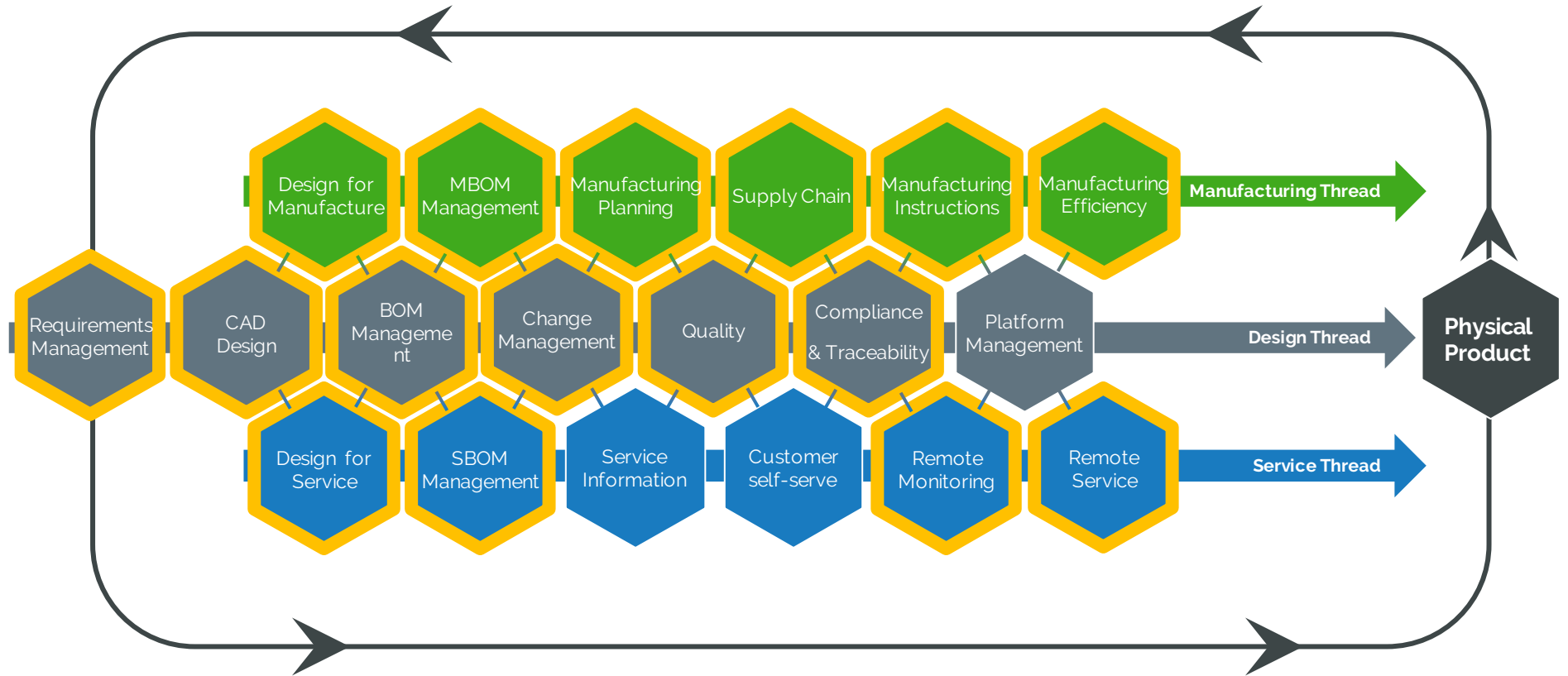
**Digitize  
the Core**  
Our way to #1 digital MRO



