
# on the Internet of Things

Software Project for Computer Science
and Electrical Engineering

# What is the Internet of Things?

*A system in which objects in the physical world can be connected to the Internet by sensors and actuators* (coined 1999 by Kevin Ashton)

Key aspects:

- E2E communication via Internet standards
- Machine-to-machine communication
- Embedded devices, often constrained and on battery
- Typically without user interface
- Very large multiplicities, w/o manual maintenance

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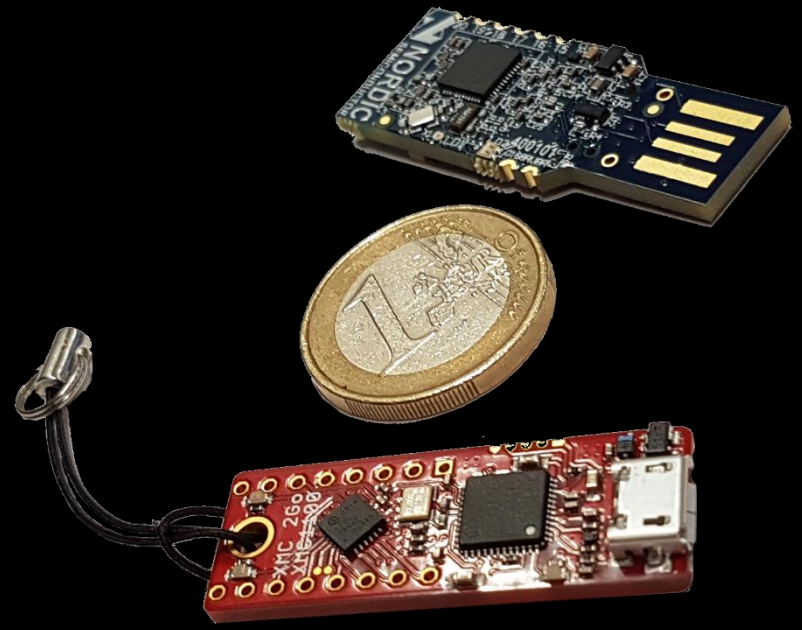
# IoT Applications

- Facility, Building and Home Automation
- SmartCities & SmartGrids
- Personal Sports & Entertainment
- Healthcare and Wellbeing
- Asset Management
- Advanced Metering Infrastructures
- Environmental Monitoring
- Security and Safety
- Industrial Automation

