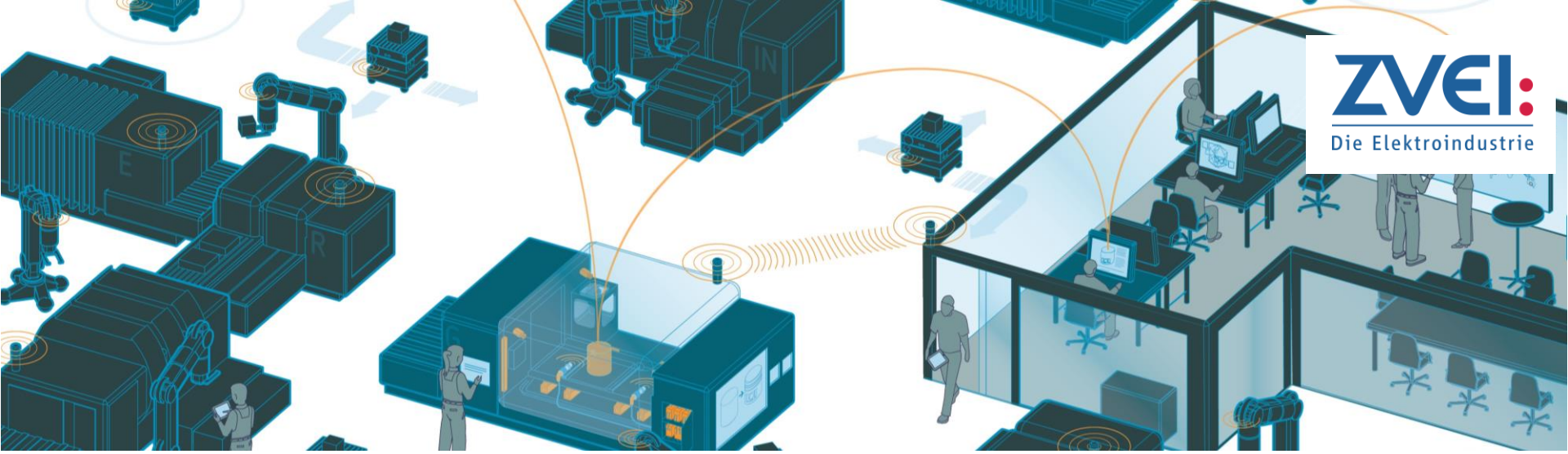


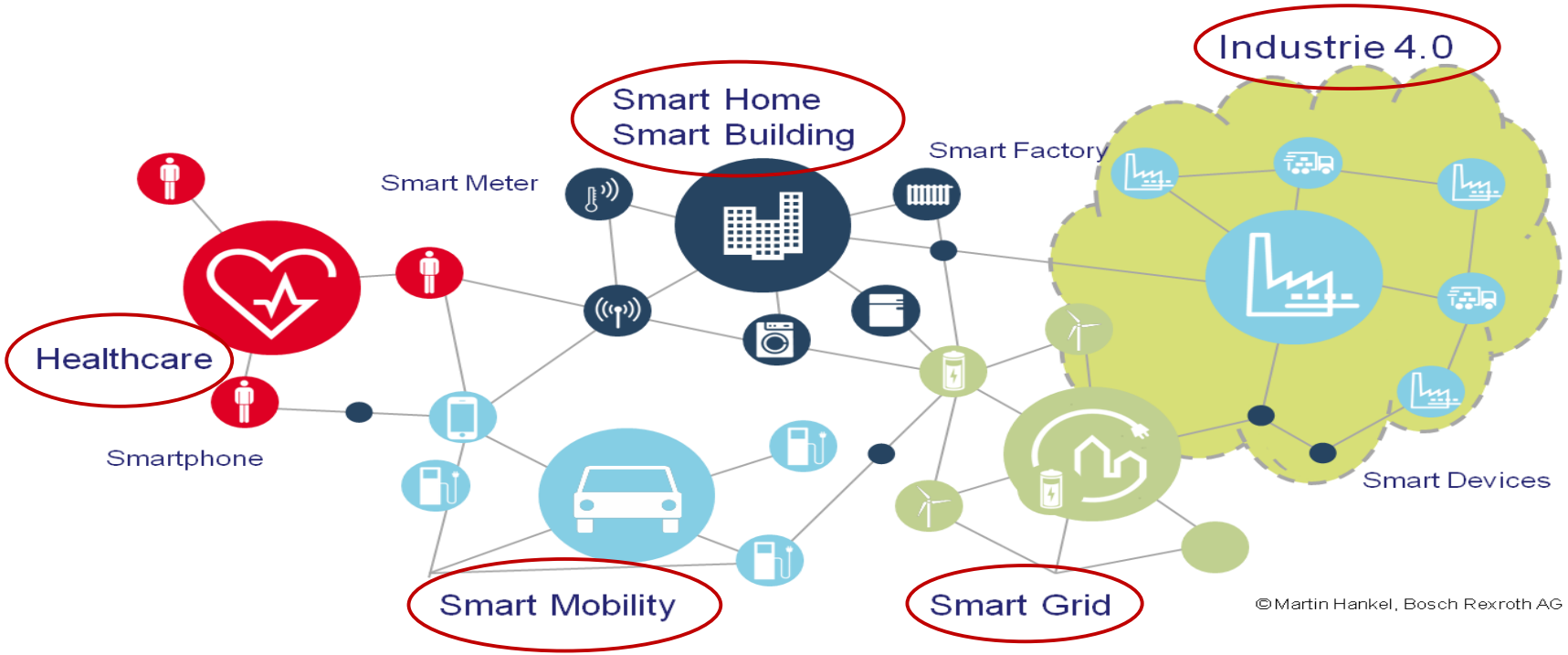
# Manufacturing digitalization requires from the ICT infrastructure

