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Ostbayerische Technische Hochschule
Amberg-Weiden

IT Security of Cloud Services and IoT Devices in Healthcare

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1. Introduction and Motivation

Homecare

Def.: Form of care for the sick and elderly in which patients are cared for in **their familiar home environment.**



<https://www.presseportal.de/pm/19954/4323883>

Integrated Care

Def.: Is an approach to strengthen people-centred health systems through the promotion of the comprehensive delivery of quality services across the life course mostly **not in their familiar home environment.**



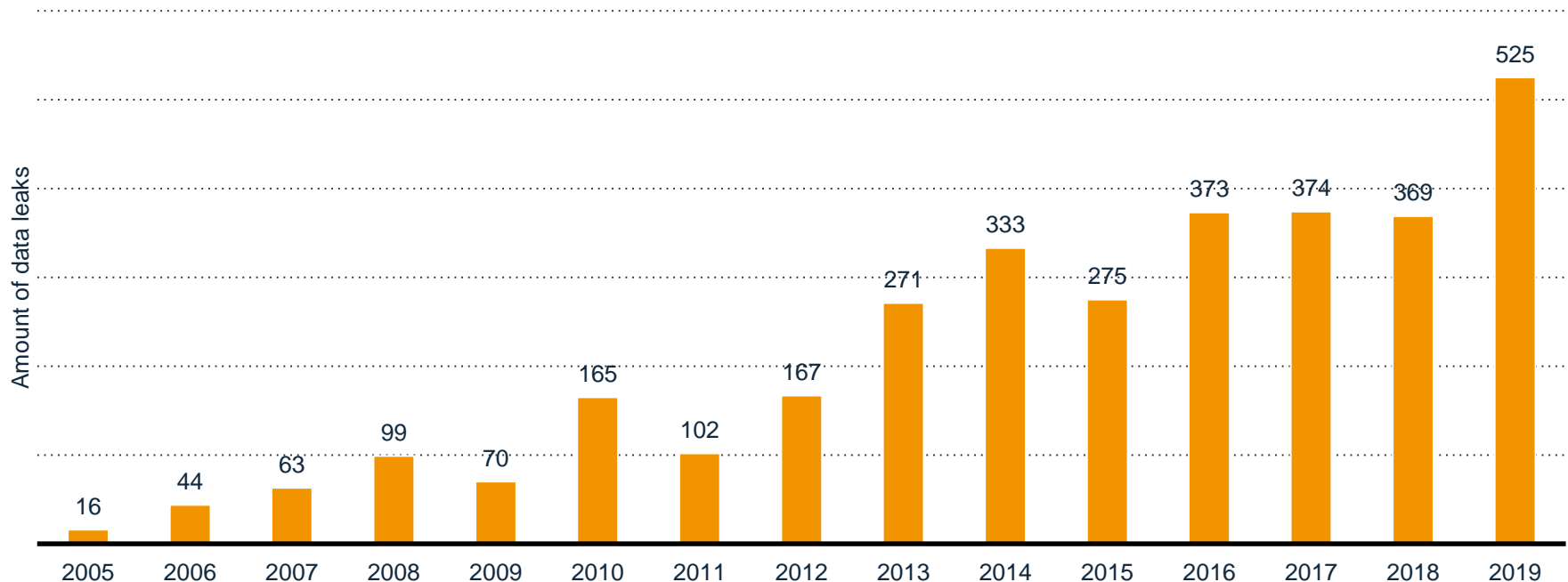
<https://www.iis.fraunhofer.de/de/ff/sse/health/communication-and-integrated-care.html>



These different environments lead to different IT security challenges in the domain of the upcoming medical internet of things.

