Development of an Industrie 4.0 Software Platform for SMEs

ICIMP 2019

January 11th 2019, Vienna

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Agenda

1. **Structure of our Research**
2. **Survey: The need for Industrie 4.0**
3. **Development Methodologies**
4. **Industrie 4.0 Software Architecture**
5. **Conculsion and Outlook**

Basic structure of our research

Topic	Content
Survey	What challenges are companies actually facing?
Methodology development	Guidelines to develop Industrie 4.0 solutions
Industrie 4.0 software architecture	Modular, scalable and flexible software architecture
Use Cases	Application and validation of methodologies

Focus of today's presentation

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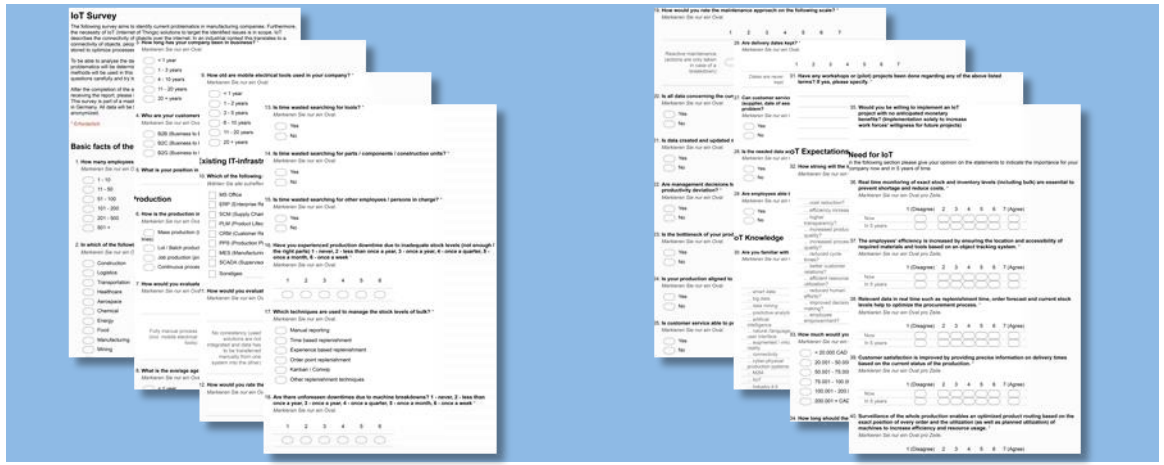
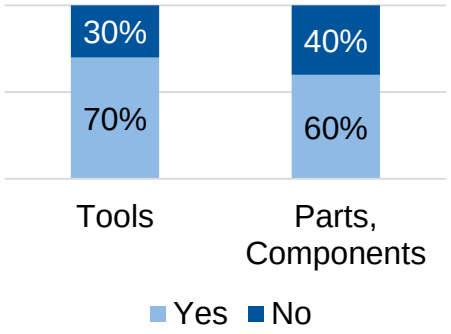
Survey: The need for Industrie 4.0

An online questionnaire was distributed to companies in the Greater Montreal area

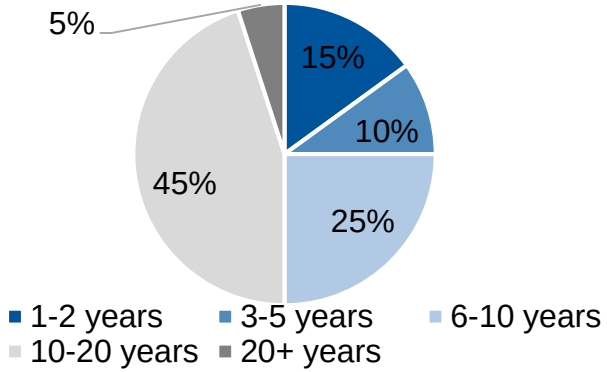


- Distribution of 125 online questionnaires
- 16 % response rate (20 valid answer sheets)
- English and French version
- Company size from 11 to 500 employees
- Focus on manufacturing companies
- Mainly B2B sector

Is time wasted searching for….



