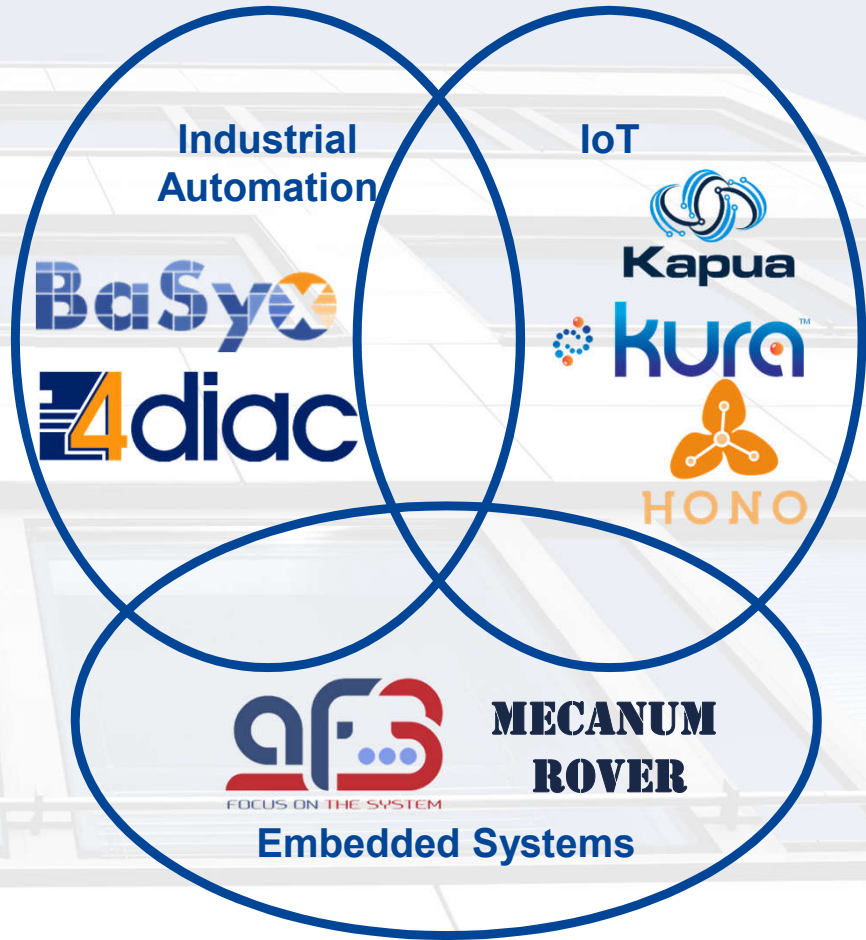


# Eclipse Insight

## Cross Domain Engineering



# Eclipse Insight

## Agenda

▶ **16:30 – 16:40 Welcome**

▶ **16:40 – 17:30 Industrial Automation Engineering**

- Introduction to BaSys 4.0 (Fraunhofer IESE)
- Making networked production easy with Digital Twins (Fraunhofer IESE)
- On the way to self-configurable automation systems (fortiss I4.0)

▶ **17:30 – 17:40 Break**

▶ **17:40 – 18:00 Internet of Things Engineering**

- Creating IoT applications from cloud to edge with Eclipse IoT (Jens Reimann)

▶ **18:00 – 18:10 Break**

▶ **18:10 – 18:50 Embedded Systems Engineering**

- Mecanum Rover: homebrew robotics and reactive microservices (Angelika Wittek, Oliver Springauf)
- Model-based Systems Engineering with AutoFOCUS3 - the autonomous ff1 car (fortiss MbSE)

▶ **18:50 – 20:00 Networking**

fortiss

Who we are

# fortiss company

- ▶ Research Institute of the Free State of Bavaria for software-intensive Systems and Services
- ▶ Proprietors: Free State of Bavaria (2/3) and Fraunhofer-Gesellschaft (1/3)
- ▶ Legal form: non-profit limited liability organisation
- ▶ Affiliated but independent institute of the Technical University of Munich
- ▶ Core competences:
  - research, development and transfer projects as a base for new products, services, and business models
    - funded project
    - bilateral projects
  - Application-oriented research & development for software, systems & service engineering

# fortiss in numbers



**3**

**offices in Munich**



**170**

**employees**



**60**

**running  
research projects**



**150**

**current  
research partners**



Guerickestr.