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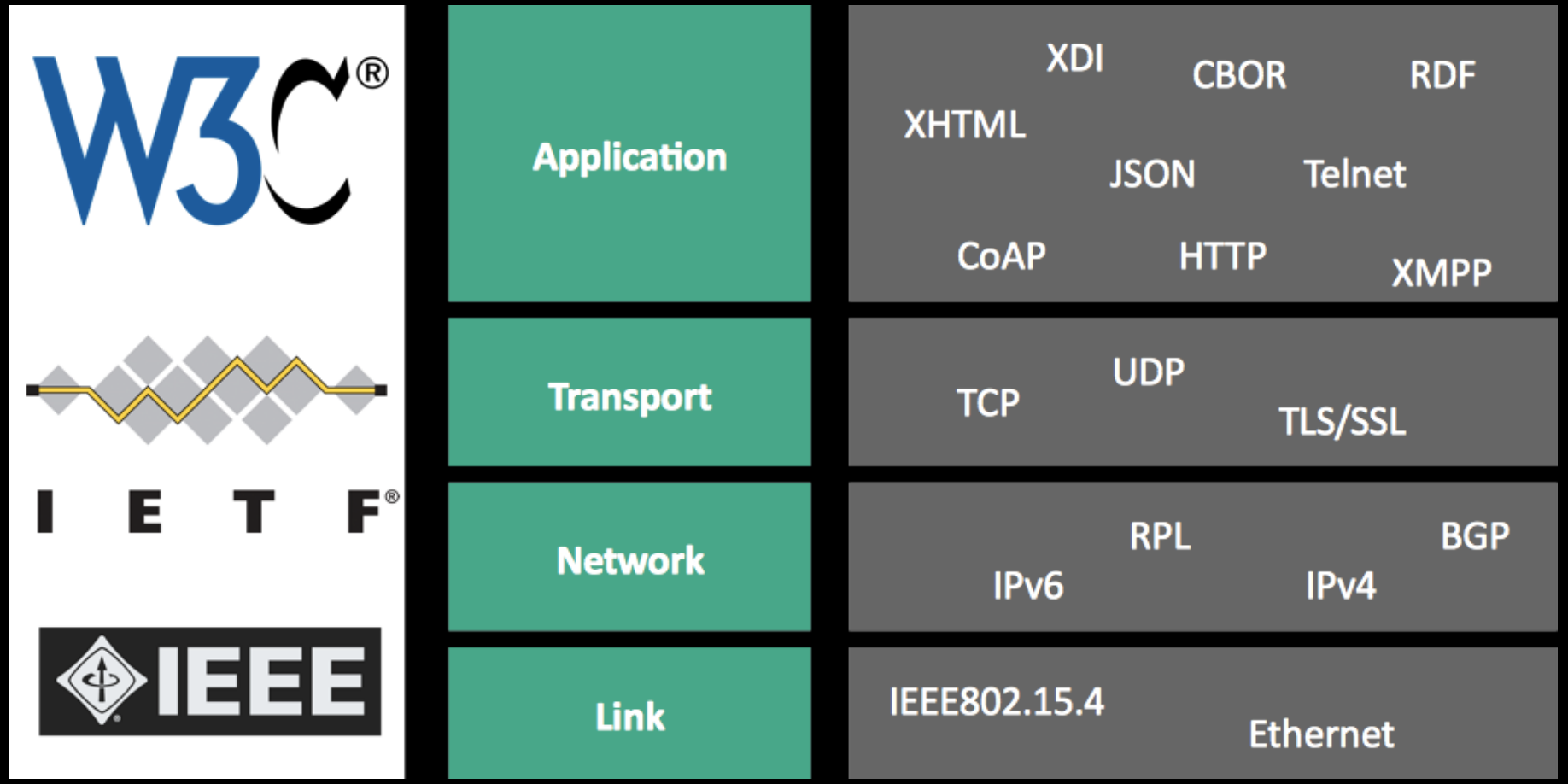
# IoT Challenges

The five key issue areas identified by ISOC:

1. Security
2. Privacy
3. Interoperability and standards
4. Legal, regulatory, and rights
5. Emerging economies and development

