Can’t run Linux on your IoT device? Run RIOT!
Inria INFINE Team

Goals in a nutshell:
• Design & analysis of novel communication paradigms, protocols & architectures
• Focus on concepts of ultra-distributed, information- and user-centric networking

Some of INFINE’s collaborations in the USA:
• Cisco (on IoT)
• UMass (on CDN)
• UC Berkeley (on OpenWSN, 6TiSCH)

Intersection with “Smart City & Mobility Towards Environmental & Social Sustainability”:
• mobile traffic offloading
• RIOT (which is the topic of this talk)
The Internet of Things (IoT)
Challenge: IoT Innovation & Sustainability

Hindered by proliferation of closed platforms, incompatible silos, locked-down hardware

Need for de facto standard open-source software bundle, equivalent of Linux for IoT devices
  • community-driven, open-source
  • independent from vendors, hardware architectures...
  • interoperability & communication based on standard, open-access specifications

Why did we come to this?
  • we needed efficient/maintainable IoT network protocol implementation
  • we needed cross-platform support, on heterogeneous IoT hardware
  • we needed real-time properties and preemptive scheduling
RIOT: Thin-waist, Open-source IoT

RIOT is an open source, low-power, small-footprint operating system
- Fits in ≈10k RAM, ≈100k ROM
- Linux-like API, but based on a micro-kernel fitting IoT device constraints
- IoT network stacks based on open standard low-power protocols (IPv6/6LoWPAN…)

Core functionally equivalent to Linux, based on:
- open-source,
- open-access protocol specs,
- community-driven development.

Closed- & -source Applications

Other network stacks
- CoAP, LWM2M...
- RPL, UDP...
- IPv6, 6LoWPAN...

Open-Source Drivers

RIOT

Closed-Source Drivers

Peripherals (including network interfaces)
- Lowpower MCU + radio or wired communications

Third-party software

Hardware
Applications: IoT, home/building automation...
Status & Next Steps

RIOT’s status:

- Lively community, world-wide (but mostly European)
- Both academic & industrial contributions
- RIOT core is mature, many on-going developments around it

Some

Expected collaborations with industry:

- Partners contributing to RIOT’s open source core (dev & maintenance)
  - Similar to companies contributing to Linux kernel
- Partners using RIOT (to focus on their core business)

Number of commits per month. Source: BLACK DUCK Open Hub.
https://www.openhub.net/p/RIOT-OS
Thanks. Questions?

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