Raspberry Pi’s as Cyber-Physical Systems: Intelligent communication for Industry 4.0 scenarios
A Master Team Project in Cooperation with mayato GmbH

Dr. Christian Bartelt  Fabian Burzlaff  Eric Ecker  Prof. Dr. Heiner Stuckenschmidt
Wait,.... what?
Research Cluster: Intelligent Processes

Our Mission: Enhance processes by software innovations based on state-of-the-art research in Data Science, Service&Enterprise Systems Design and Software Engineering.
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Intelligent Business Processes

Intelligent Automation Processes

Intelligent Processes

Service & Enterprise Systems Design (Prof. Mädche)

Data & Web Science (Prof. Stucken-schmidt)

Software Engineering (Dr. Bartelt)

Intelligent Engineering Processes

Intelligent User-Centric Processes
The „intelligent interconnection“ between industrial systems offers a tremendous amount of new possibilities.
And this means?
In a perfect world, all digital entities describe their offered informations & functions identically out-of-the-box
In reality, every vendor does what he thinks is best for his business.
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- High Integration- and maintenance costs due to different standards
- Heterogeneous information models

→ „Plug-and-Play“ of machines not supported
Solution?
In order to make all digital entities Industry 4.0-ready, we will implement a Raspberry Pi as a MULTICom-Tool.

1. OPC UA Client managing Industry 4.0-ready Information models

2. Applications that utilize information models (e.g. Analytics)
Our Approach
We will provide you with a fast onboarding and regular feedback from one of our industry partner

1. **Onboarding**
   - Our current Master Team Project will help you in the beginning of your project

2. **Learning by doing**
   - You will have the opportunity to work with real hardware on your own in our programming lab

3. **Feedback**
   - Mayato as an expert for Industry 4.0 will provide you with valuable feedback about you work
We expect advanced technical expertise and the willingness to finish the project within 6 months

- Organizational Set-Up
  - 4-6 Students
  - 6 months (1 semester)
  - Language
    - German

- Suggested Timeline *

- Preconditions
  - Advanced Programming Skills (e.g. Java, C# and/or others)
  - XML-Parsing, UPC-UA, MQTT, REST, RPC, Raspberry PI (e.g. Raspian), CI/CD, Industrial Protocols (e.g. MES Communication)
  - Experiences in at least two technologies!

* Compulsory attendance
Thank you for your attention!

Master Team Project

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Our Industry partner mayato GmbH

70 Mitarbeiter

Standorte in Mannheim, Bielefeld und Wien

Hauptsitz in Berlin

mayato GmbH

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Relevant Links

- Mayato: [https://www.mayato.com/industry-analytics/](https://www.mayato.com/industry-analytics/)
- RAMI 4.0: [https://www.vdi.de/fileadmin/user_upload/VDI-GMA_Statusreport_Referenzarchitekturmodell-Industrie40.pdf](https://www.vdi.de/fileadmin/user_upload/VDI-GMA_Statusreport_Referenzarchitekturmodell-Industrie40.pdf)
- OPC UA: [https://opcfoundation.org/about/opc-technologies/opc-ua/](https://opcfoundation.org/about/opc-technologies/opc-ua/)
- MQTT: [http://mqtt.org/](http://mqtt.org/)
- ... and all tutorials for aforementioned technologies! 😊