ITEA Smart Systems Engineering workshop

Session III - AI application development | DataOps vs. DevOps

ITEA Smart Systems Engineering workshop

7 April 2022 | online

Mark van Helvoort, Philips Medical Systems Nederland B.V.

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ITEA 4 is the Eureka Cluster on software innovation

Introduction

Background experience

- *Mark van Helvoort*
  - *Philips - MRI*
  - *Program/Project Manager*

- *Cancer Treatment Breakthrough*
- *Smart Life Cycle Management*

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Cancer Treatment Breakthrough

Sorts, Starlit, Signet, Spectralligence

- *MR-linac Platform*
- *MRI-only planning*
- *Model-based imaging*

ITEA Smart Health Workshop
June 15 and 16, 2022
Eindhoven

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Intermezzo
Model-based imaging

Model based

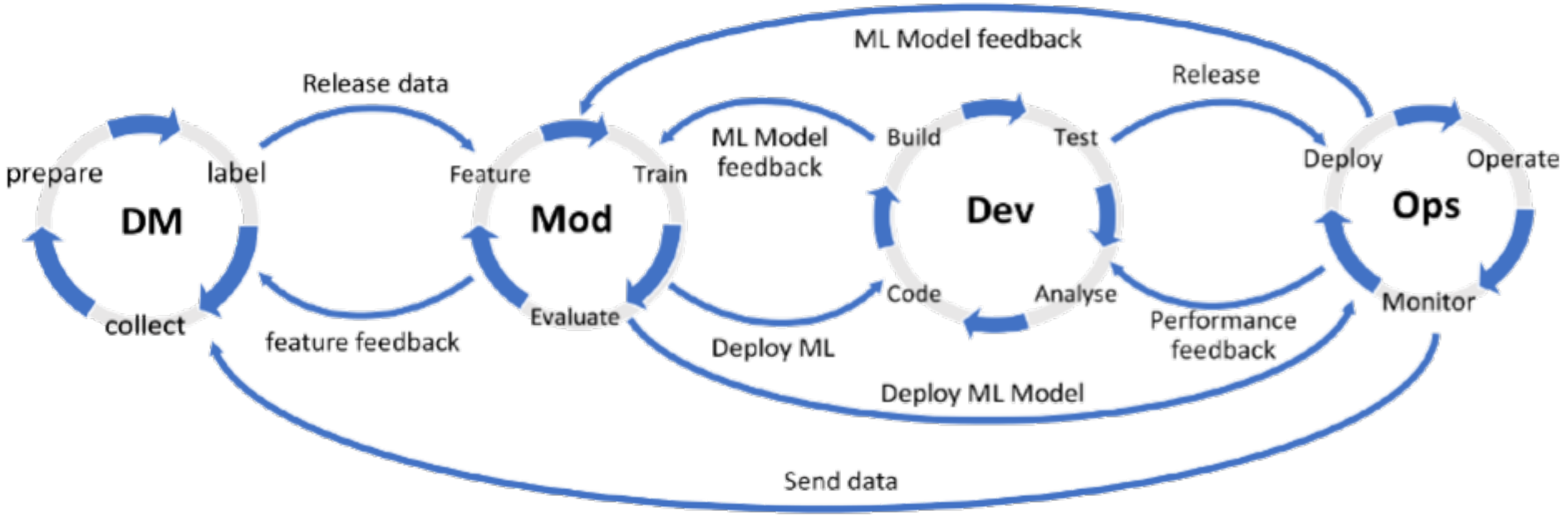
SSIM #1

Model based

Radiologist #1

