ChamelIoT

An Agnostic Hardware Operating System Framework for Reconfigurable IoT Devices

Miguel Silva
miguel.silva@dei.uminho.pt

Advisors
Adriano Tavares, Tiago Gomes,
Mongkol Ekpanyapong

FCT Fundação para a Ciência e a Tecnologia

CENTROALGORITMI

UNIVERSIDADE DO MINHO

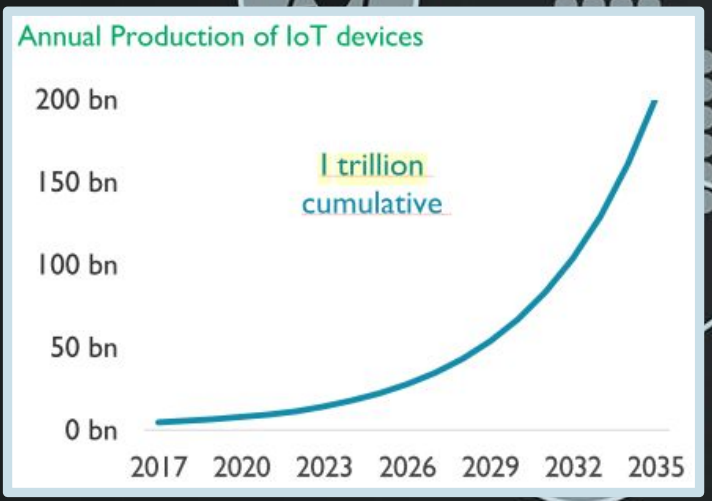
03 Jan 2019

IDC Forecasts Worldwide Spending on the Internet of Things to Reach $745 Billion in 2019, Led by the Manufacturing, Consumer, Transportation, and Utilities Sectors

EGHAM, U.K., August 29, 2019

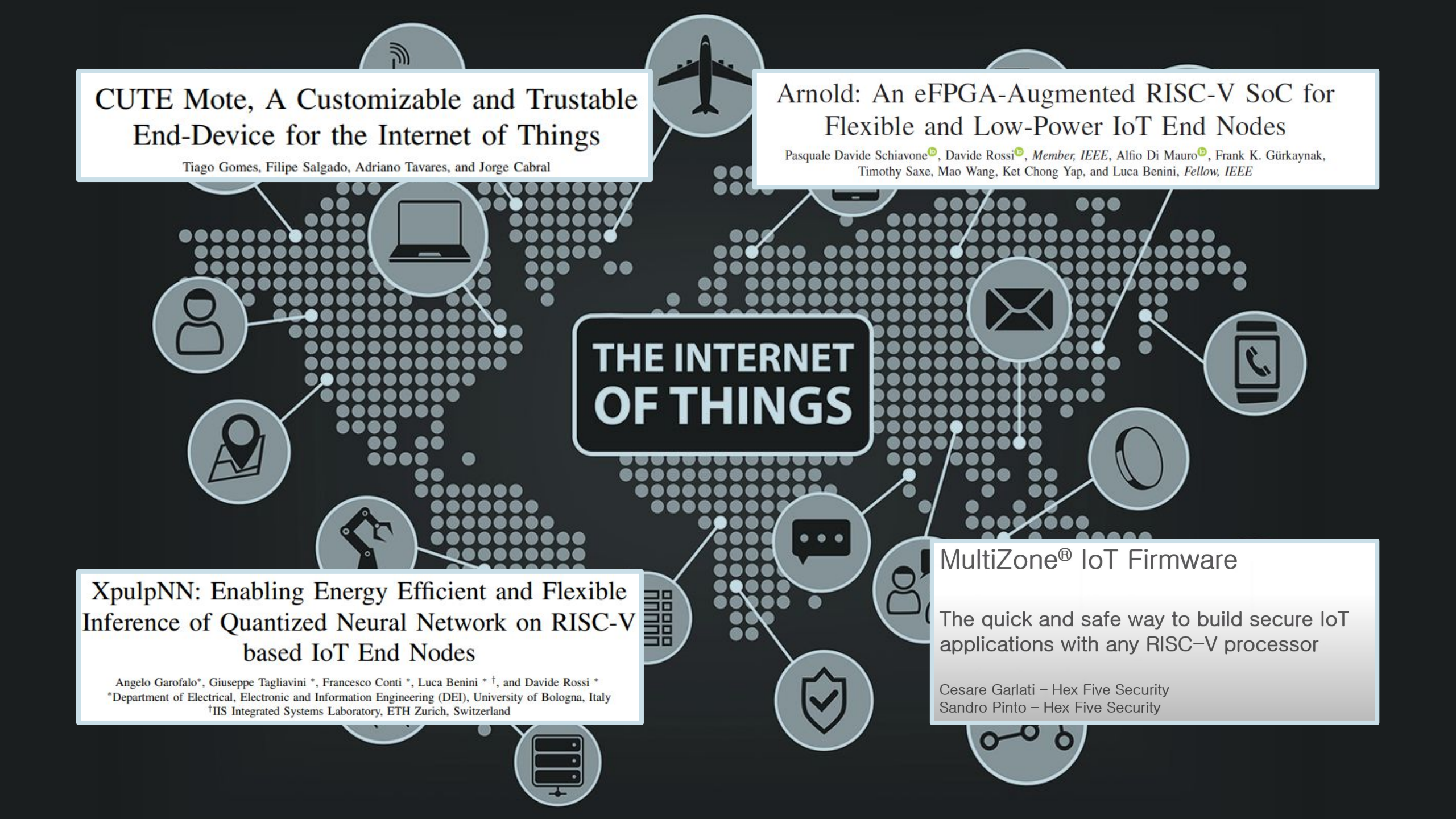
Gartner Says 5.8 Billion Enterprise and Automotive IoT Endpoints Will Be in Use in 2020