Highlight-  
Towers



Ludwig-  
Bölkow-  
Campus

# fortiss software

## Open Source

- ▶ Autofocus (Apache)  
<https://af3.fortiss.org>
- ▶ 4diac (Eclipse)  
<http://4diac.fortiss.org>
- ▶ Robotics Library (BSD)  
<https://www.roboticslibrary.org>



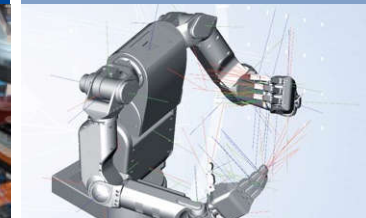
**Autofocus**  
Building kit  
with software  
development  
tools (embedded  
systems)



**4diac**  
Methods and  
tools for  
improved  
code quality  
(industrial  
automation)



**Robotics  
Library**  
C++ library for  
robot kinematics,  
motion-planning  
and control



# Industrial Automation Engineering

- Introduction to BaSys 4.0
- Making networked production easy with Digital Twins
- **On the way to self-configurable automation systems**

Industrial  
Automation

The logo for 4diac, featuring a stylized '4' with horizontal lines to its left, followed by the word 'diac' in a bold, sans-serif font.

# structure of industrial automation systems

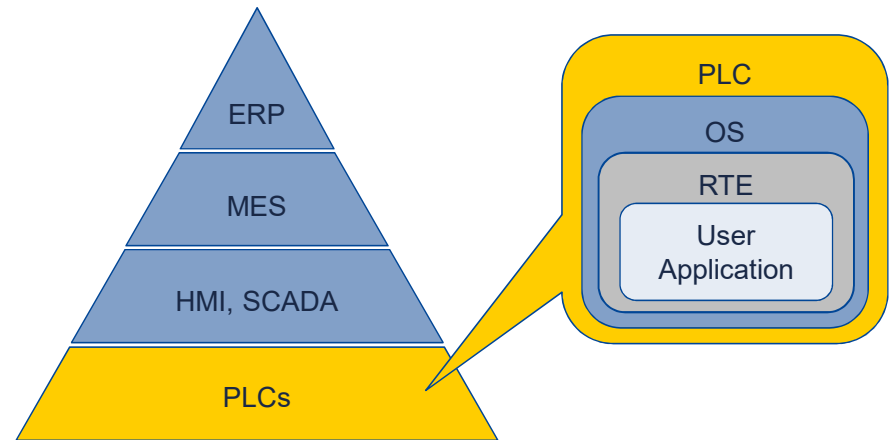
## ▶ automation pyramid

### ▶ PLC

- industrial environments (dust, vibration, humidity ...)
- types (soft, micro, compact, modular)
- user applications as function block networks
- type instance concept

