FRANKFURT UNIVERSITY OF APPLIED SCIENCES

Internet of Things Seminar
Introduction

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FRANKFURT UNIVERSITY OF APPLIED SCIENCES

Agenda

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Prof. Dr. Oliver Hahm

- Study of Computer Science at Freie Universität Berlin
- Software Developer for ScatterWeb and Zühlke Engineering
- Research on IoT and Operating Systems

Contact

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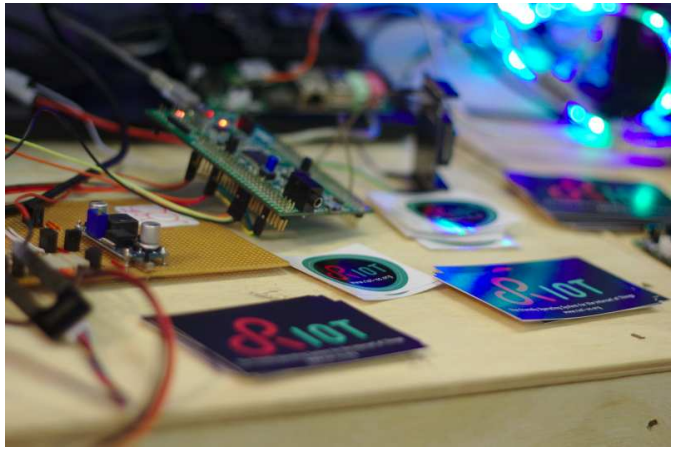
Join the RIOT!

RIOT is the friendly operating system for the IoT!



You're interested in ...

- ... programming the IoT?
- ... collaborate with hundreds of people from all over the world?
- ... contribute to a big FLOSS project?

Get in touch

Get in touch and do some hacking at the **All RIOT** event at the university!
Every two or three weeks 4pm in room 1-237.

Or look at `https://riot-os.org/community.html`

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Learning objectives

- understand the basic technologies for the Internet of Things,
- asses emerging technologies concerning their suitability,
- get acquainted quickly with new technologies, and
- develop new application fields.
- to search for, read, summarize and cite scientific literature on a large scale;
- to read and interpret national and international standards;
- to write a report as a scientific paper;
- to give a scientific talk.

Organizational

- Team work (two students per group)
- Identify research areas
- **Develop research questions**
- **Work on the research questions**
- Prepare final report
- Present your work

campUAS

Enrolment Key:
`HahmIoT`

Organizational

Develop research questions

- Each team selects one of the research areas
- Each team develops a research question in this area
- The team becomes the shepherds for this question
- The shepherds present their questions in a short pitch

Work on the research questions

- Each team selects one of the pitched research questions
- The teams start writing a report on this question
- The shepherds review the corresponding reports
- The comments from the reviews shall be incorporated into the reports

Dates

- October 20, 2022: Introduction and identification of research areas
- November 03, 2022: Pitch of the research questions and selection of a question
- December 15, 2022: First version of the report is sent to the shepherds
- January 12, 2023: First presentation
- February 09, 2023: Final submission

Assessment

- 30% for shepherding
  - Development of the research question
  - Reviews
  - Moderation
- 50% for the report
- 20% for the presentation

Further Information

Course page

All material regarding this course can be found at
https://teaching.dahahm.de

This includes

- Announcements
- Slides
- Dates

Agenda

The Internet of Things

What is the Internet of Things?

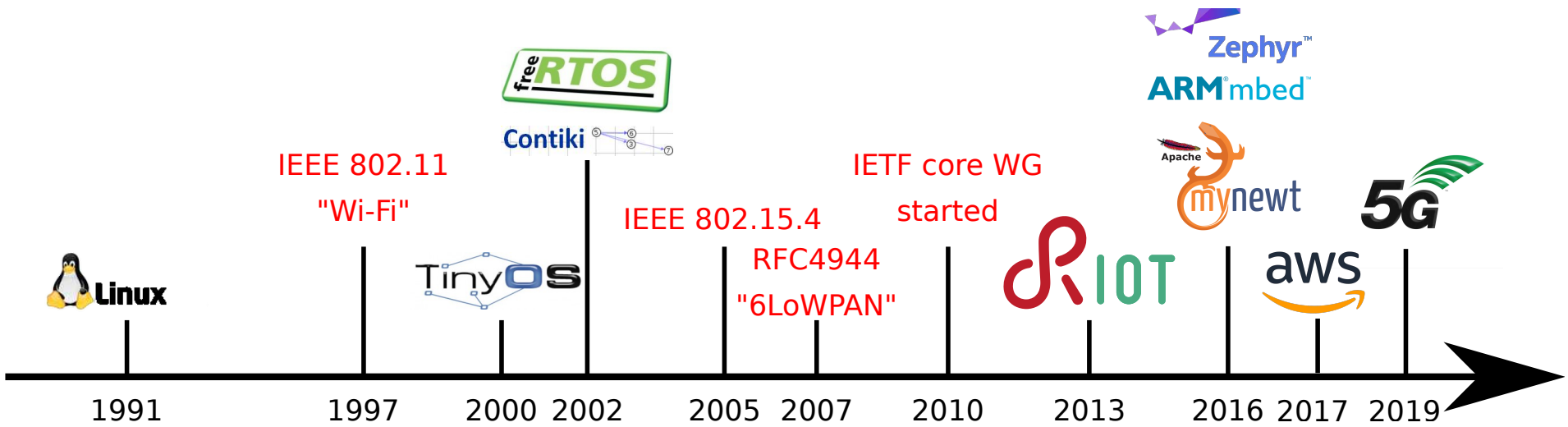
A Brief History of the Internet of Things

1982 A Coca-Cola vending machine was connected to the Internet at Carnegie Mellon University

1997 The **Smart Dust** research proposal at Berkeley kick-started research on **Wireless Sensor Networks (WSNs)**

1999 Kevin Ashton (P&G) coined the term **Internet of Things**

2008 Cisco identified the *birth* of IoT by the tipping point "when more 'things or objects' were connected to the Internet than people".

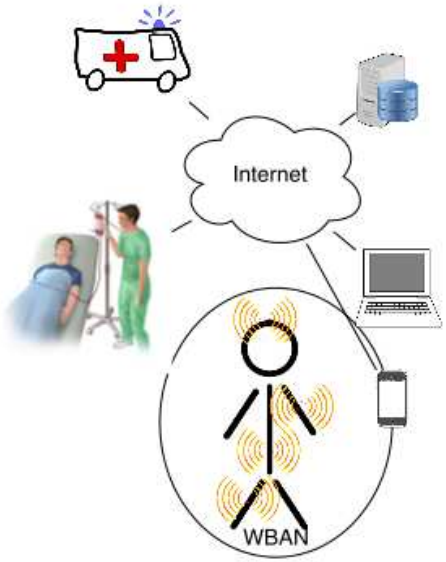


Connecting Smart Objects at Internet Scale

- From 3.5 billion Users to 50 billion Devices on the Internet
- Transforming Things into Smart Objects
- Enabling Interconnected Smart Services

Use Cases

Mobile Health



Micro & Nano Satellites

Industrial Automation

Building & Home Automation

Challenges

What are the main challenges and research areas for the Internet of Things?

Challenges

Low-end IoT Devices: Limited Resources (RFC7228)

iotlab-m3

Senslab WSN430

Arduino Due

- Memory < 1 Mb
- CPU < 100 MHz
- Energy < 10 Wh

Requirements

- Interoperability
- Energy Efficiency
- Reliability
- Latency
- Low Cost Factor
- Autonomy
- Security
- Scalability
- Sustainability
- Privacy
- Safety

Any Questions?