Reference

Smart Lifecycle Management
IVVES and beyond



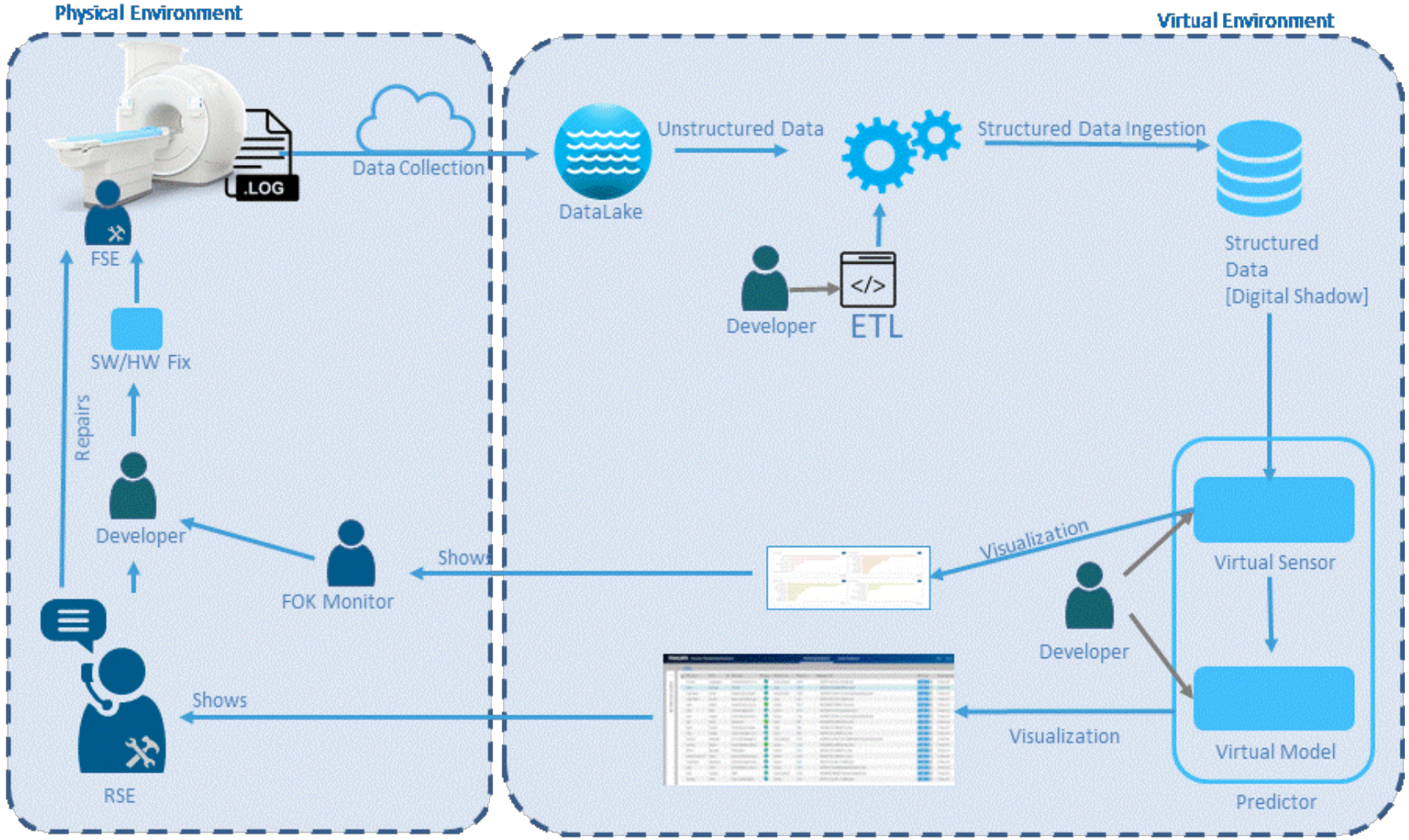
L. E. Lwakatare, I. Crnkovic and J. Bosch, "DevOps for AI – Challenges in Development of AI-enabled Applications," 2020 International Conference on Software, Telecommunications and Computer Networks (SoftCOM), 2020, pp. 1-6, doi: 10.23919/SoftCOM50211.2020.9238323.

- *Challenges (regulated environment)*
  - *Traceability*
  - *Post-installation deployment*

Smart Lifecycle Management

IVVES, Reflexion, Daytime, Tidit*

* Pending national funding



Opportunities

- *Automation*
- *Data quality*
  - *Non-labelled data*
  - *Noisy data*
- *Synthetic data*
- *Context-free analysis*
- *Combined learning*
  - *Fleet-based*
  - *Instance based*
  - *Time-line driven*
- *Federated learning*
- *Embedded AI*
- *Integration of AR*
- *Development optimization*
  - *Virtual test environments*
  - *Modelling of engineering process*