Gunther Koschnick

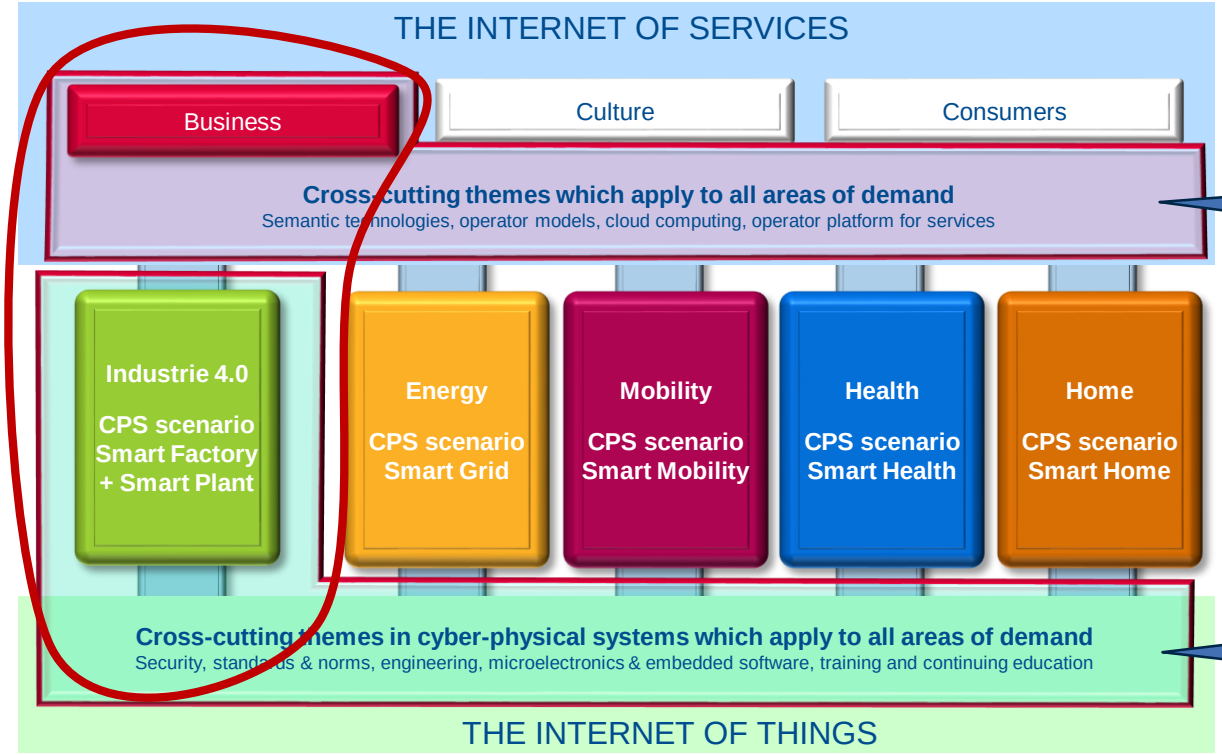
GIO Manufacturing Webinar April 28th , 2020

