Internet of Things

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June 11, 2013

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- Internet Protocols
- Simplified Internet Protocols
- Interoperability with Internet (e2e, URI, ...)
- Open Standards
- Always on

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- RFID
- NFC
- Wireless Sensor (and Actuator) Networks
- Smart Grids
- Cars
- ...

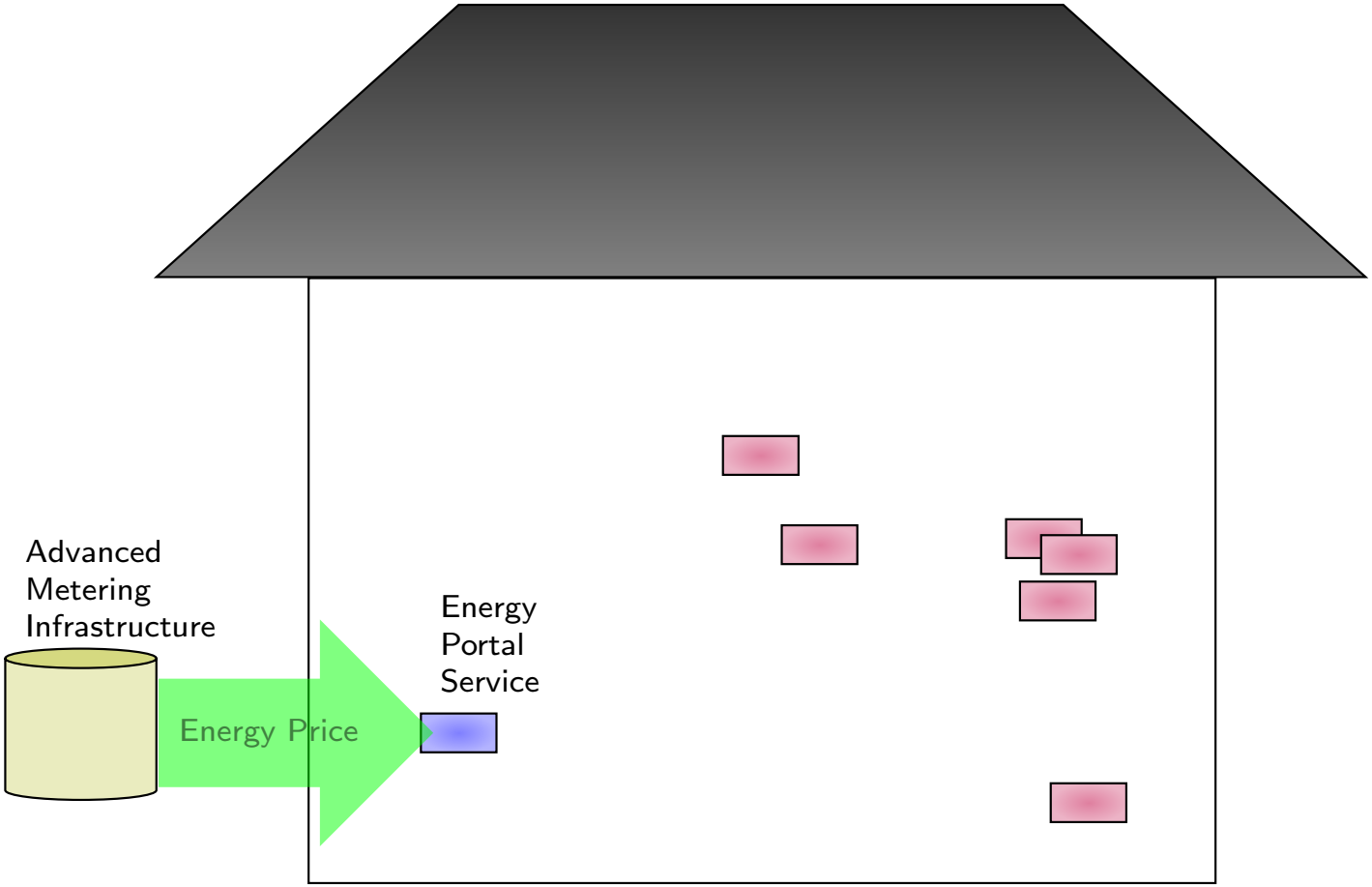
History repeating?