THE INTERNET OF THINGS



Popular Internet of Things Forecast of 50 Billion Devices by 2020 Is Outdated

Warning: All projections for the Internet of Things are subject to change



CUTE Mote, A Customizable and Trustable End-Device for the Internet of Things

Tiago Gomes, Filipe Salgado, Adriano Tavares, and Jorge Cabral

Arnold: An eFPGA-Augmented RISC-V SoC for Flexible and Low-Power IoT End Nodes

Pasquale Davide Schiavone, Davide Rossi, *Member, IEEE*, Alfio Di Mauro, Frank K. Gürkaynak, Timothy Saxe, Mao Wang, Ket Chong Yap, and Luca Benini, *Fellow, IEEE*

XpulpNN: Enabling Energy Efficient and Flexible Inference of Quantized Neural Network on RISC-V based IoT End Nodes

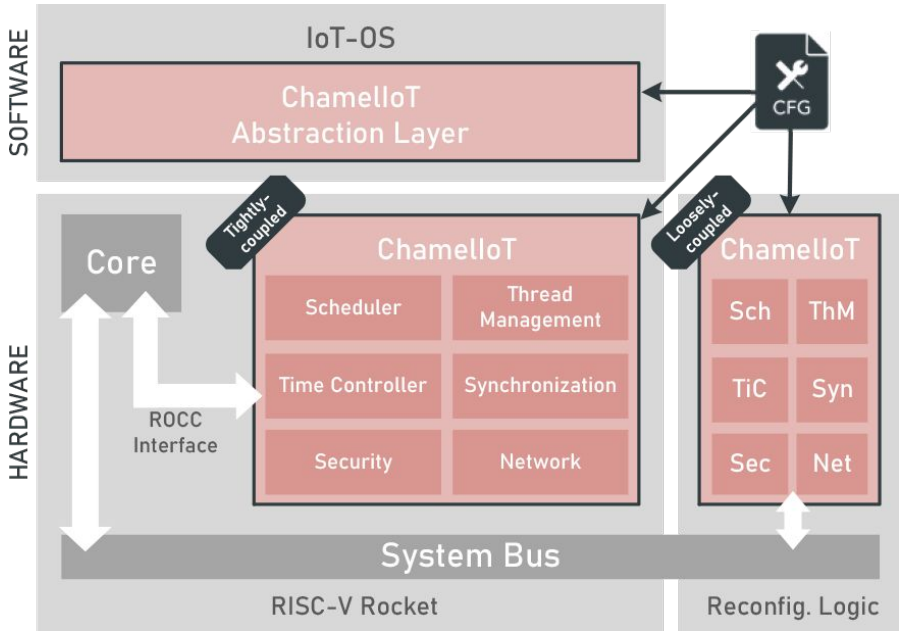
Angelo Garofalo*, Giuseppe Tagliavini *, Francesco Conti *, Luca Benini * †, and Davide Rossi *
*Department of Electrical, Electronic and Information Engineering (DEI), University of Bologna, Italy
†IIS Integrated Systems Laboratory, ETH Zurich, Switzerland