# No Internet without Open Standards

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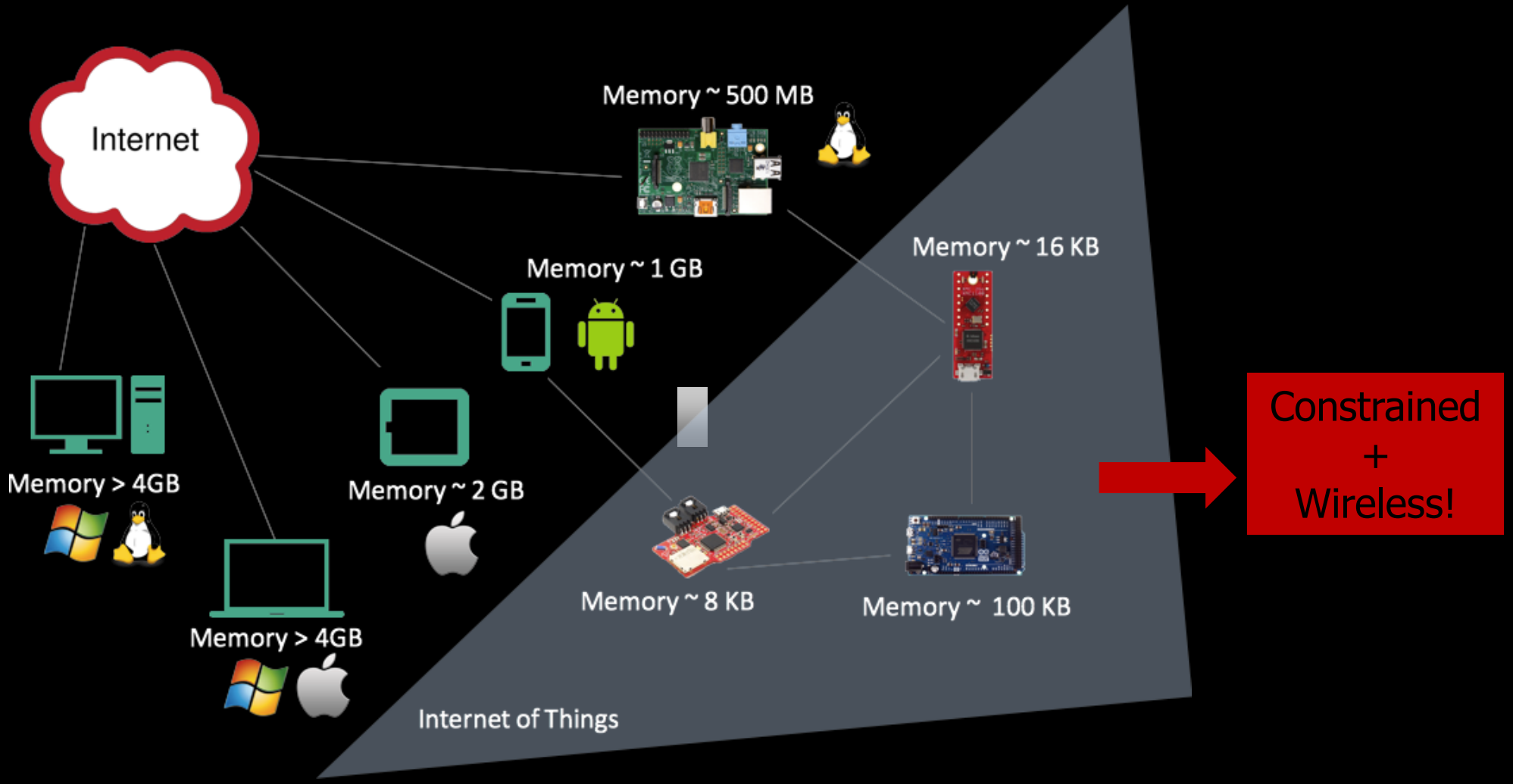
# The Constrained Internet of Things (IoT)

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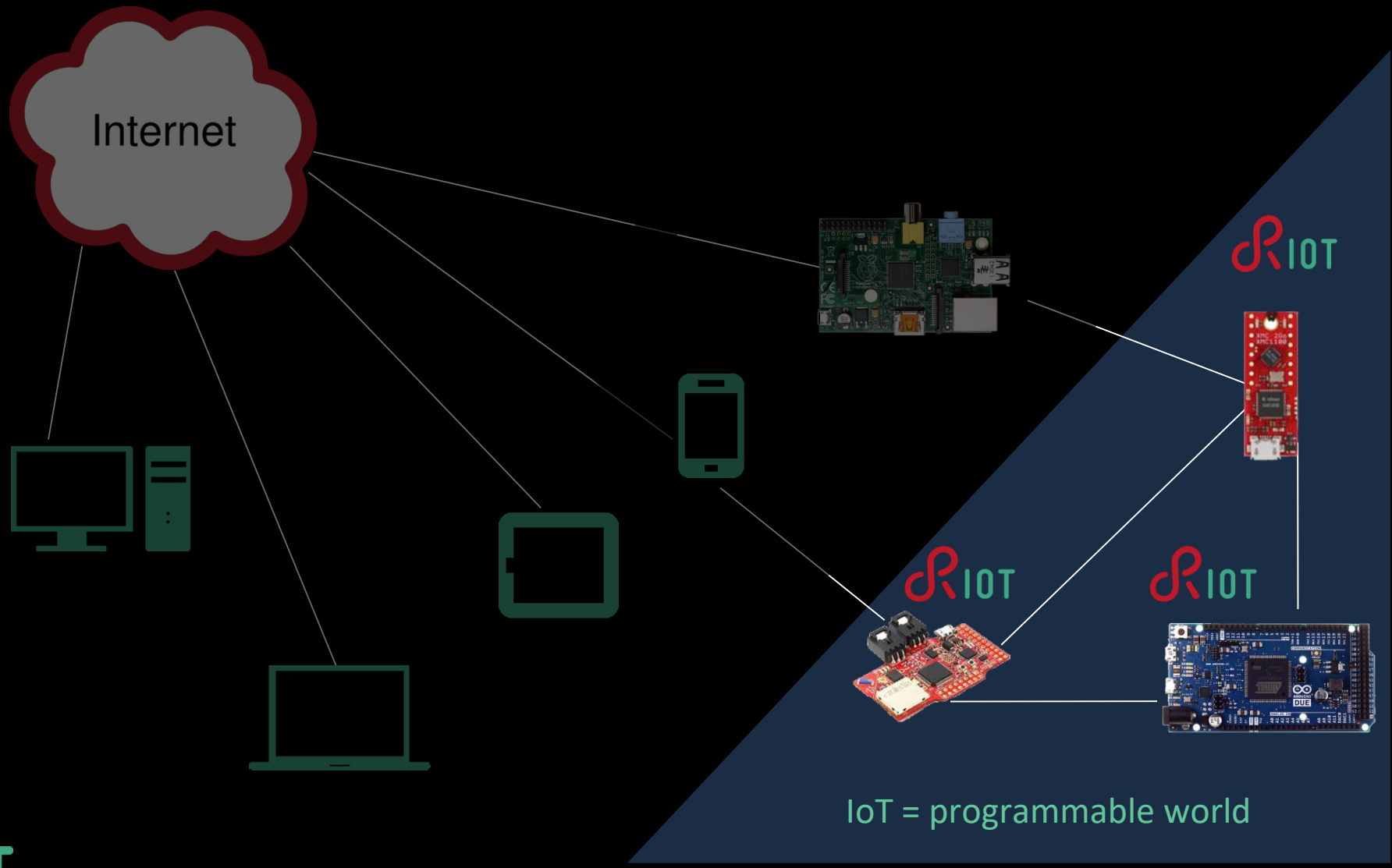
# RIOT: The Friendly OS for the IoT