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Contact details

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- *Philips – Magnetic Resonance Imaging*
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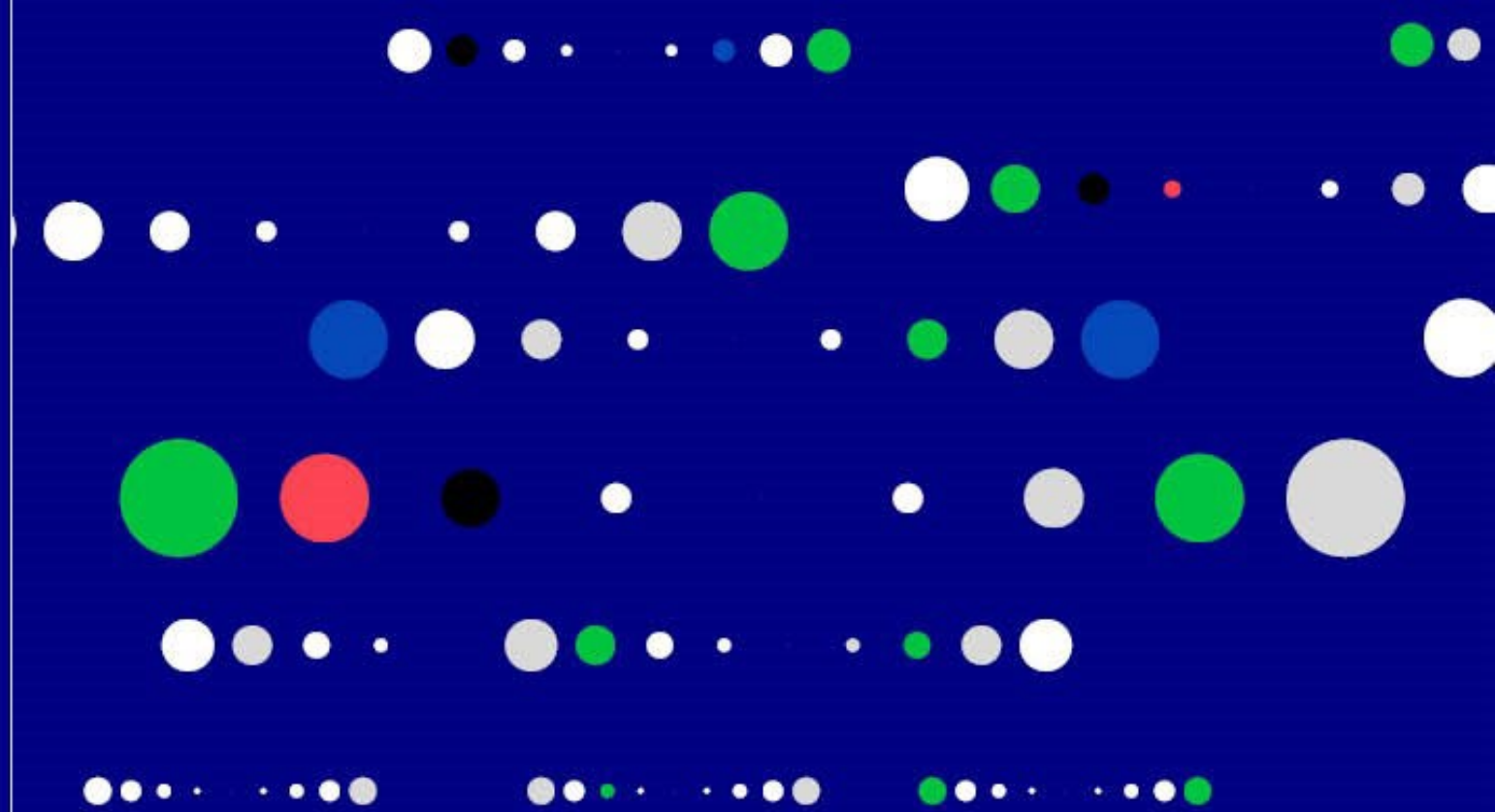
- *http://esi.nl/research/research-in-projects/reflexion.dot*
- *https://daytimeproject.com/*
- *https://ivves.eu/*
- *https://www.project-sunrise.eu/*
- *http://pavis-project.eu/*



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Thank you for your attention

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Andries Stam, Almende BV

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ITEA 4 is the Eureka Cluster on software innovation

