ETSI IoT Week 2022

oneM2M stacks and self energy consumption

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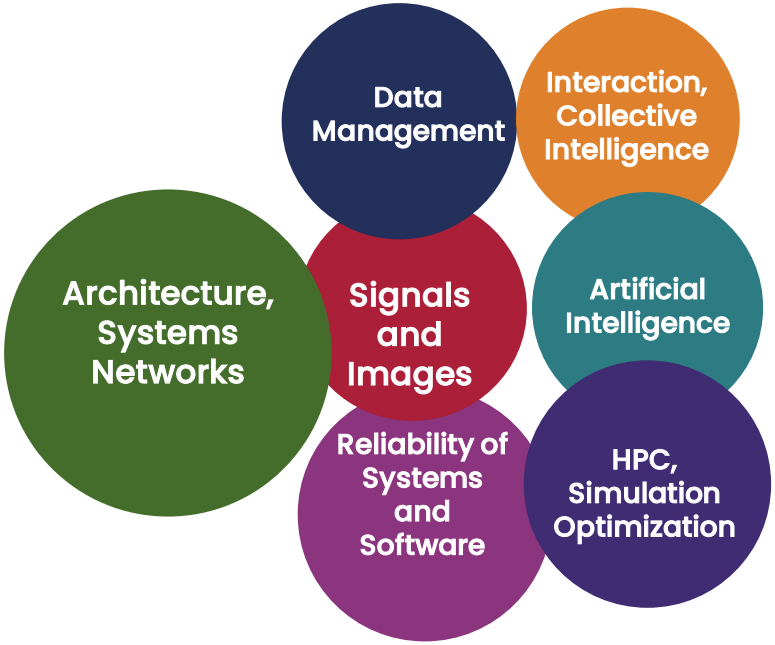
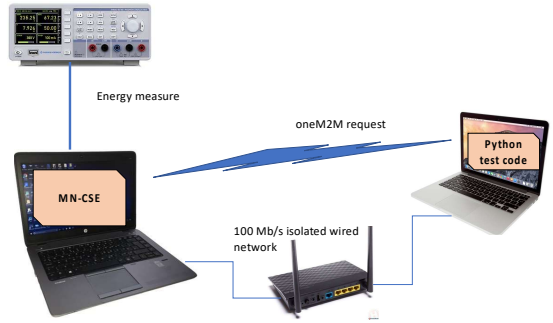
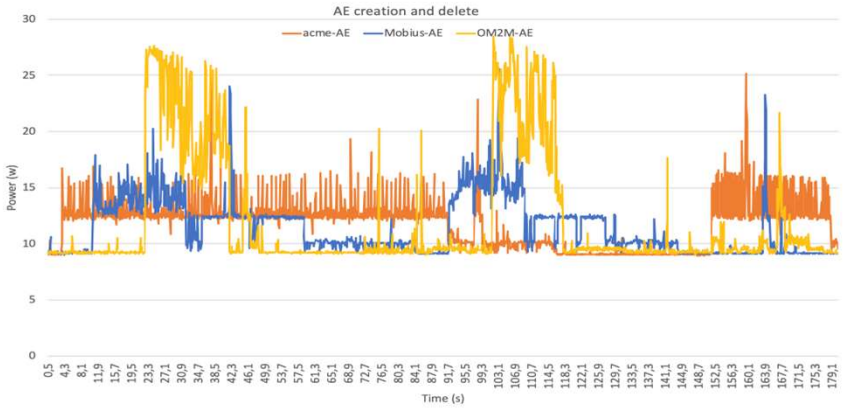
Research at IRIT



- Informatics Research Institute of Toulouse
  - More then 600 hundred
  - Topics : Big Data, Internet of Things, Artificial Intelligence, security, …
  - SEPIA Team: Operating Systems, Distributed Systems, from Middleware to Architechture
- Two results:
  - Study of self energy consumption of oneM2M stack
  - New opensource :
    - LOM2M : IoT stack for microcontroller

- 3 oneM2M opensources : ACME, MOBIUS, OM2M
- Testing platform
  - HP elite book, macbook, isolated wired network, power analyser
  - Test program in python
- Tests oneM2M resources
  - Standalone stack: ACME (+0.1W), MOBIUS (+0.09W), OM2M (+0.15W)
  - AE creation ACME (+31.32W), MOBIUS (+1.82W), OM2M (+2.45W)
  - CNT creation (+69.55W), MOBIUS (+1.75W), OM2M (+1.04W)
  - CIN, LAST CIN, subscription/notification
  - oneM2M redirection