# DIGITIZE THE CORE – LEVERAGING THE DIGITAL THREAD

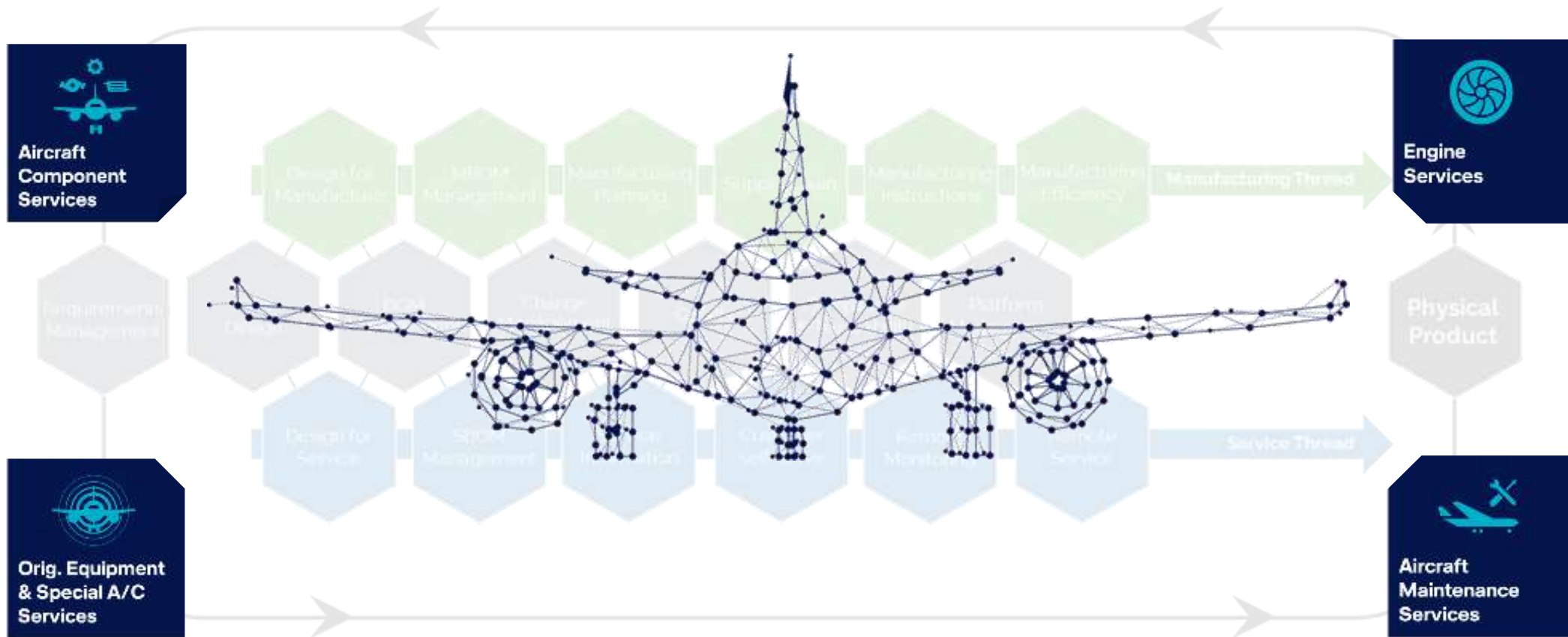
FOR IMPROVED ENGINEERING TO MANUFACTURING TO SERVICE COLLABORATION

**Digitize  
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Our way to #1 digital MRO



# PLM JOURNEY – OUR GOAL

*Creating a model-based digital thread with PLM as the source of all engineering related data*



# PLM JOURNEY – VALUE DRIVEN APPROACH

Standardization  
Flexible Staffing  
Quality & Audit  
Customization  
Single-Point-of-Truth  
Design to Cost  
Future Services & Afterm.  
Shortened Development Times  
Data Security

**Example: Business Values → Standardization**  
Fast Onboarding  
Re-organisation of Tasks and Responsibilities  
Process Standards (Best Practice) / Human Factors  
Simpler Outsourcing/ Offshoring  
Workflow supported Change Mgmt.  
Transparency Project Status  
Process Measurability