- SME founded in 2000
- based in Rotterdam, NL

- curious about the principles of **complex systems**
  - in particular self-organising systems
  - interaction, feedback, adaptation, escalation

- use these to **improve interaction**
  - between people
  - between people and their environment

- often through the application of **advanced technology**
  - ICT, smartphones, IoT, sensors/actuators, robotics

- to create a **better and more connected world**

almende
ORGANIZING NETWORKS

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nviso · sirris driving industry by technology · consider it · DFKI Deutsches Forschungszentrum für Künstliche Intelligenz GmbH · Diebold Nixdorf

NXP · OTARIS · almende · AnyWi Technologies · ir.deto · Beia Consult International

HI iberia · nimbeo · quantyca · Quobis · ULMA Embedded Solutions

- Toolkit, Methodology and Knowledge Base for **Secure DevOps**
- Aimed at SMEs to address the security of their IoT products and services

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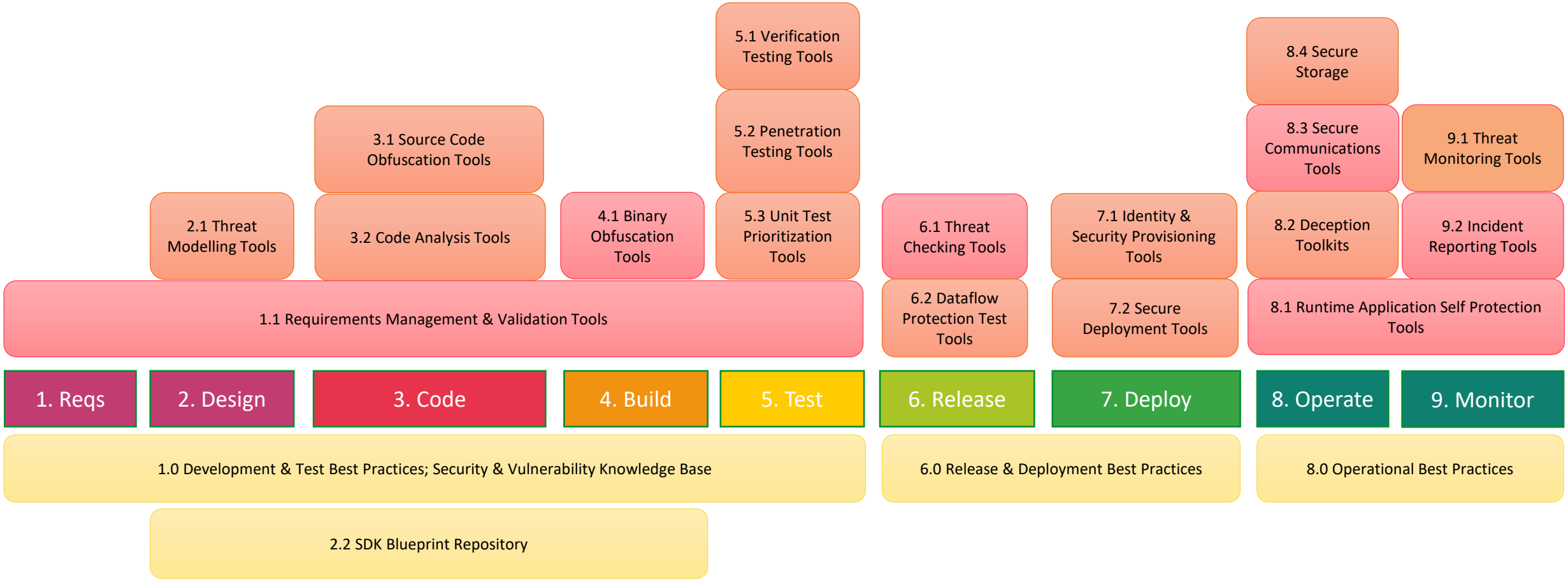
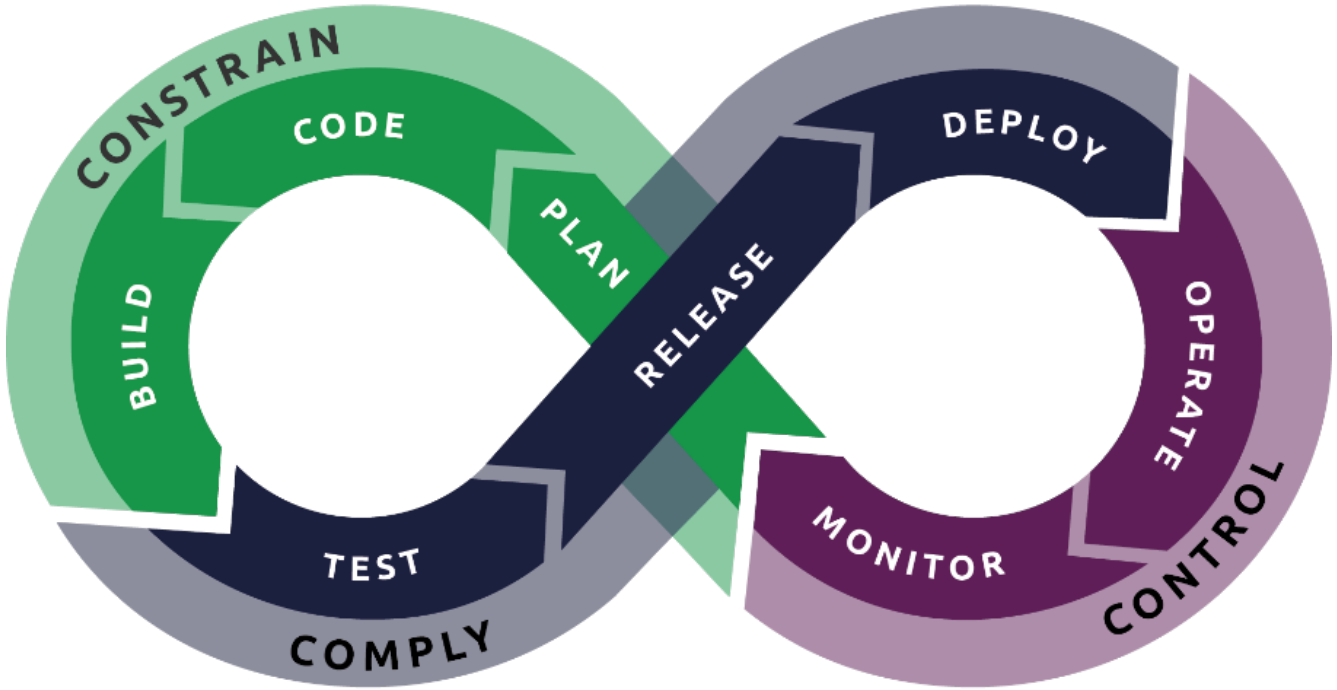
SCRATCh
SECURE AND AGILE CONNECTED THINGS

