

# MicroFaaS: Adaptive serverless computing for Internet of Things

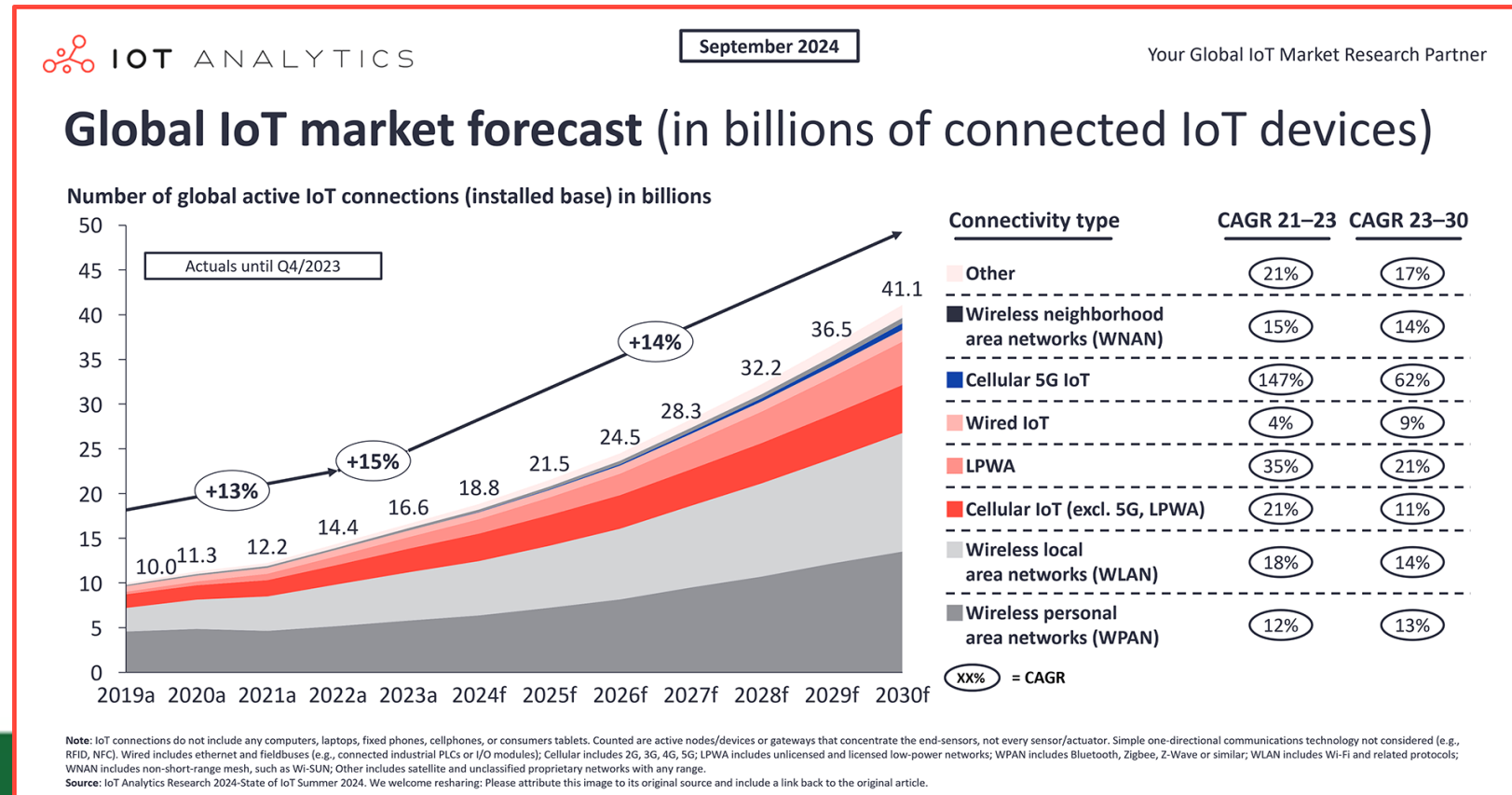