ZVEI – German Electrical and Electronic Manufacturers‘ Association

# „Connected World“

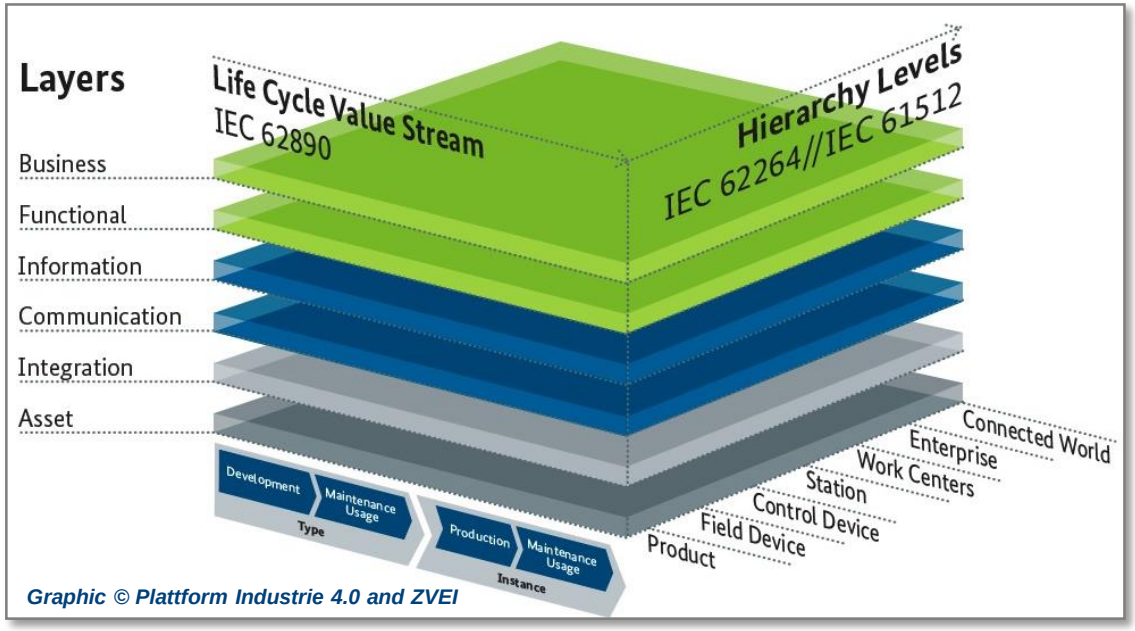


# Digital Economy




Quelle: Acatech / ZVEI

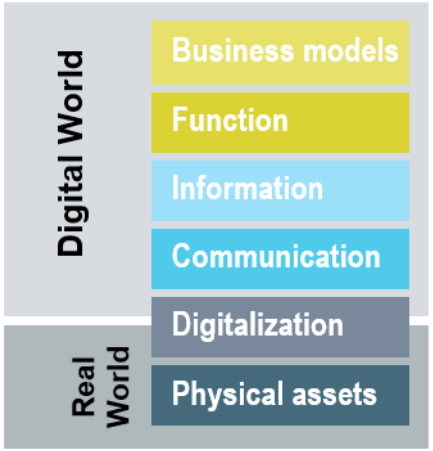
# How to bring OT and IT together?
## Reference Architectural Model Industrie 4.0

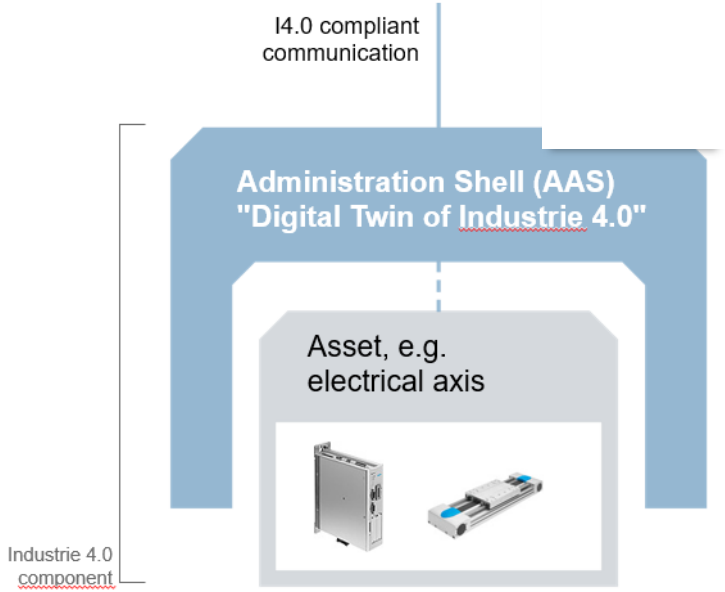



- **RAMI4.0** is a three-dimensional map showing the **most important aspects** of Industrie 4.0.
- **RAMI4.0** ensures that all participants involved share a **common perspective** and develop a **common understanding**.