Tools & Overview



SCRATCh

SECURE AND AGILE CONNECTED THINGS



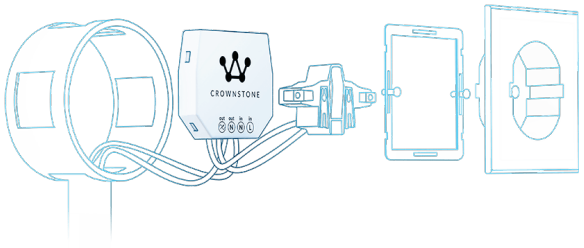
Methodology

- Based on the Essence Method
- Constrain, Comply and Control
- Security by Design
- Requirements-Centric Approach

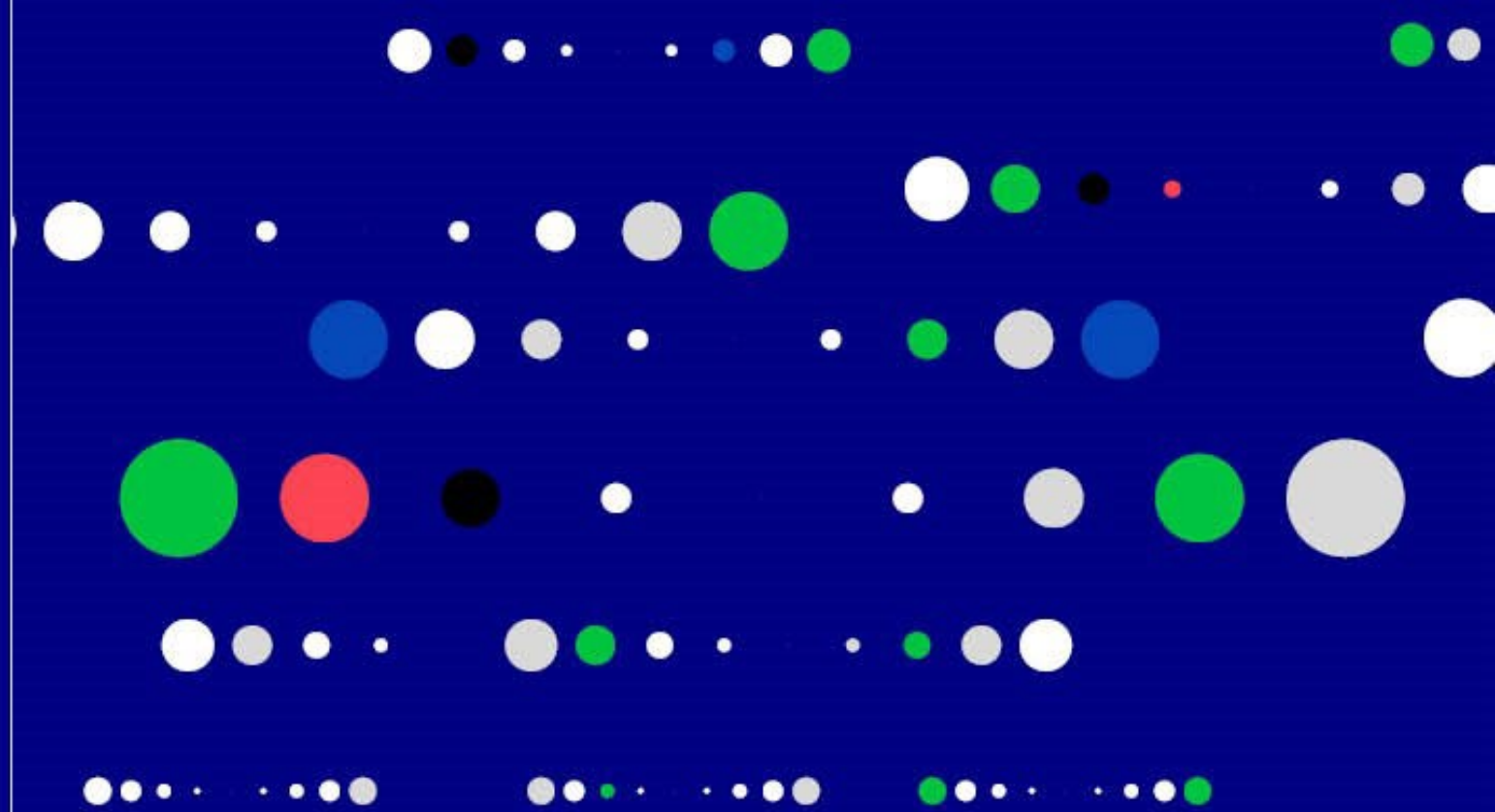
Smart Systems Development – Important Trends & Challenges

- **European Values**
  - privacy by design, low use of energy, zero waste, …
- **Resilience**
  - distribution, redundancy, adaptation, continuous approaches, …
- **Intelligence Everywhere**
- **Development Virtualisation**
  - hardware development (robotics, IoT, etc.)
- **Hybrid by Design**
  - high levels of automation, human in the loop, IT as the “scaffold”

CROWNSTONE



Asimovo



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Mikko Raatikainen, University of Helsinki

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Introduction
Background experience

Mikko Raatikainen
Post-doc researcher
University of Helsinki

UNIVERSITY OF HELSINKI
FACULTY OF SCIENCE

Industrial Grade Machine Learning for Enterprises (IML4E) project of ITEA
https://iml4e.org/

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Towards MLOps in ML-based digital systems and services

Key challenges

DevOps has become the de facto practice in software industry.

While ML systems have some more explorative elements
… MLOps tools to cover data and model engineering are maturing rapidly.

The challenges for *integrated systems with ML* are in:

- Integrated and automated workflows.
- The life-cycle from an idea (through pivoting) to maintenance.
- Fast-paced orchestrated, iterative development with continuous feedback.