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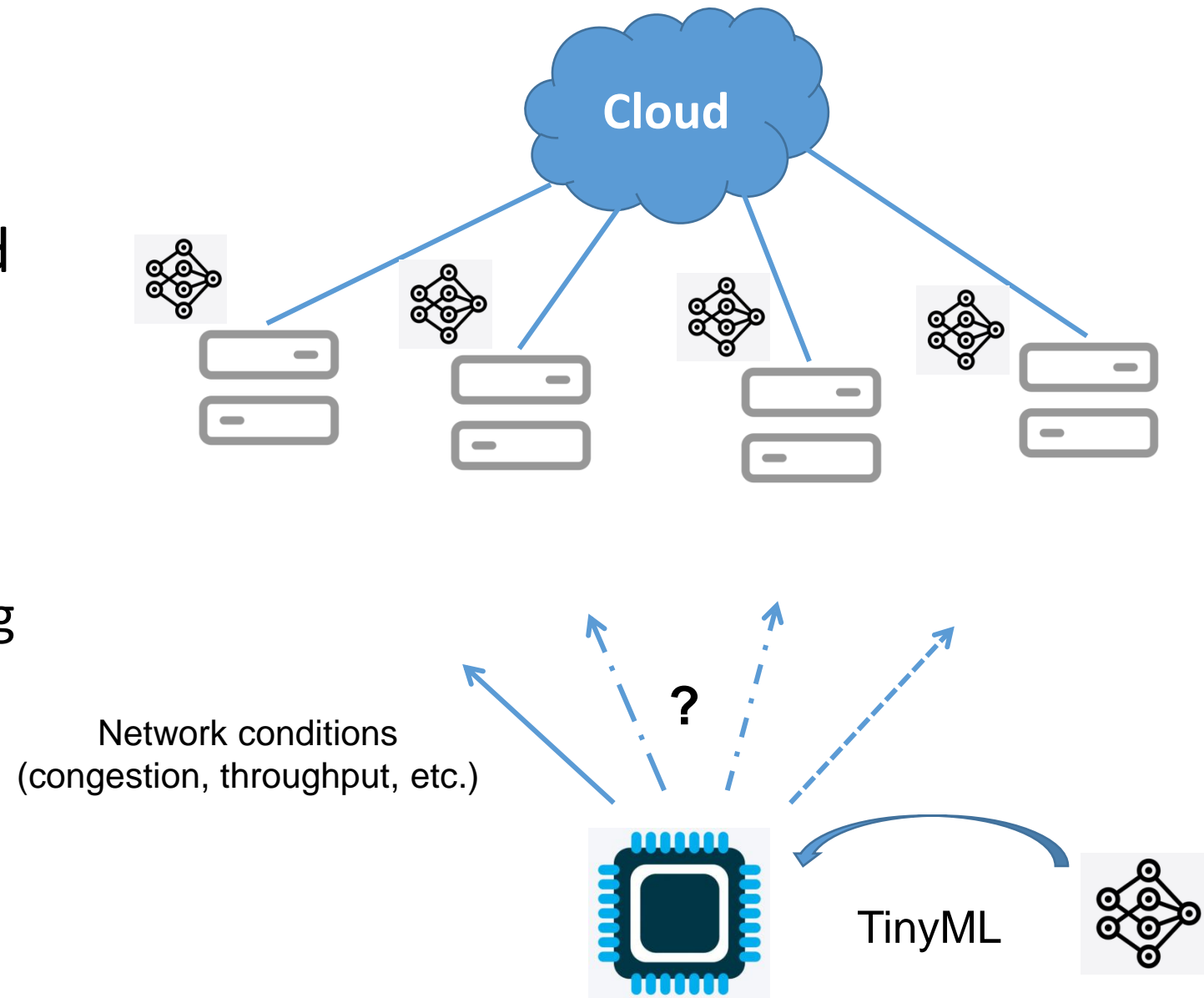
# Motivation