IOT

If your IoT device cannot run Linux,
then run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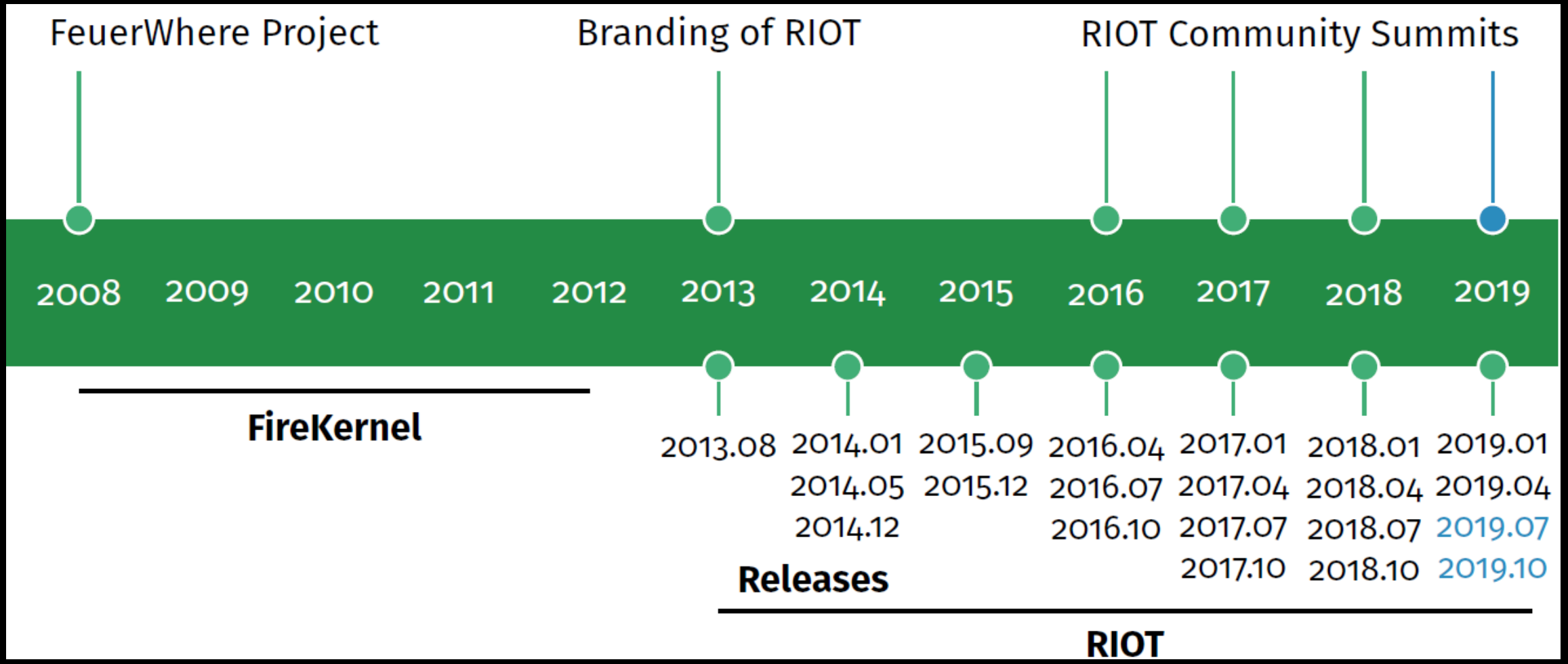
# RIOT: Facts sheet