### ▶ automation systems in Industry 4.0

- higher inter connection
- rising complexity
- distributed systems

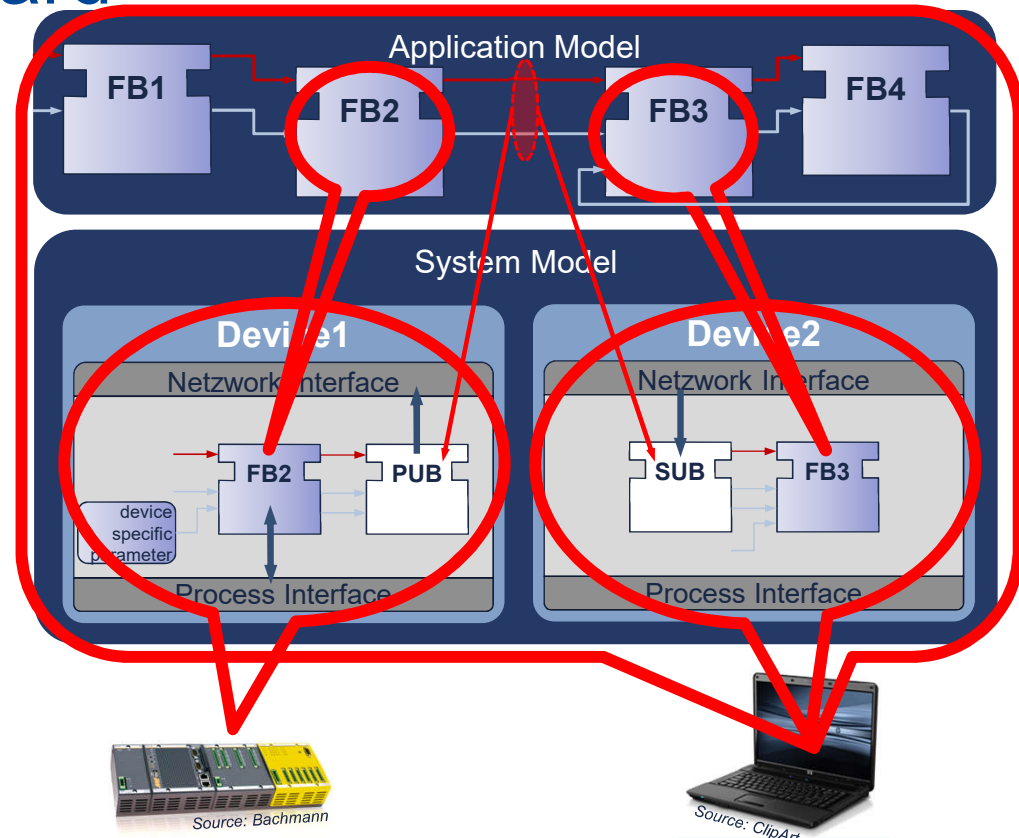




# The IEC 61499 Standard

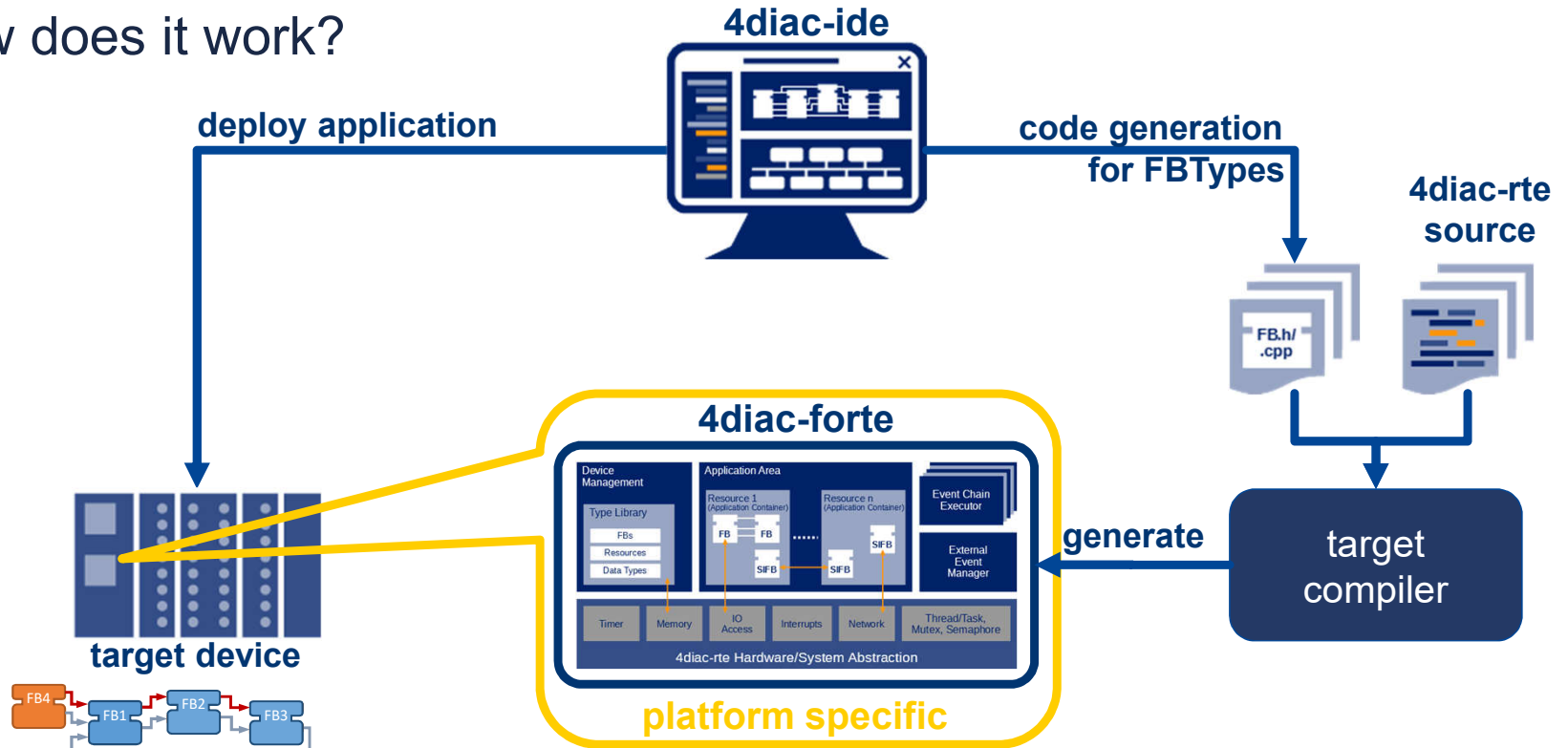
## distributed control systems

- ▶ domain specific language for distributed control systems
- ▶ event based system
- ▶ standardizes
  - device configuration by management commands
  - exchange format