Average age of machines



- Most of the companies struggle to locate assets on the shop floor
- Machines: 50 % older than 10 years; tools: 50 % older than 6 years
- Production interruptions: insufficient stock and break downs
- Mostly manual collection of data from shopfloor
- The impact of Industrie 4.0 is expected to be greatest in customer relations and production monitoring

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Methodologies to develop Industrie 4.0 solutions

Based on the survey results and using the VDI 2221 standard three fields have been identified

Resource tracking on the shop floor	Monitoring and analysis of shop floor data	Reduction of production interruptions: machine break downs
Reduction of production interruptions: Insufficient stock levels	Improved decision making, efficiency increase, increased process quality	Maintenance activities are reactive in many cases
Optimized stock management	Detailed information on order status	
Asset Tracking	**Poduction Monitoring**	**Predictive Maintenance**

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Industrie 4.0 software architecture: Overview

An overview of the four different layers of the software architecture

1 User layer

- Device independence
- Automatic software updates

2 Cloud layer

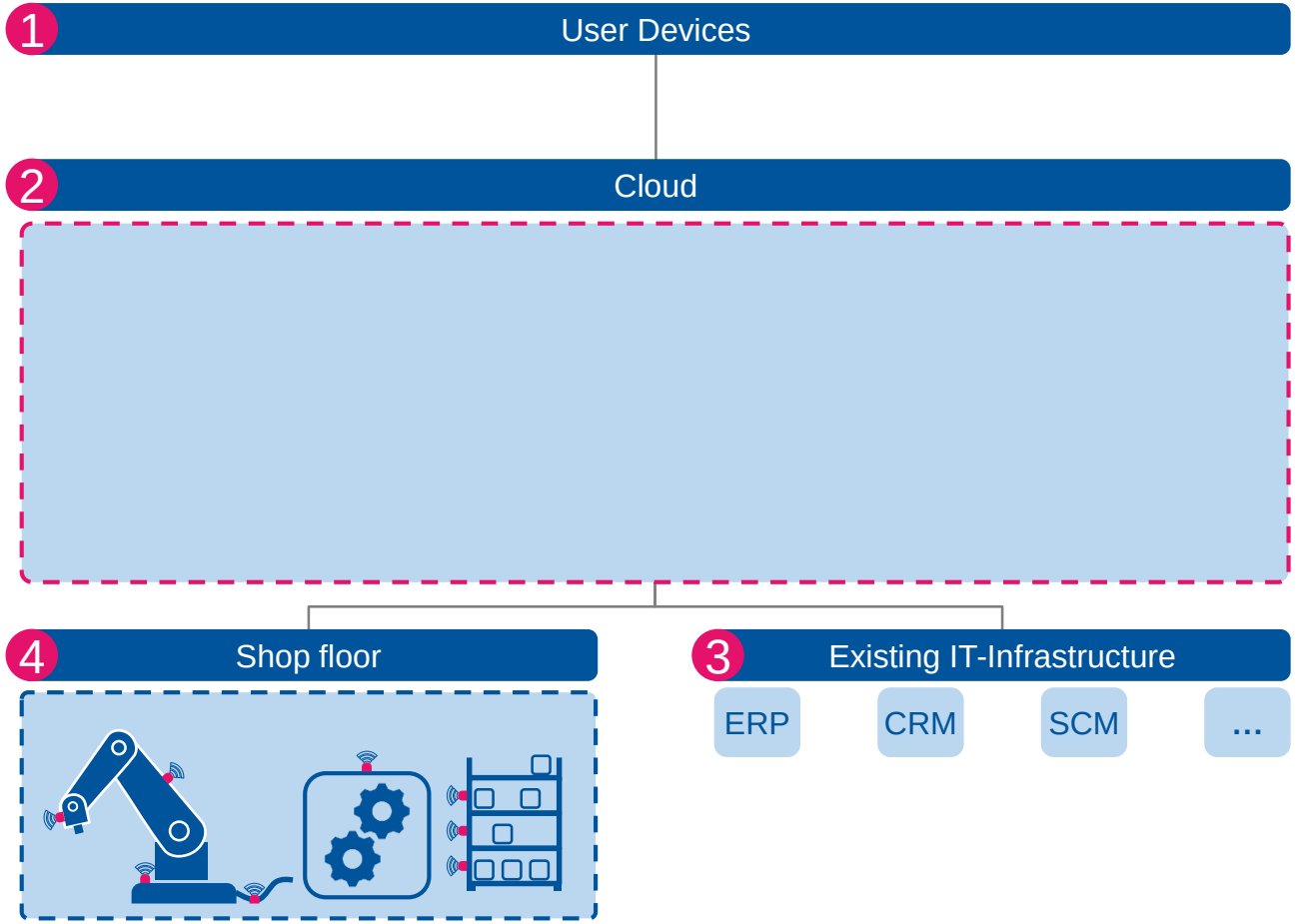
- Scalable data processing
- Storage of data

3 IT-infrastructure layer

- Extraction of data from existing systems
- Insertion of data into existing systems