Analysis : impact on energy

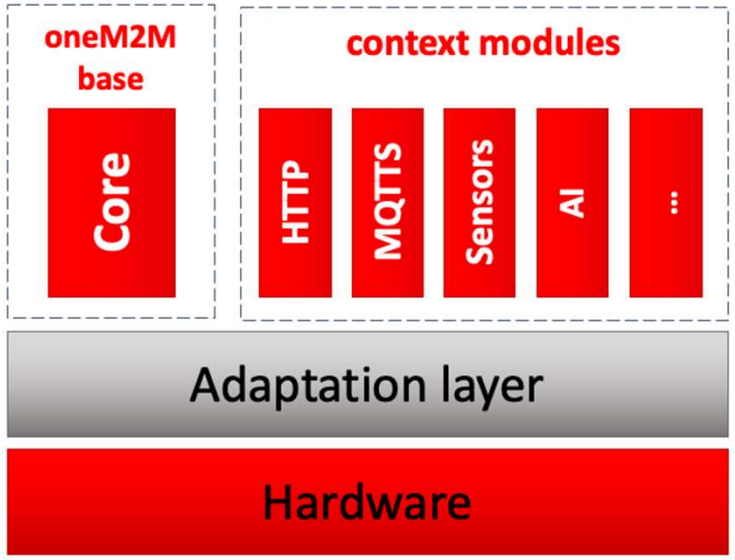
- programming language :
  - python (ACME), node JS (MOBIUS), java (OM2M)
  - Portability, facility for WEB technologies
- database :
  - objects database, SQL, NoSQL, …
  - Impact of the number of resources in the database.
- Distributed architecture or not: memory, processes
- Complex oneM2M architecture (INs, MNs and ASNs CSE)

Proposals

- Integrate Energy consumption in development process
  - Low power IoT stack
- Inside oneM2M:
  - Energy monitoring, QoS connected to self energy consumption, energy budget, activate/disactivate functionalities

LOM2M – new opensource IoT stack for microcontroler

oneM2M R3 compliant



Language
- C++

OS
- Arduino (ESP8266)
- Unix based systems

RAM footprint
- ~60KB RAM (ESP)
- ~3MB RAM (Unix)

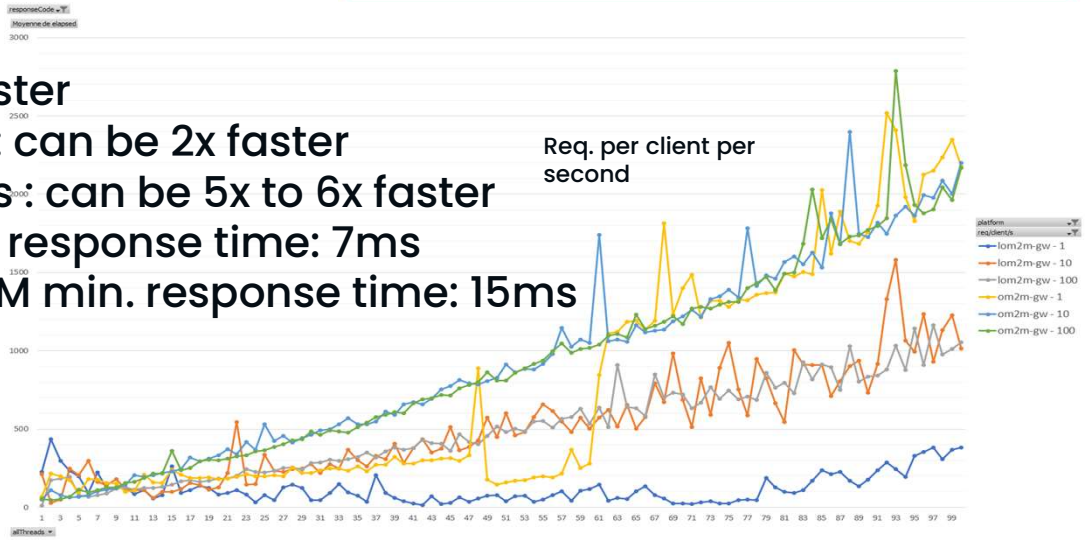
Binaries footprint
- ~500KB ROM (ESP)
- ~5-6 MB (Unix)

For comparison:
Eclipse OM2M MN-CSE
- Java OSGi based
- Footprint: ~30 MB
- RAM occupation: at least 400 MB (GW)

Sizes may vary regarding enabled features

LOM2M is faster
- 50 clients : can be 2x faster
- 100 clients : can be 5x to 6x faster

LOM2M min. response time: 7ms
Eclipse OM2M min. response time: 15ms



Mid-November: https://gitlab.irit.fr/sepia-pub/lightom2m