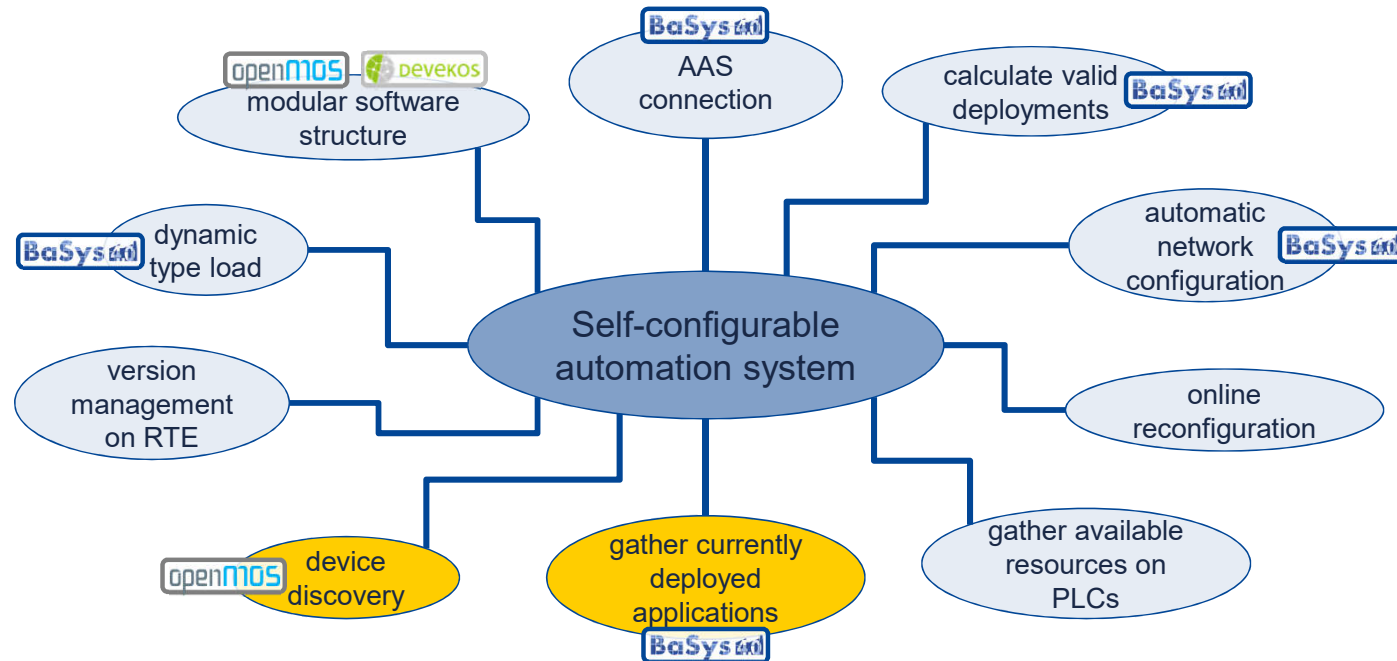
# Eclipse 4diac

How does it work?



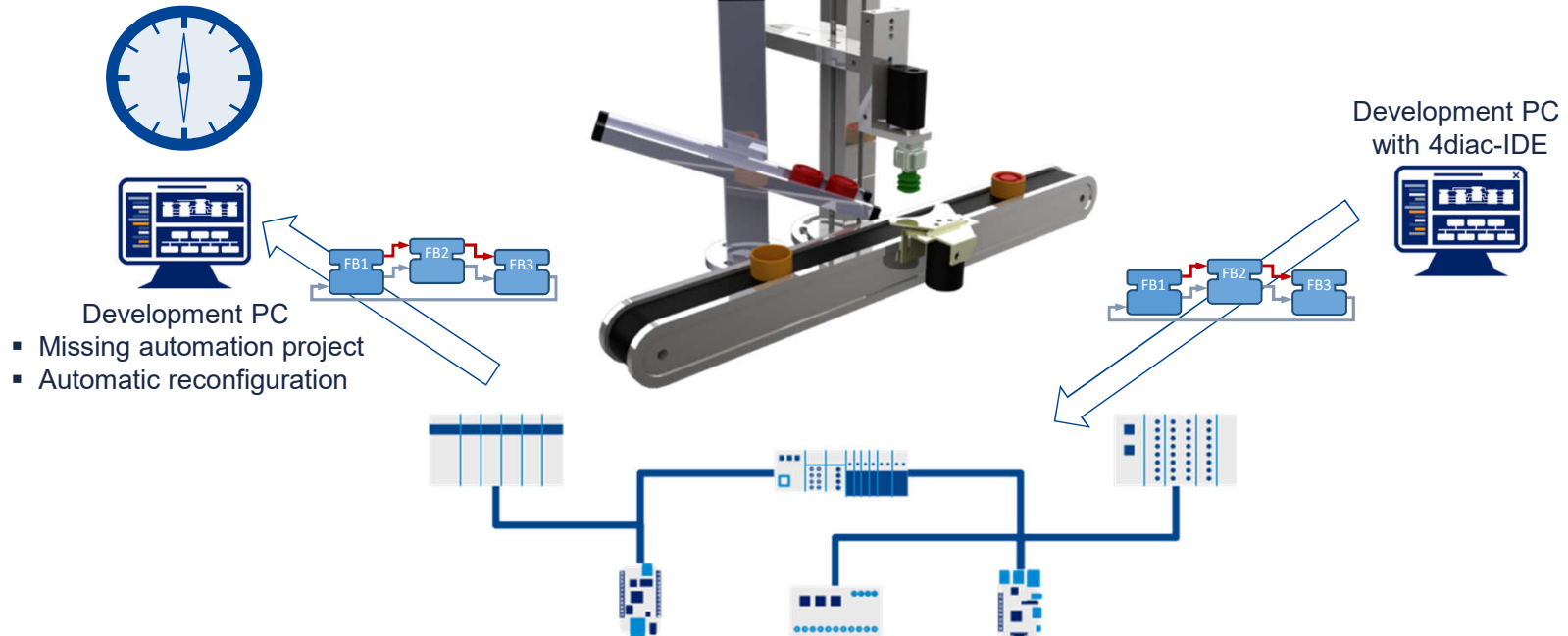
# self-configurable automation systems

needs to achieve self-configuration



# Demonstrator

## concept



# Demonstrator

## discovery

### 4diac-ide with JmDNS