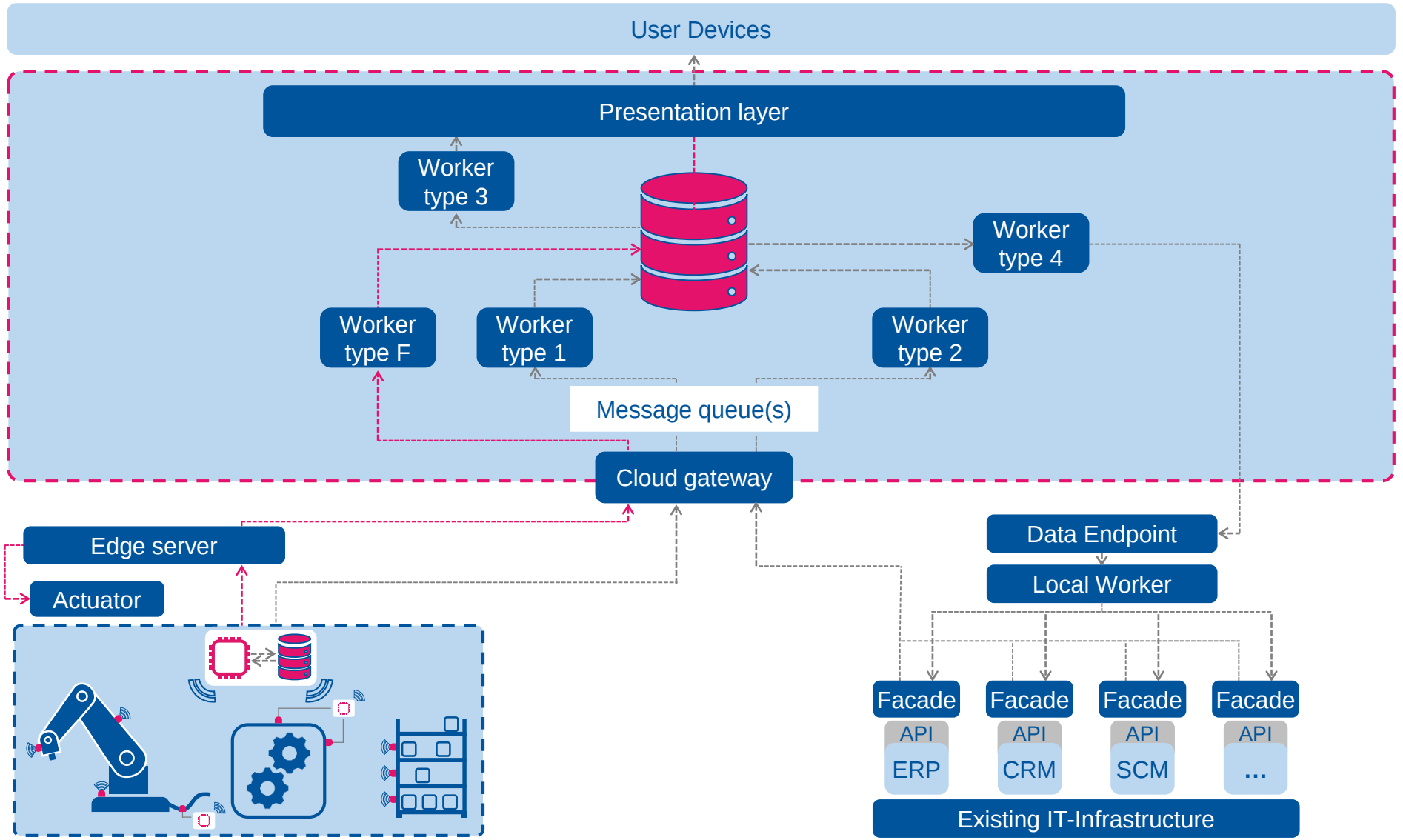
4 Physical layer

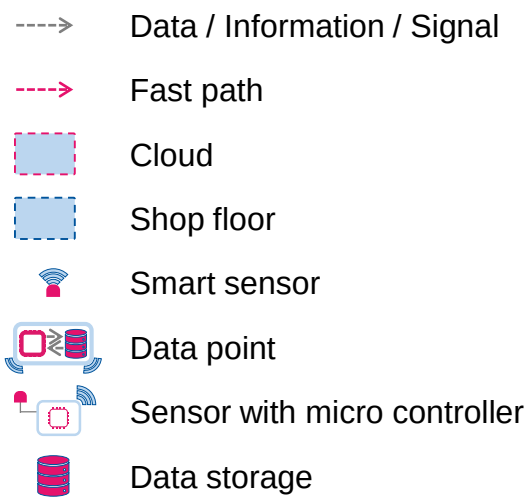
- Quasi real-time production surveillance
- Fast handling of critical data