# Core Concept of smart manufacturing is the versatile Administration Shell

**RAMI 4.0 Architecture**




Specific for an individual asset

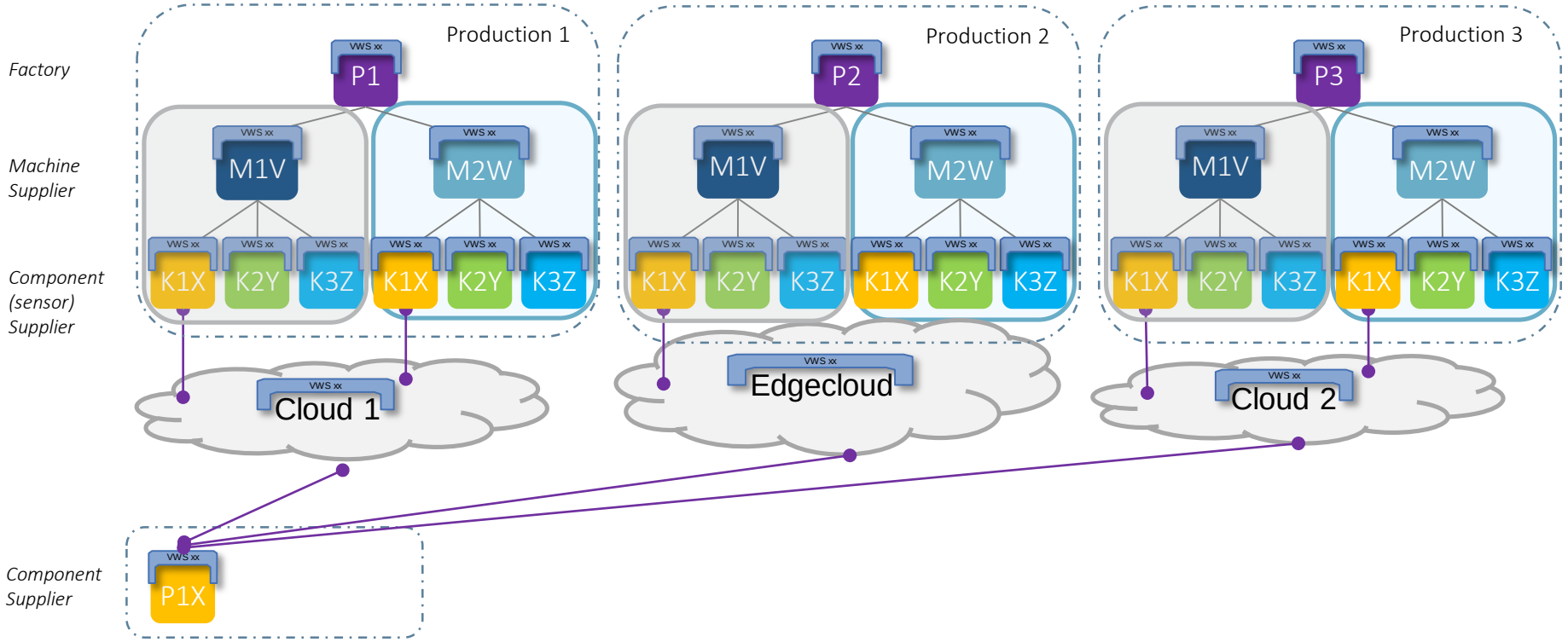
Connection is established via **I4.0 / IoT communication**

The Administration Shell provides **information and added values**

The digital worlds reflects the **specific features of the asset**

**All components require an Administration Shell to be part of Industrie 4.0 and smart manufacturing.**

# Usecase: Collaborative Condition Monitoring



# The Role of 5G for Industry 4.0

## Industry 4.0

- Increase the **flexibility**, **versatility**, **productivity**, **resource efficiency** and **usability** of industrial production
- **Connectivity** as a key enabler for cyber-physical production systems