**Business Implementation**



Process Definition & Employee Trainings



OBJECTIVE	BUSINESS VALUE → BUSINESS GOAL		
XYZ			
Objective Owner: XYZ			
KEY RESULTS	Target score*	Current score	Confidence level
<input type="checkbox"/> Key Result 1	Tbd	Tbd	n/a
<input type="checkbox"/> Key Result 2	Tbd	Tbd	n/a
<input type="checkbox"/> Key Result 3	Tbd	Tbd	n/a



**IT Implementation by SCRUM**

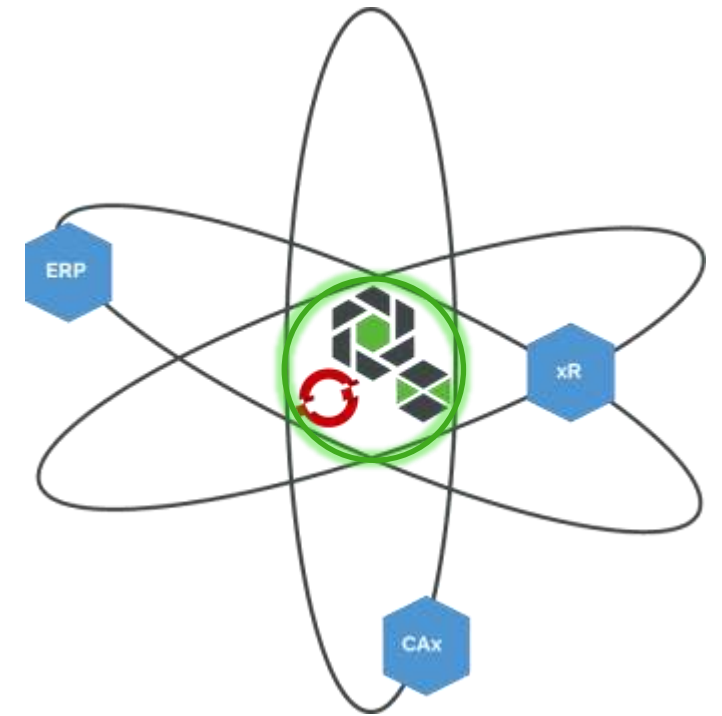


Development & Migration



# PLM JOURNEY – TOOLS

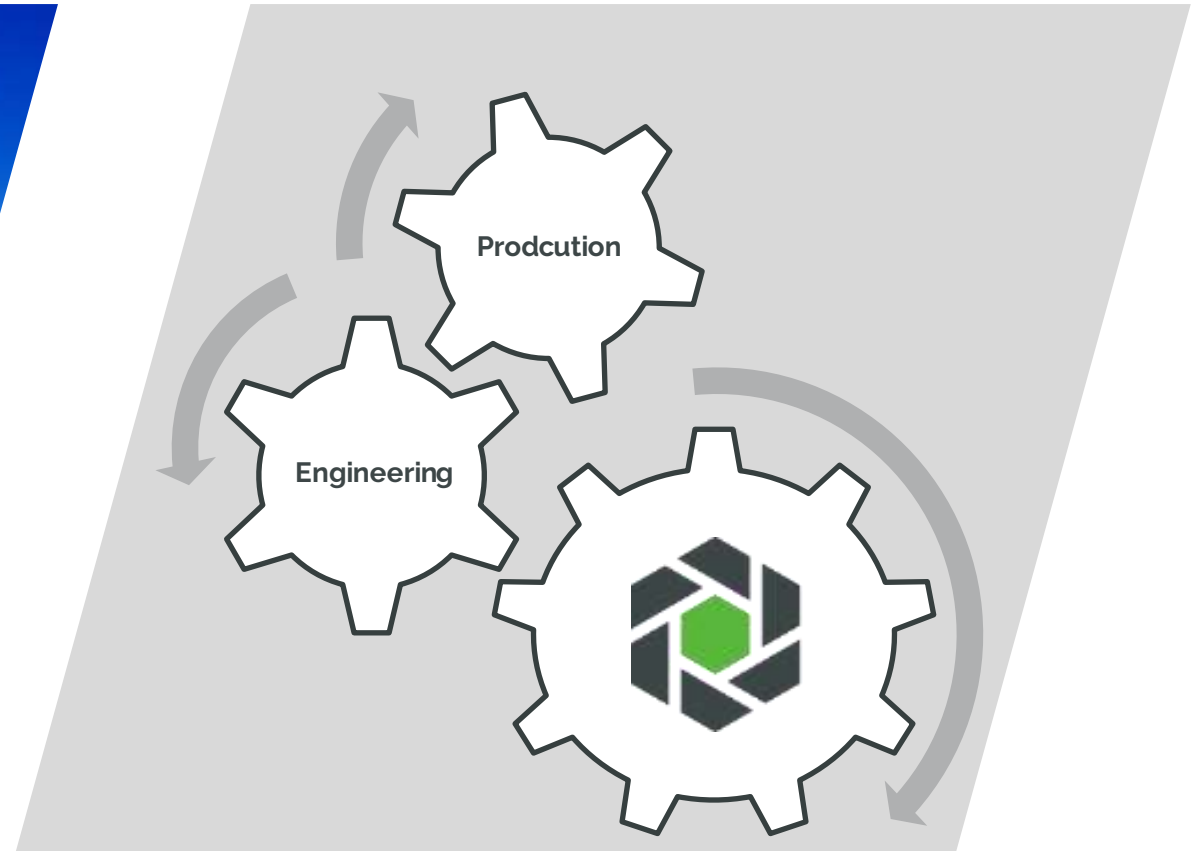
- **Techstack** revolves around Windchill in combination with Thingworx Navigate and Red Hat Openshift
  - Thingworx simplifies and consolidates information
  - Openshift provides us with additional flexibility if necessary
- **Other Systems and applications** are interacting with Windchill for mutual benefits
  - Different CAx applications work into Windchill