1. Introduction and Motivation

Amount of Registered Healthcare Data Leaks in the US (Years 2005 to 2019)



Source: [Identity Theft Resource Center "2019 End-of-Year Data Breach Report", Page 15](#)

1. Introduction and Motivation

IT Security – Frameworks / Working Groups

Regulations
5G

ISO/IEC
27xxx

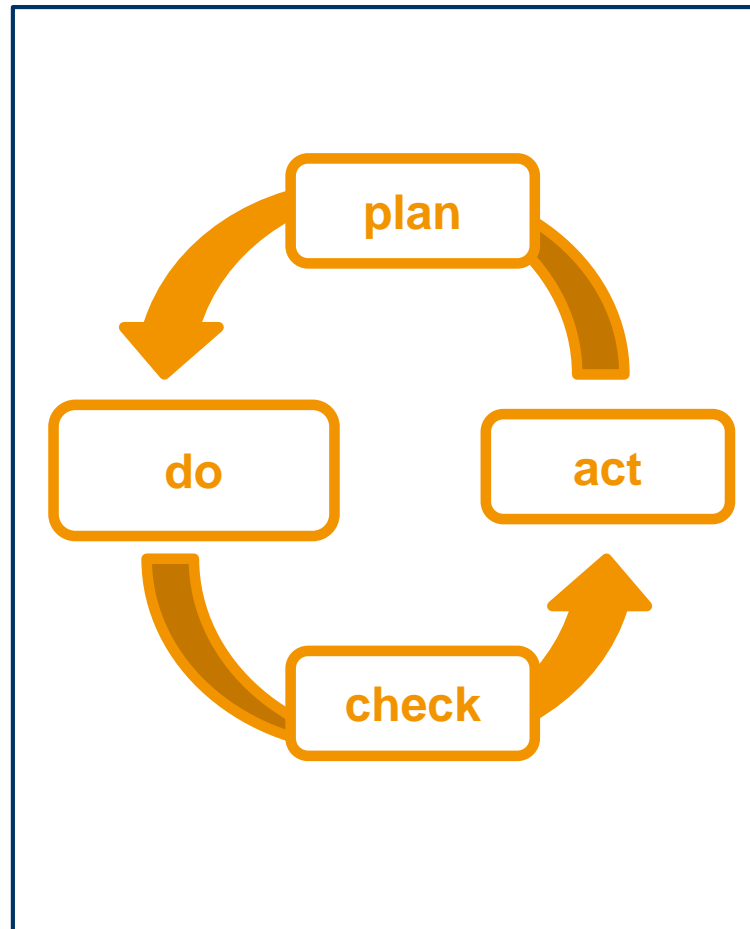
BSI

COBIT

NIST
Cybersecurity
Framework

NERC

ISO 15408



Cloud
Security
Alliance

ETSI TC
CYBER

IASME

ISACA

ANSI/ISA
62443

IEC 62443

ISO 15408

Healthcare
DIN EC 80001/ IEC 8 80001

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2. Medical IoT and Cloud Services

Different Settings and Environments

IoT-Devices Risk Classes

IV very high risk	hip prosthesis, cardiac catheter ...
III high risk	x ray, infusion pumps
II medium risk	x ray data, ultrasound
I low risk	wheelchair, fever thermometer