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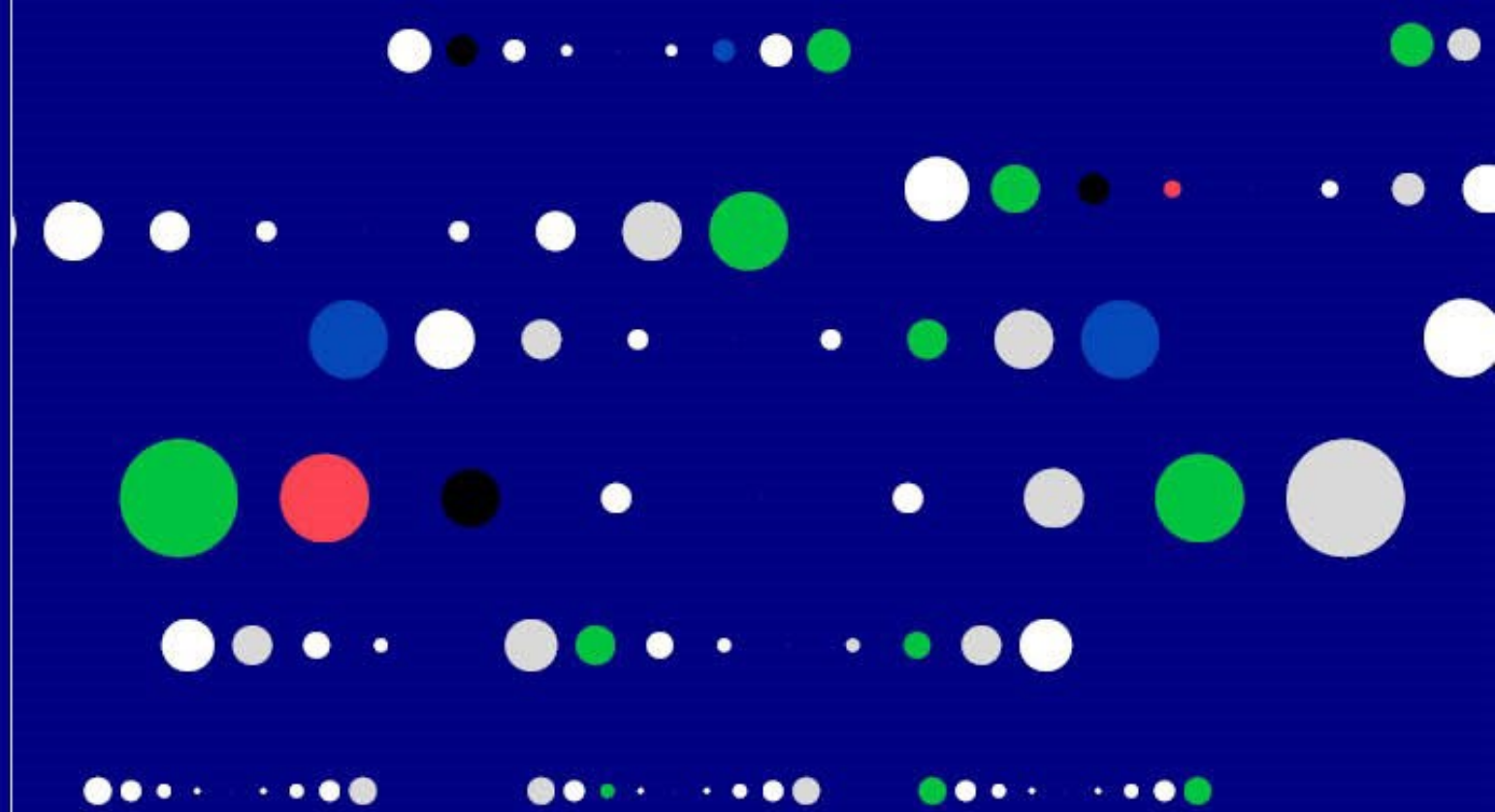

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Andrej Gisbrecht , Robert Bosch GmbH

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Introduction slide

Background experience

- Andrej Gisbrecht
- PhD in Computer Science

- Robert Bosch GmbH
- Semiconductor Fabrication, MEMS

- Autonomous Integrated Scheduling in Semiconductor Industry (AISSI)