  - Other internal applications support the certification processes
  - Data supply for xR
  - Openshift as our main platform for microservices



# PLM JOURNEY - CHALLENGES



**New Processes to comply with aviation regulations**



**Processes need to be adapted to the system**

# PLM JOURNEY - SUCCESSES



Multiple products realized with PLM



Integrating xR Solution with PLM



Starting with integrating Production

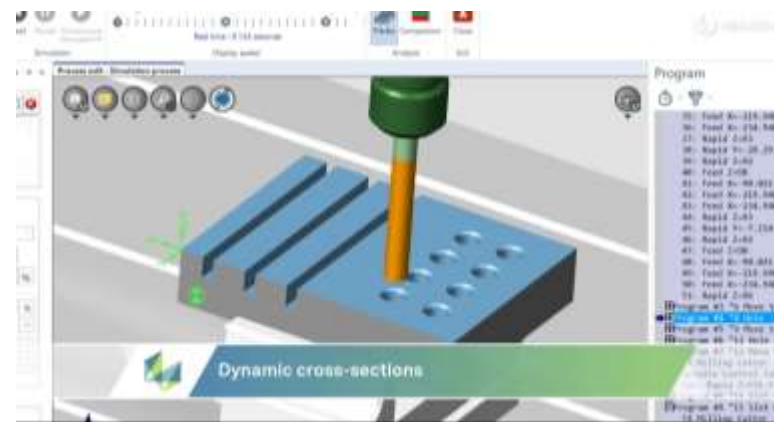
# PLM – IOT JOURNEY

Bridging the Gap between PLM and IoT to fulfill Maintenance, Repair and Overhaul Processes within the Digital Thread

## PLM



## Bridging Technologies



## OT/IoT



# STARTING THE OT/IOT JOURNEY

## WELCOME TO OUR SHOPFLOOR



# FIELDS OF TENSION OPERATIONAL TECHNOLOGY AND IOT

Lufthansa Technik's business segments use a wide variety of toolings and equipments to fulfill maintenance and manufacturing services.