MultiZone® IoT Firmware

The quick and safe way to build secure IoT applications with any RISC-V processor

Cesare Garlati – Hex Five Security
Sandro Pinto – Hex Five Security

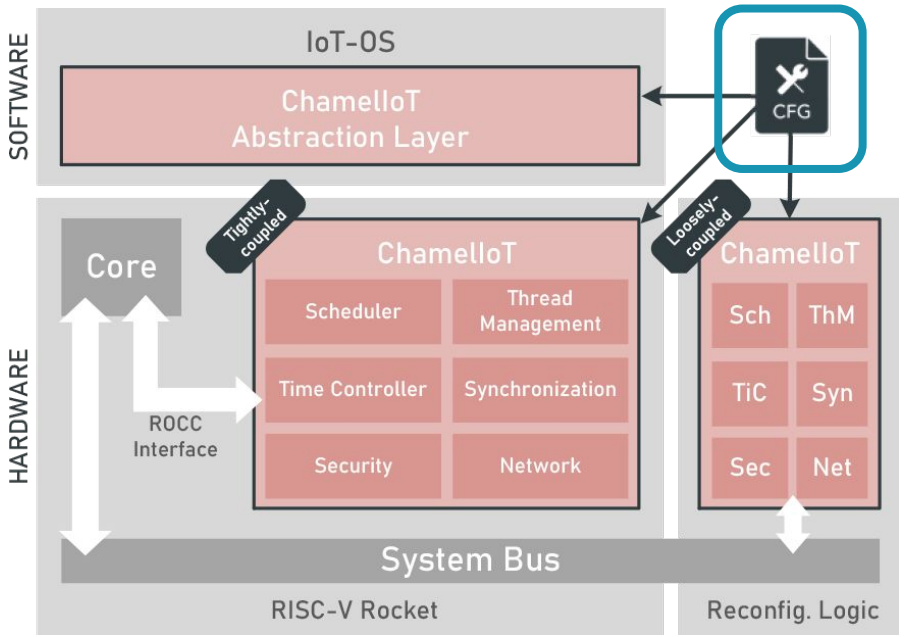
CHAMELIOT



ChamelIoT's goal is to provide a framework to accelerate IoT OSes in hardware.

- RISC-V -based OS accelerator (tightly- and loosely-coupled)
- IoT OS abstraction layer
- Configuration Tool

CHAMELIOT



ChamelIoT's goal is to provide a framework to accelerate IoT OSes in hardware.

- RISC-V -based OS accelerator (tightly- and loosely-coupled)
- IoT OS abstraction layer
- **Configuration Tool**

MSCTHESIS

ChamelloT's Configuration Tool

Goals

- Develop an Eclipse-based tool to allows the user to build the full system (Hardware accelerator + IoT Operating System)
  - Allow the configuration of all ChamelloT's components
- Integrate the build system of the three supported OSes

Competences

Learn to develop Eclipse plugins

Understand Chisel and ChamelloT's hardware accelerator

Understand the three different OSes and their build systems

SOMEREADING

- M. Silva, A. Tavares, T. Gomes and S. Pinto, "**ChamelIoT: An Agnostic Operating System Framework for Reconfigurable IoT Devices**," in IEEE Internet of Things Journal, vol. 6, no. 1, pp. 1291-1292, Feb. 2019

- M. Silva, D. Cerdeira, S. Pinto and T. Gomes, "**Operating Systems for Internet of Things Low-End Devices: Analysis and Benchmarking**," in IEEE Internet of Things Journal, vol. 6, no. 6, pp. 10375-10383, Dec. 2019

- M. Silva, T. Gomes, and S. Pinto, "**Leveraging risc-v to build anopen-source (hardware) OS framework for reconfigurable IoT devices**,"in CARRV2021, Jun. 2021

THANK YOU!

Miguel Silva (UMinho)
miguel.silva@dei.uminho.pt