Integrated Care

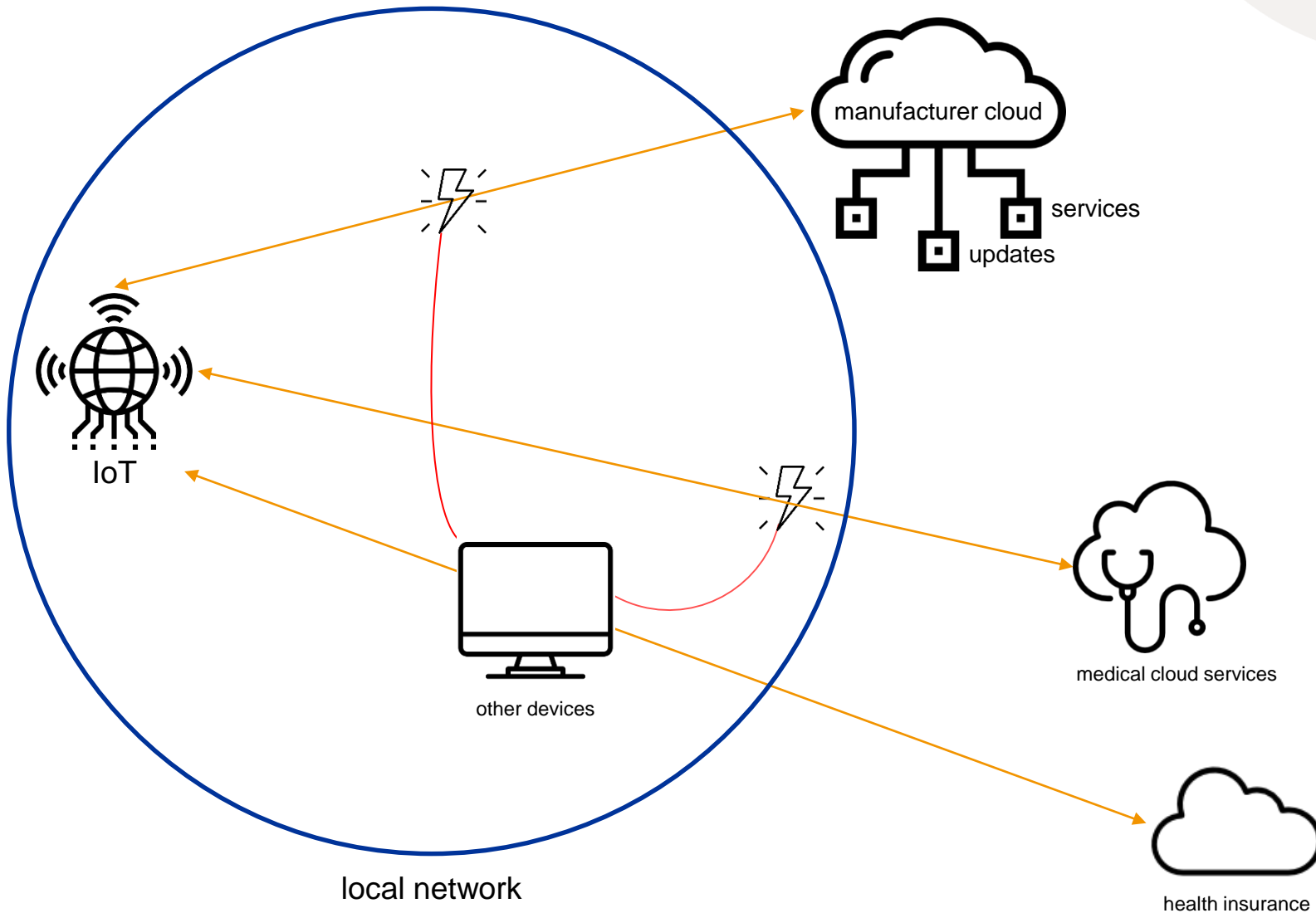
- Safe and controllable environment
- Levels of certain IT skills expected

Homecare

- Unprotected area
- No IT skills expected

2. Medical IoT and Cloud Services

Connection between IoT and Cloud



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3. Consequences for IT Security

- Current situation
 - IoT manufacturers often neglect the PDCA process
 - Sensitive patient data is being processed
 - Old medical equipment is being repurposed for IoT applications

- Consequences
 - IT security needs to be higher than in other industries
 - Best practices must be enforced
 - A unified process must be defined

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4. Conclusions & Future Work