## 1. Process Technologies



The workshops use more than 45 clusters of process technologies to fulfill maintenance and production services.

## 2. Asset Age



The machine parks consist of operational technologies of all ages within the last five decades.

## 3. Degree of Automation



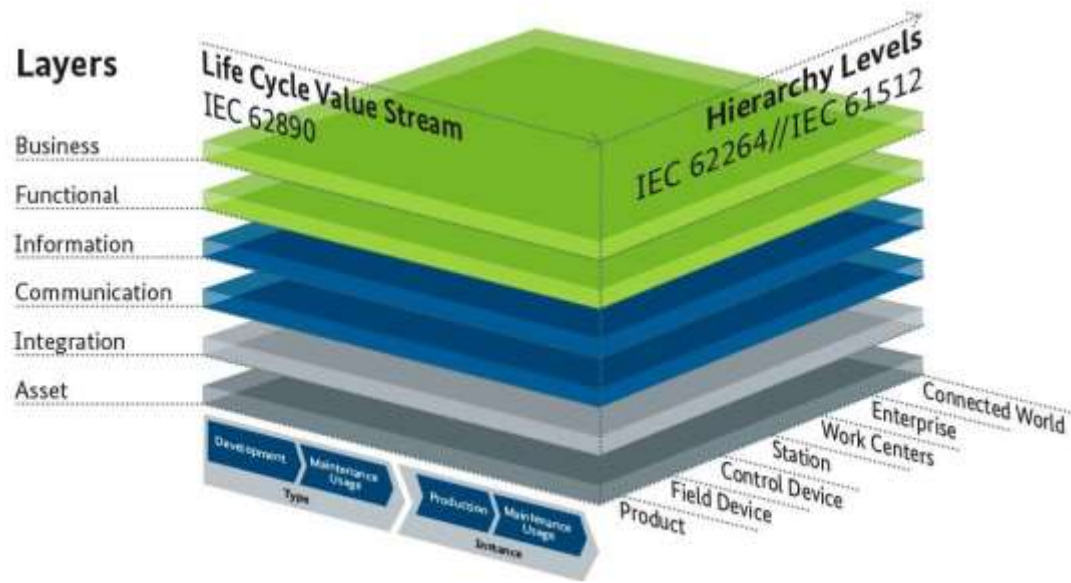
A wide range of automation levels are used from manual to fully automated technologies.