- Microkernel architecture (for robustness)
  - The kernel itself uses ~1.5K RAM @ 32-bit
- Efficient hardware abstraction (for portability)
- Tickless scheduler (for energy efficiency)
- Deterministic O(1) scheduling (for real-time)
- Low latency interrupt handling (for reactivity)
- Modular structure (for adaptivity)
- Preemptive multi-threading & powerful IPC
- Appealing API

# The History of RIOT

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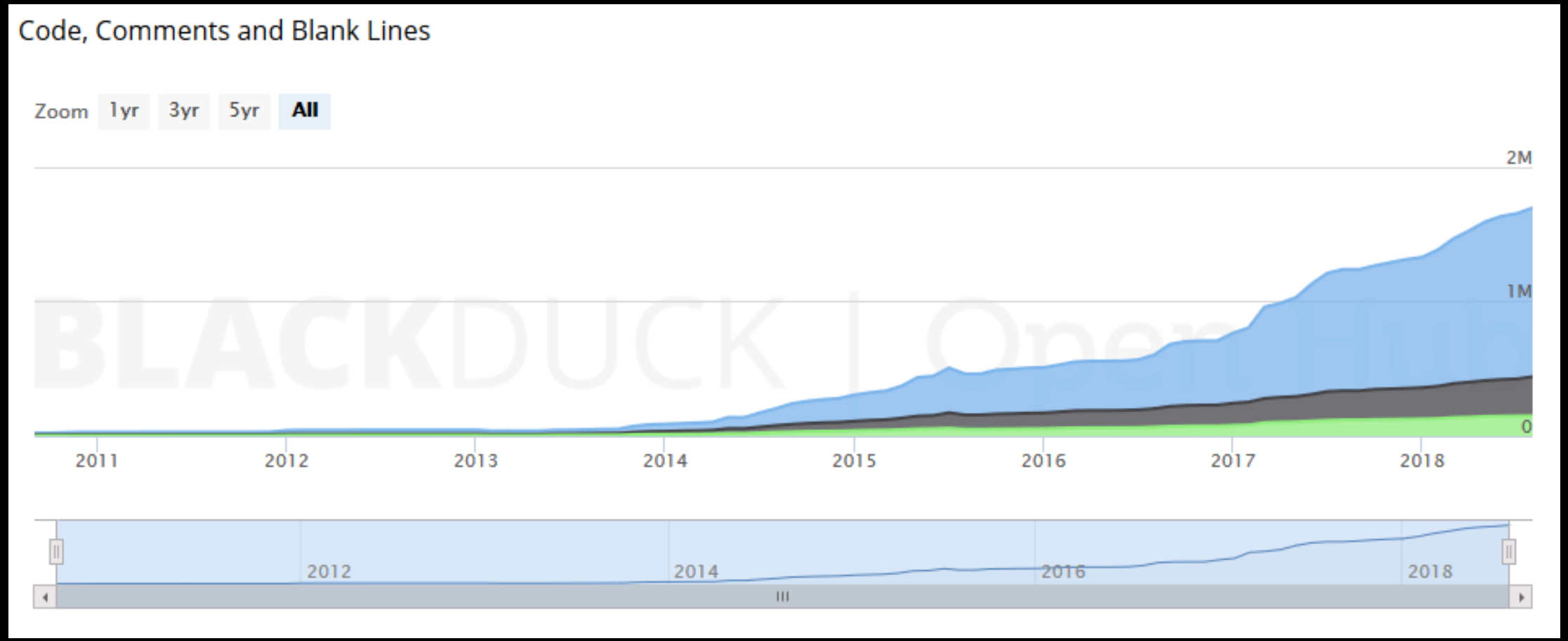
Freie Universität Berlin