**Future Industrial Connectivity Infrastructures**

## 5G

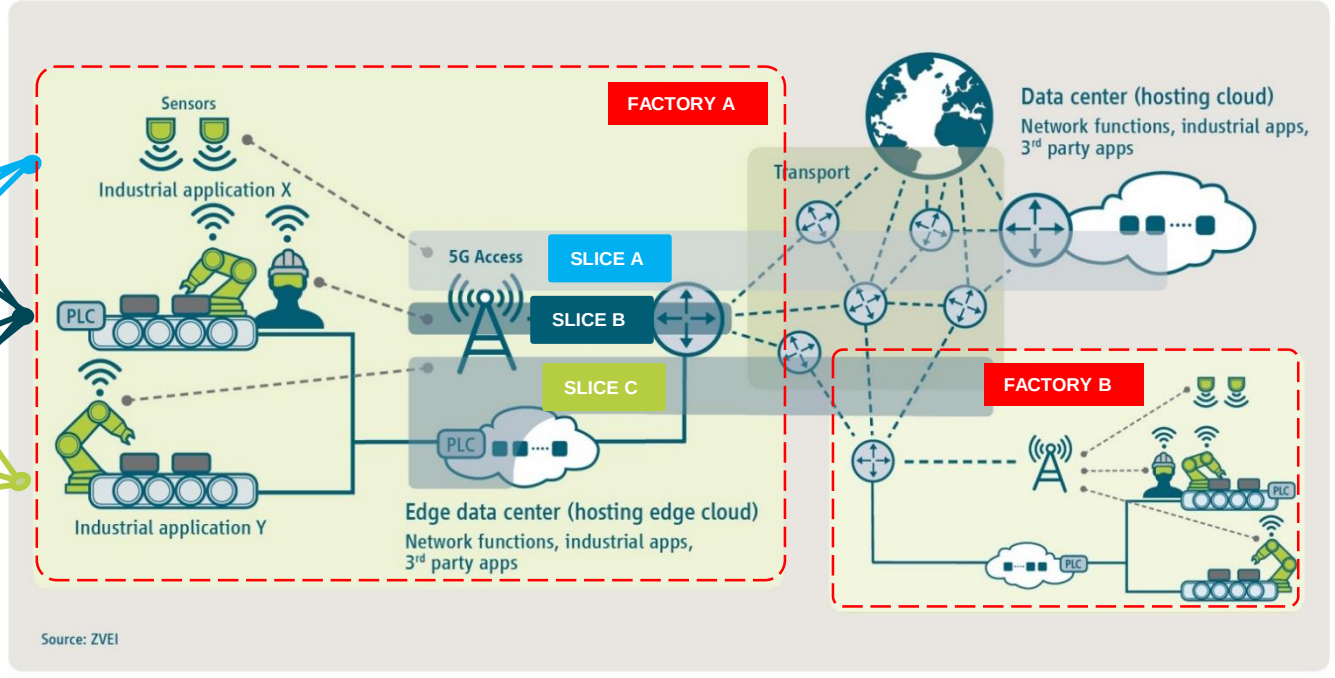
- Strong focus on **machine-type communication** and the IoT[1]
- URLLC[2] and mMTC[3] enable completely **new applications**, also in industry
- 5G as **"one size fits all" solution**

[1]Internet of Things, [2]Ultra-Reliable and Low-Latency Communication
[3]Massive Machine-Type Communication

**Enabler for new applications and use cases and for lifting Industrie 4.0 to the next level**

# Technical Requirements for Industrial Networks

| | |
|---|---|
| Peak data rate | 1–20 Gb/s |
| User experienced data rate | 10–100 Mb/s |
| Latency | 1–10 ms |
| Connection density | 1 thousand – 1 million devices/km² |
| Battery life | 10 years |
| Availability | 99.999 % (of time) |
| Reliability | 99.999 % (of packets) |
| Position accuracy | 10 m–< 1 m |
| Security | Strong privacy & security, and purification |



# Summary

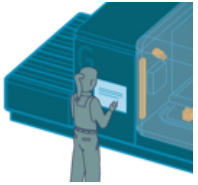
- OT Industry will provide a defined interface for connecting the ICT world with factories, machines and products.
  >> Asset Administration Shell with all necessary profiles and semantics <<

- 24/7 is mandatory, especially in critical infrastructures such as power plants. Automation gives their customers guarantee.

- Digitalization opens up new opportunities.

5G ACIA
5G Alliance for Connected Industries and Automation

- 5G-ACIA is a very positive example of how ICT and OCT learn from each other and generate benefits for customers.



- Usability for installation, commissioning and operation should be adapted to the experts in automation on site.

ZVEI:
Die Elektroindustrie