Use case: Dashboard example

A comprehensive overview of important performance indicator





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Conclusion and Outlook

To improve the feasibility and reduce the complexity standardization is needed

Based on a survey the actual needs of companies have been assessed

Methodologies to develop *asset tracking*, *production monitoring* and *predictive maintenance* solutions were created

A modular, flexible and scalable software solution is provided

In two use cases the solution has been applied and validated

Standardization on physical layer and IT-infrastructure layer is needed

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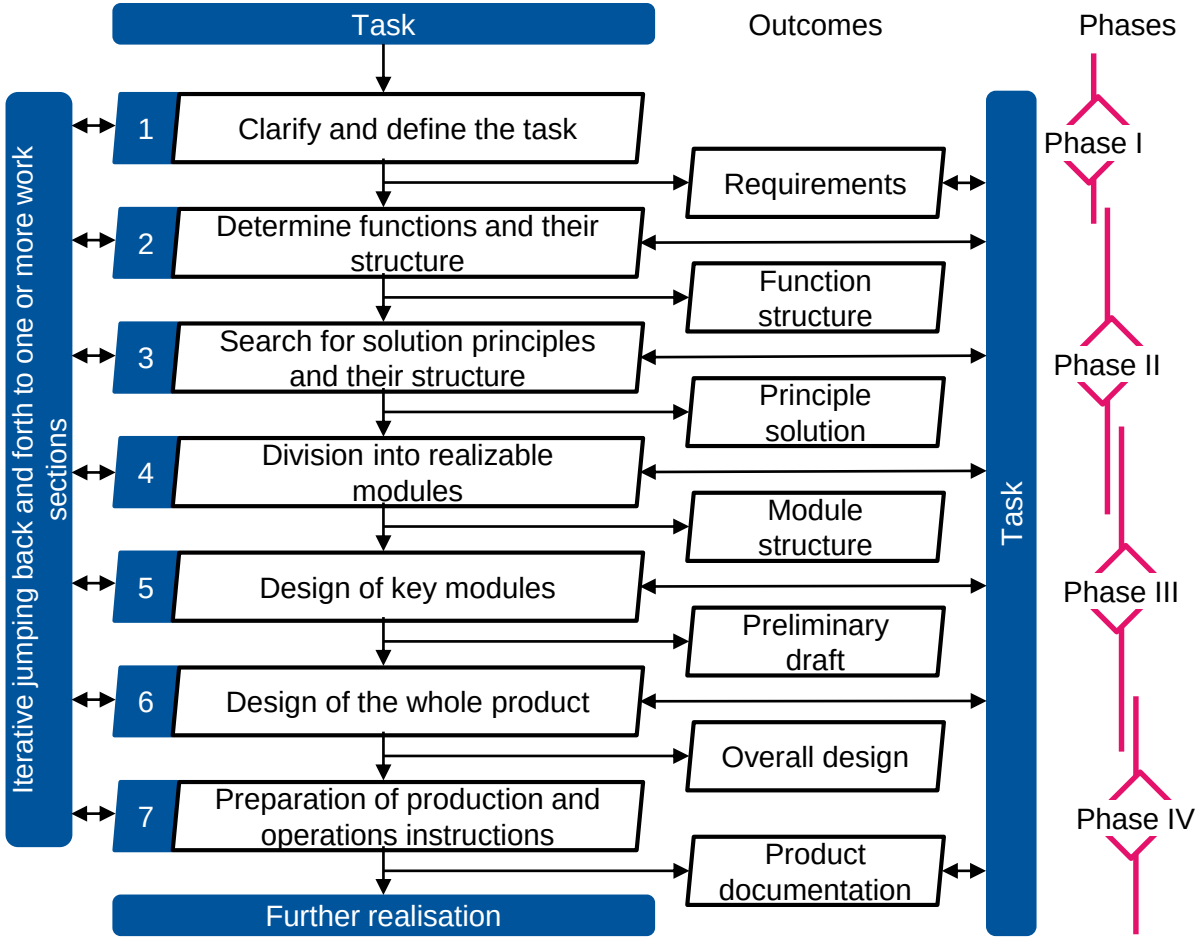
Thank you very much for your attention!

BACKUP

VDI 2221

To properly derive methodologies to develop Industry 4.0 solutions the VDI standard is used



Structured top down approach

Phase I: Plan

Phase II: Concept

Phase III: Design

Phase IV: Finalize