- IoT growth projected to exceed 40B devices by 2030
  - Need for intelligence provided by ML models
    - Data processing, fraud detection, etc.
  - Major constraints
    - limited CPU, memory, energy



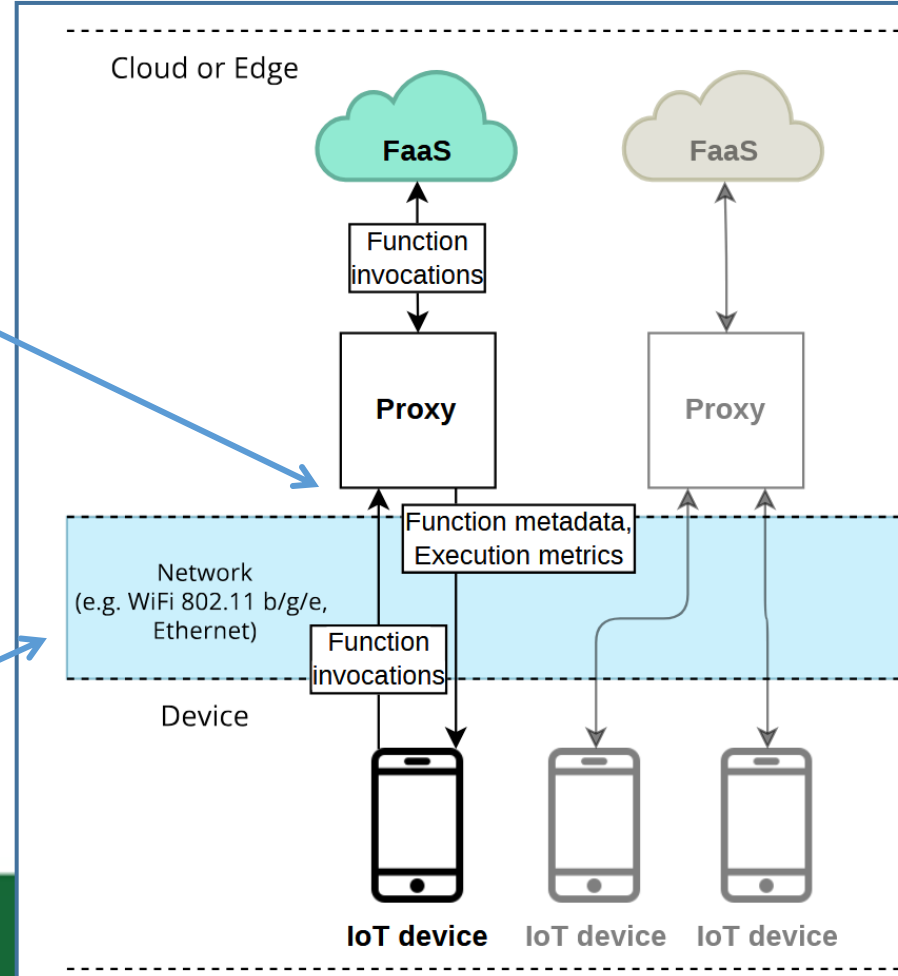
# Research problem

- ML models can be optimised and deployed on IoT devices
  - Microcontrollers
  - Linux based IoT devices
- ML models on the edge
  - Various possibilities for ML serving
    - 6G MEC
    - On-Prem servers
    - Home Gateways
    - Drones
- Which edge instance should be selected for invocation?



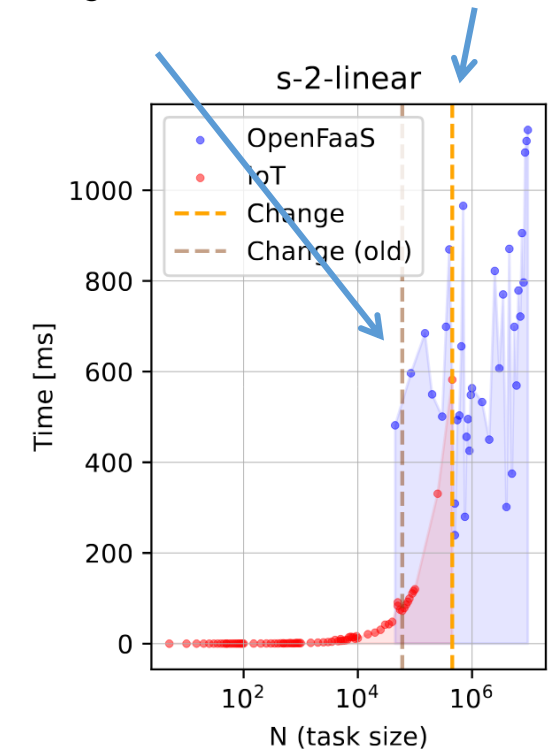
# MicroFaaS

- **MicroFaaS is an intelligent and adaptive offloading framework for IoT devices**
  - Incorporates **prior benchmarking and regression models** for execution cost estimation
  - **MicroFaaS proxies** store these regression models and **share them across IoT clients**, enabling a knowledge base about remote FaaS functions
  - MicroFaaS **monitors network connectivity** and **updates communication cost models** dynamically.



## Case study

*service invocation switching during network congestion*  
*in normal network conditions*



# Summary

- **MicroFaaS** is an **intelligent and adaptive offloading framework** for IoT devices
  - Approach analysed in MicroFaaS **reduces calibration time** for the offloading algorithm
    - **68.75%** of the time taken by a naive strategy that offloads all tasks to FaaS.
    - **5.23%** of the time required when all tasks are executed locally on the IoT device.
- The framework is **cloud-agnostic**, allowing seamless **integration with multiple FaaS providers**.

*T Szydło, O Krolík, "MicroFaaS: Adaptive serverless computing for Internet of Things", FGCS accepted*