Hochschule für Angewandte Wissenschaften Hamburg
Hamburg University of Applied Sciences

Inria
INVENTORS FOR THE DIGITAL WORLD

# An active and strong community



# The RIOT Ecosystem

Community follows the IETF spirit.

Rough consensus and running code!

- RIOT uses copyleft license (LGPLv2.1)
- 210 contributors worldwide
- 1400+ Pull Requests (last 12 months)
- Maintainer team of ≈ 30 people
- Many industrial opportunities & support

# Some commercial supporters















# An active and strong community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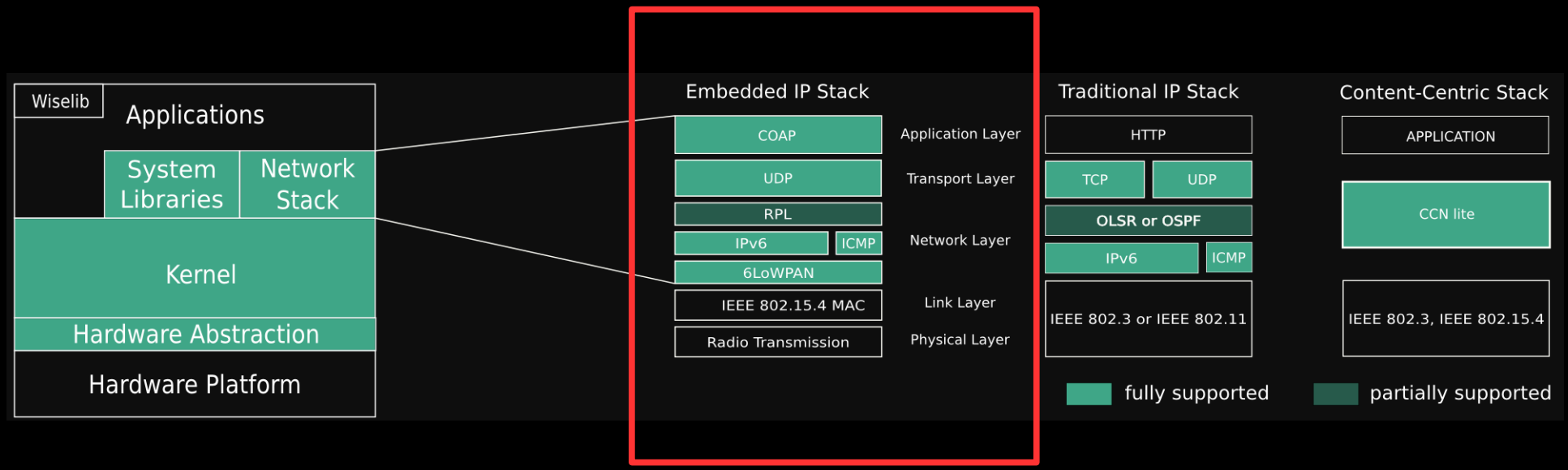
# RIOT: Built to connect




- Open-access protocols
  - e.g. 6LoWPAN, IPv6, CoAP, …
- RIOT supports several network stacks
- On many wireless technologies and NICs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# What this Project is About

- Get involved in building the IoT
- Find your team, work out your ideas
- Master IoT technologies and standards
- Collaborate with your team and others
- Build a multi-layered IoT solution
- Help making the world smarter with


17:00 - every last Tuesday of the month

# Four Milestones

1. Present your project
   Share the ideas of you and your group
2. First mock-up demo: Show how it will look like
3. Release candidate I: Show that it can work
4. Final project presentation: Make your results public

# Final Presentation Outdoors


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