Approach of the 5G4Healthcare Research Project



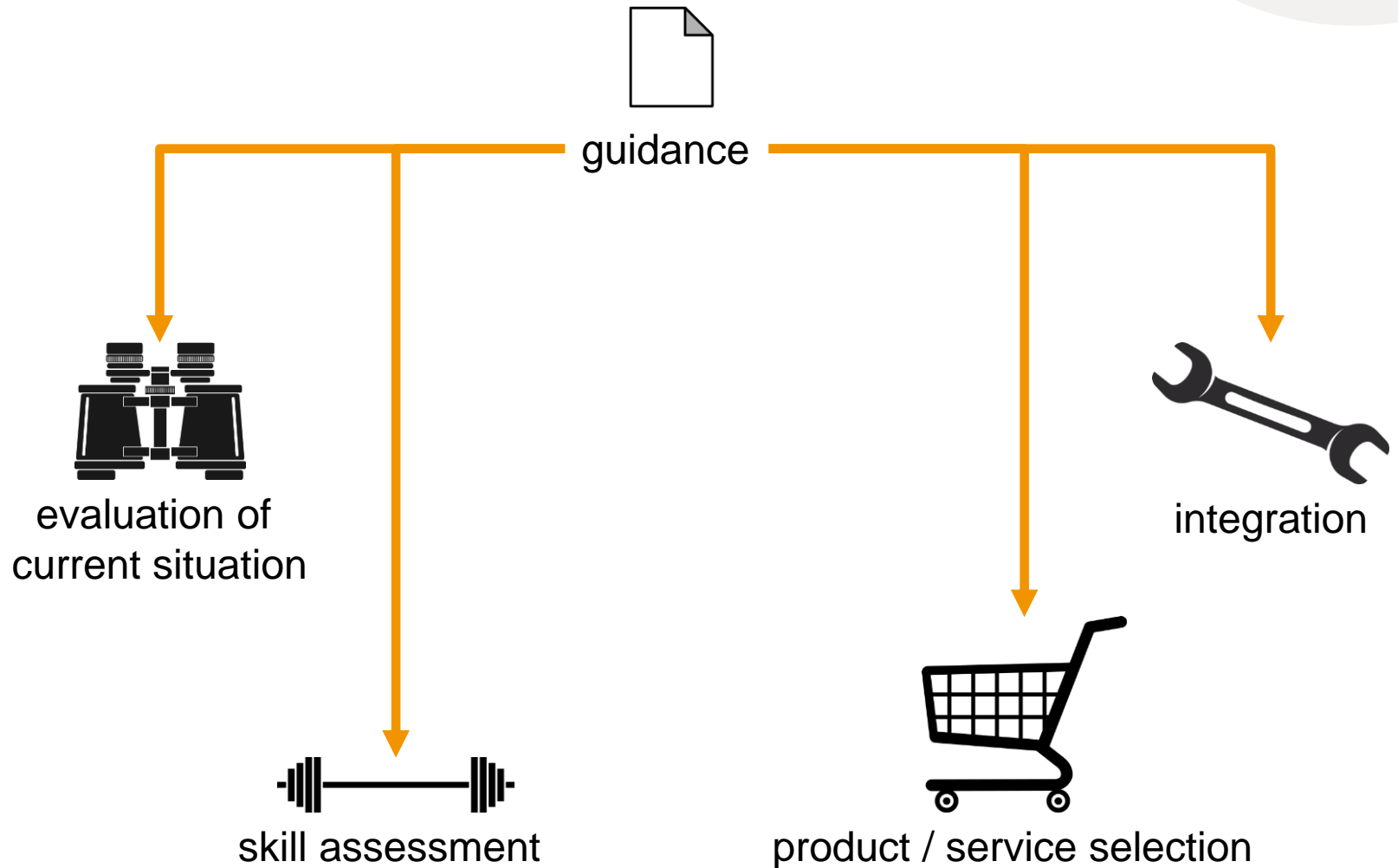
C – Conception, modeling and selection of the scenarios to be investigated in the use cases, including status quo analysis and modeling of the anticipated target scenarios using 5G.

I – Implementation and execution of the scenarios in the Campus Testbed at the university and in Living Labs on site.

E – Implementation of the evaluation concept and derivation of recommendations for scalability and transfer to standard care.

4. Conclusions & Future Work

Final Goal



Conclusion & Outlook

1. Guidelines & recommendations need to be applied by **lawmakers**
2. Structured verification/auditing process **from independent institutes** to validate medical IoT Products
3. Regulations for medical IoT product manufacturers to provide a **minimum time of support** to ensure a proper medical device live cycle (patches etc.)



Thank you, Questions?



Bundesministerium
für Verkehr und
digitale Infrastruktur

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Sources



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