# IOT-ARCHITECTURE TO BRIDGE THE DIGITAL THREAD

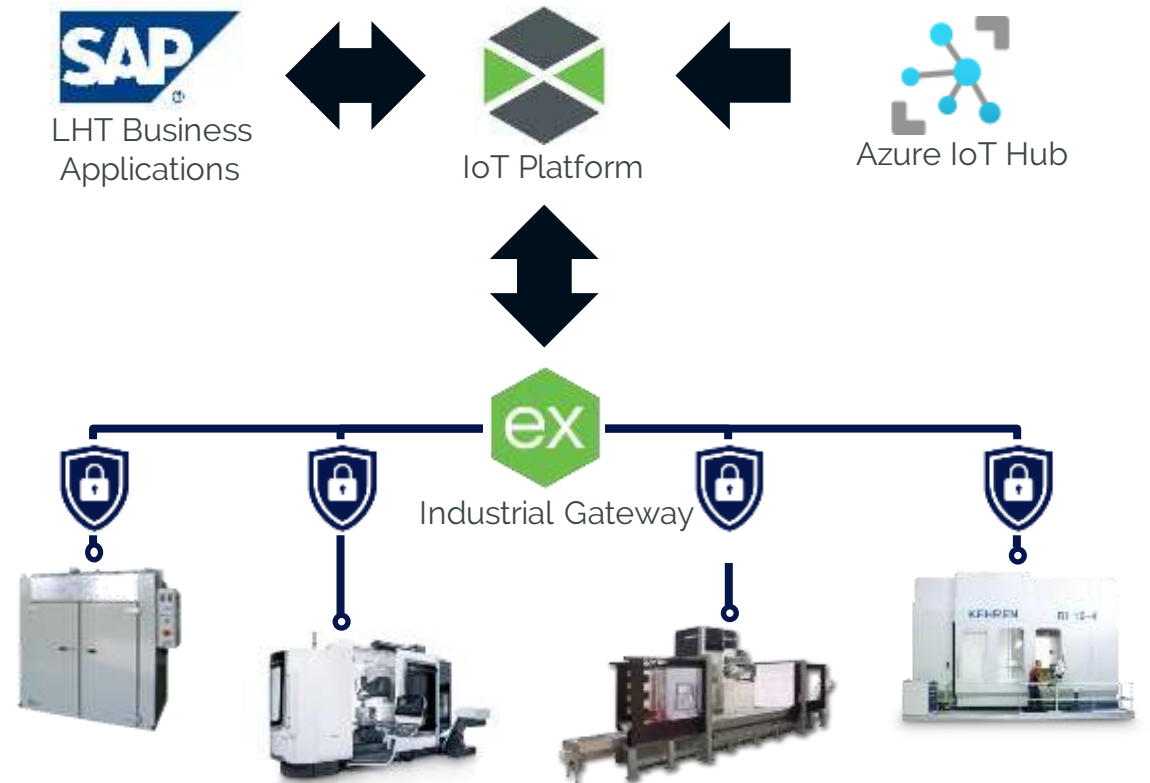
## ENSURE DATA EXCHANGE BETWEEN PRODUCTION ASSETS AND BUSINESS PROCESSES

### Service-oriented Reference Architecture Industry 4.0

Standard: DIN SPEC 91345



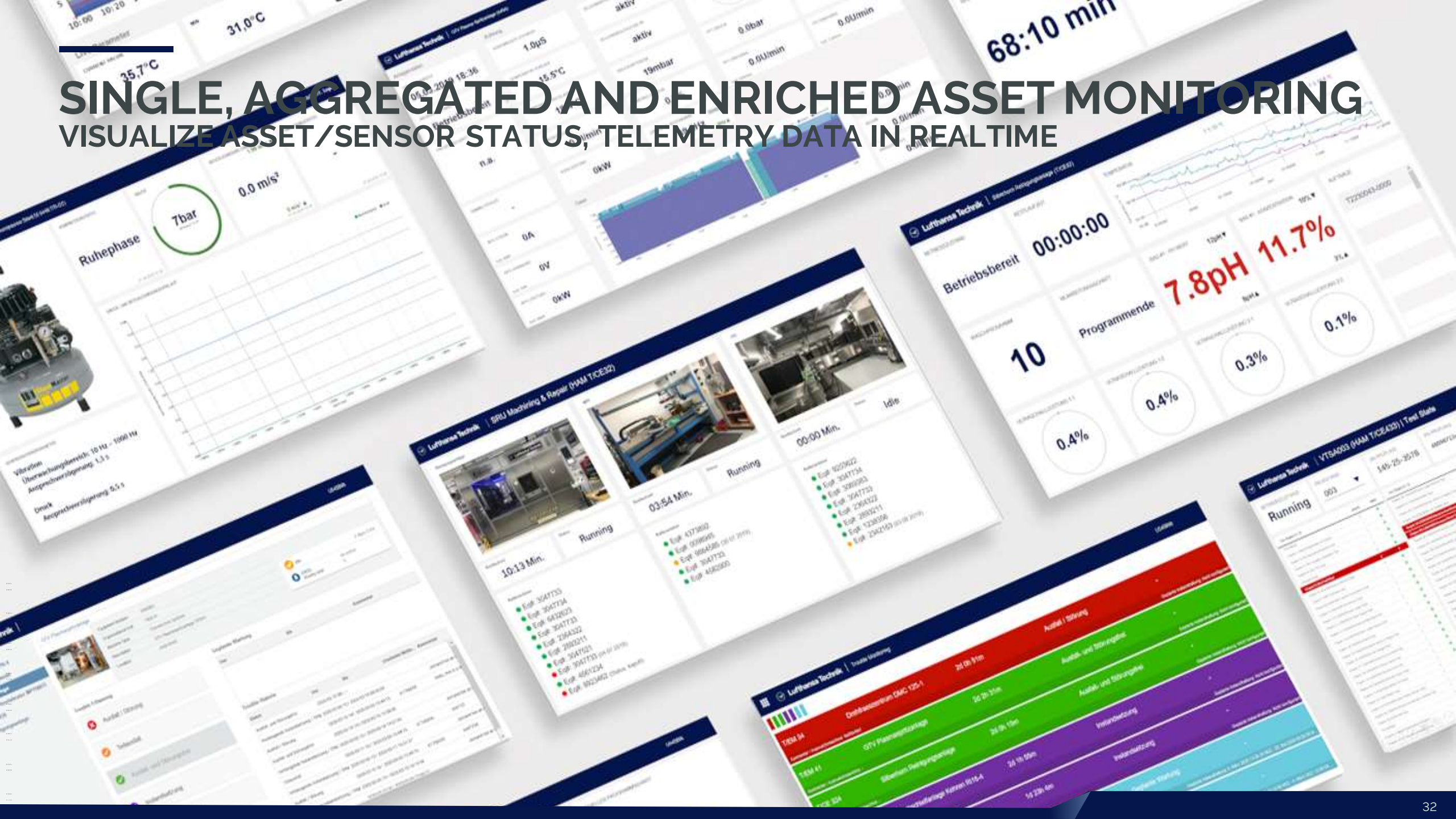
### Simplified OT/IoT Architecture



Source: [https://ec.europa.eu/futurium/en/system/files/ged/a2-schweichhart-reference\\_architectural\\_model\\_industrie\\_4.0\\_rami\\_4.0.pdf](https://ec.europa.eu/futurium/en/system/files/ged/a2-schweichhart-reference_architectural_model_industrie_4.0_rami_4.0.pdf)

# SINGLE, AGGREGATED AND ENRICHED ASSET MONITORING

VISUALIZE ASSET/SENSOR STATUS, TELEMETRY DATA IN REALTIME





# ASSET REPORTING

## AUTOMATICALLY TRIGGERED DOCUMENTATION PROCESSES

Ensure process compliance via asset reporting, e.g. fully automated heat treatment control.

Recording of technical and process data to proof process reliability.



Wärmebehandlungsprotokoll  
Heat Treatment Report

Lufthansa Technik

Aluminium Legierung  
Aluminium alloy

Equipment no: 3107027

Angabe des Kunden no.: 0  
Datum, Uhrzeit, Date, Time: 2024.03.14.09:31

Ausführer / Performed by:  
vCN HAM T/  
01651

Alle Angaben / general information: Materialangaben / material details:

16-01 bleich

2024-142

2.2 2024-0

Wärmebehandlung / Heat treatment:

LHT PMT P-4.03 495.0 60

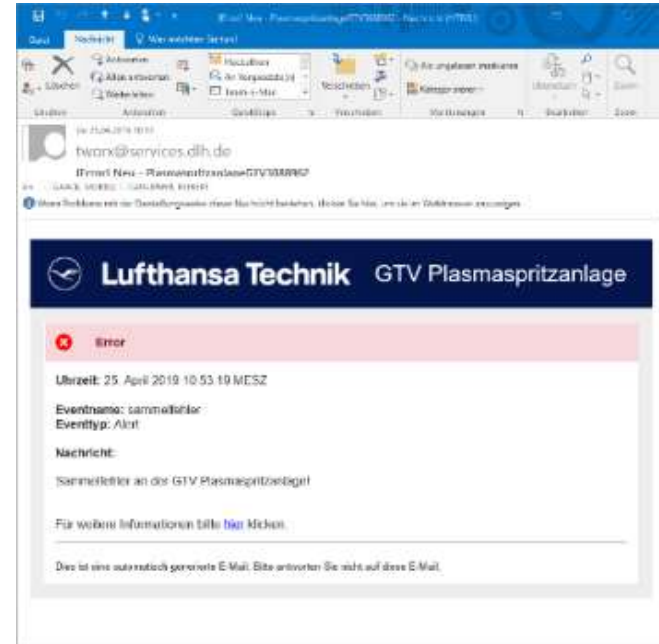
Die Wärmebehandlung wurde gemäß gültigen LHT Prozess PMT P-4.03 durchgeführt und durch Steuerungstechnik bestätigt.  
The stamp confirmed the correct setting up heat treatment according to LHT process PMT P-4.03.

LUFTHANSA TECHNIK 1/2





# ASSET ALERTING AND EVENT BASED PROCESSING



## E-Mail Notifications

Data driven decision making using real-time asset data, e.g. process limit violations.

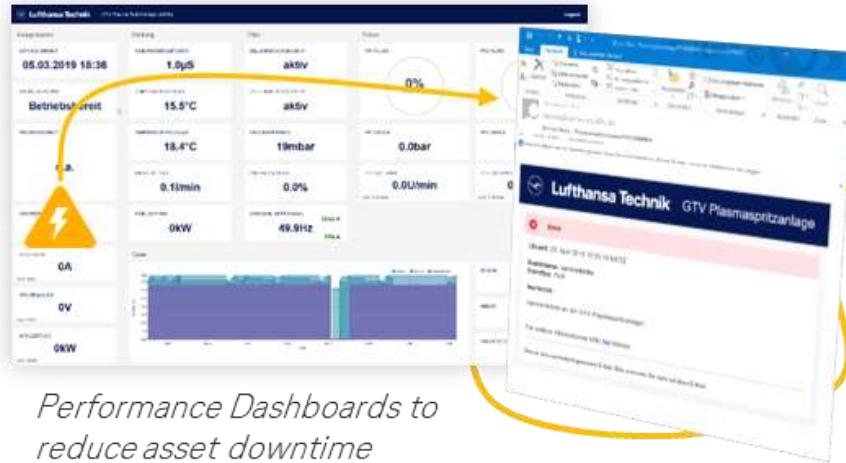


## Condition based Events

Context based asset events automatically trigger or initiate actions (middleware).

# OT/IOT AT A GLANCE

## Asset Monitoring and Alerting



## Asset Data and File Exchange



## Asset Reporting



## Asset Remote Access

Enables remote updates, trouble shooting, configuration and programming





**Lufthansa Technik**

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## UNLEASHING THE POWER OF DIGITALIZATION

- Evolving the efficiency of our production system through fully digital processes into the future
- Fostering data driven intelligence along the entire value chain
- Boosting development of digitally enabled MRO products

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# **DIGITIZE THE CORE – LEVERAGING THE DIGITAL THREAD**

## **FOR IMPROVED ENGINEERING TO MANUFACTURING TO SERVICE COLLABORATION**

- Implementing the digital thread is part of Lufthansa Technik's company strategy
- Business strategy in alignment with Digital and IT Strategy
- Digital roadmaps developed based on business target pictures
- Cross functional, OKR driven implementation in agile teams on synchronized cadence
- Accelerated realization side by side but synchronized on pre-defined touch points to maximize business value



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Your feedback provides us with valuable information on how to shape future content strategy for the event!

**PROVIDE SESSION FEEDBACK**



# LIVEWORX

A NEW ERA IN PRODUCT LIFECYCLE INNOVATION

# THANK YOU

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[ptc.com](http://ptc.com)