The No Free Lunch Theorem

Start with the problem

Domain knowledge
Semiconductor fabrication

Artificial Intelligence
Deep Reinforcement Learning

Simulation
Digital twin

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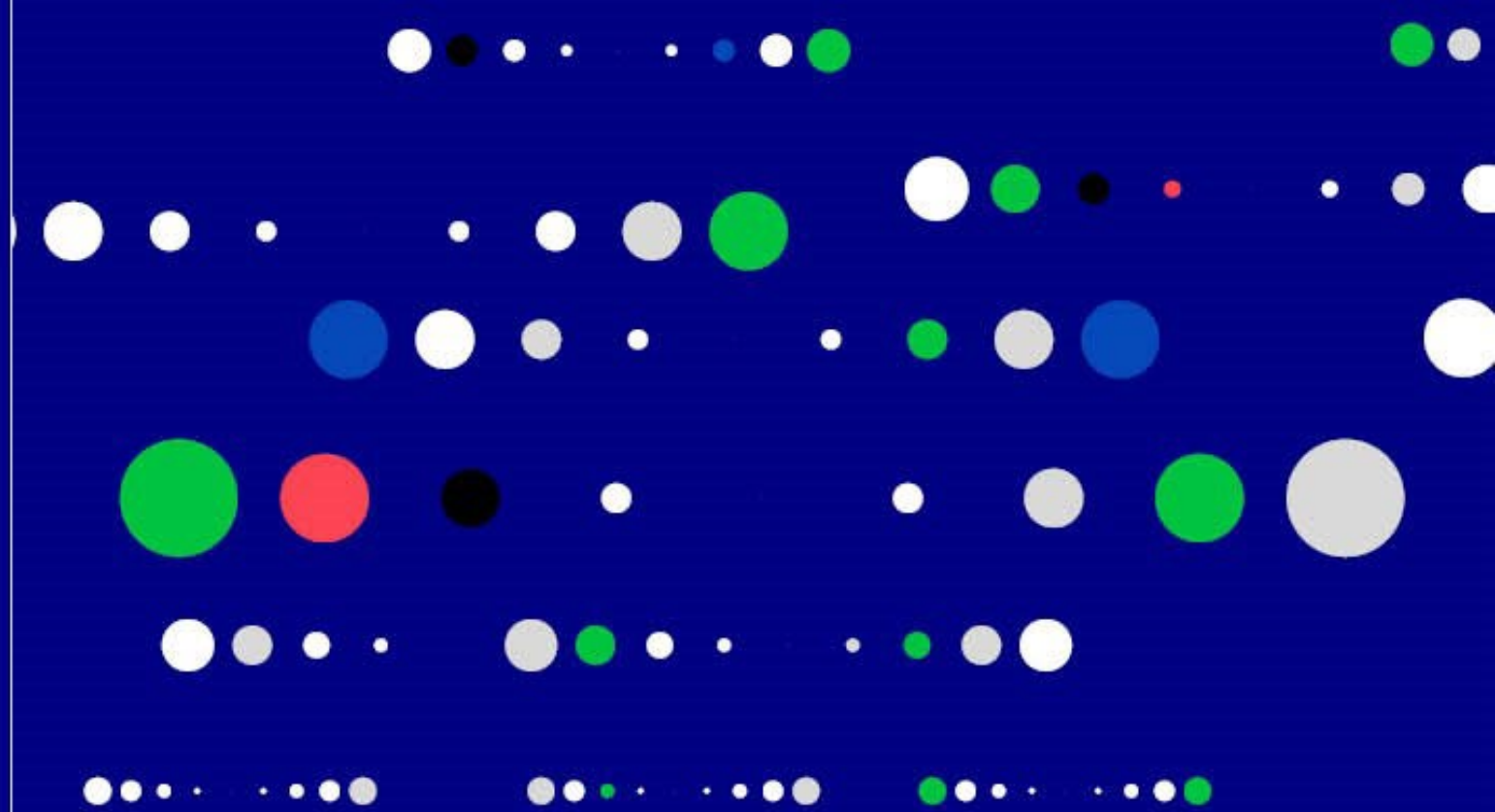
Contact details

- Andrej.Gisbrecht@de.bosch.com
- Robert Bosch GmbH
- https://aissi-project.com/



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