- 80's: IP as a word wide protocol
  - other alternatives: CLNP, X.25, Frame Relay, ATM
  - IP: Best Effort, no reservation, fixed address size, ...
- 80's: IP in entreprise network
  - Other alternatives: IPX, NetBios
  - IP: no d'auto-configuration, no service discovery
- 90's IP in telephony
- 00's IP in TV
  - Other alternatives: IEEE 1394/ATM/Hiperlan

Conclusion

- Network Value comes from Interconnection
- Interconnection is based on Open Protocols

ZigBee SE 2.0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Energy Price
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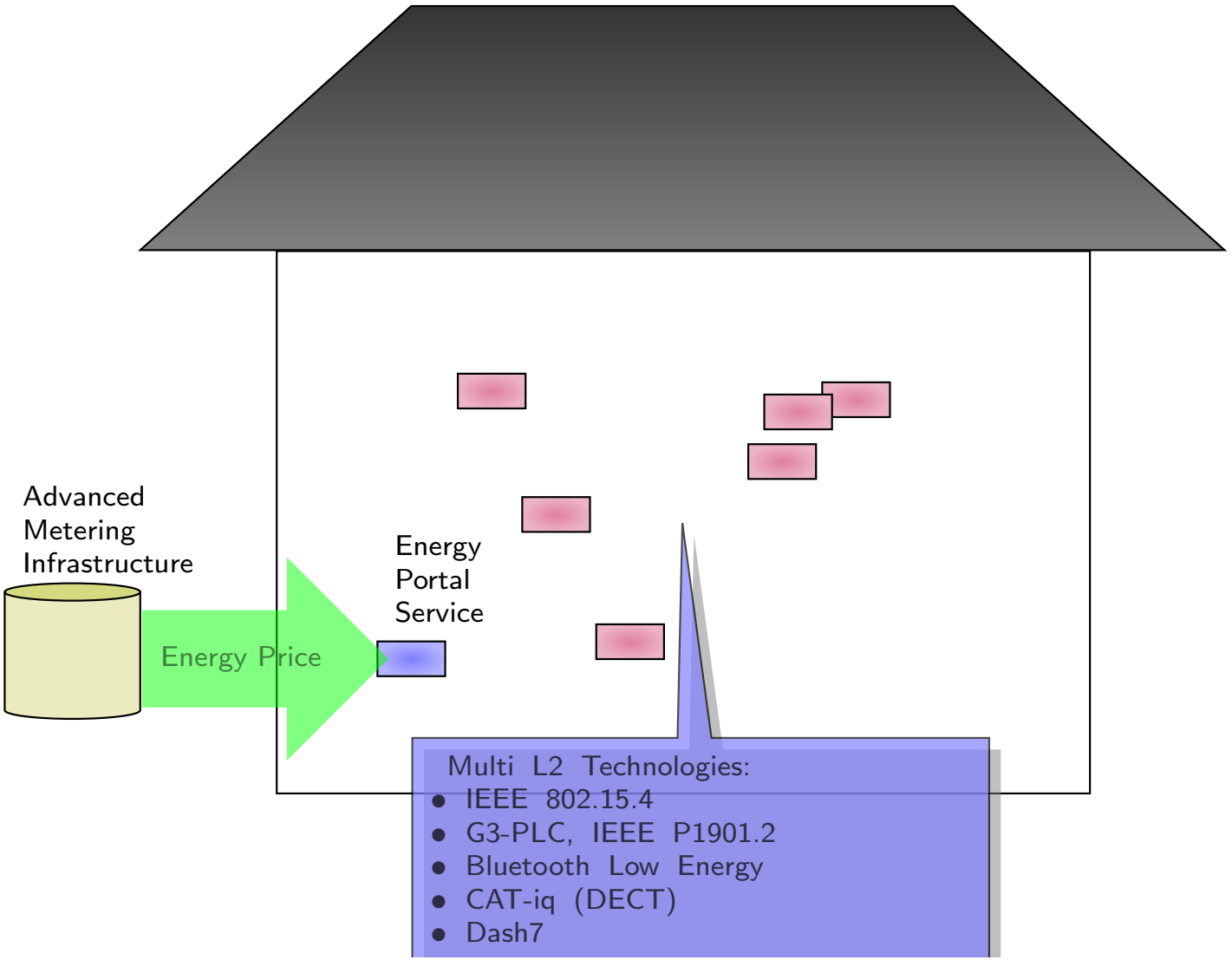
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CAT-iq (DECT)
Dash7

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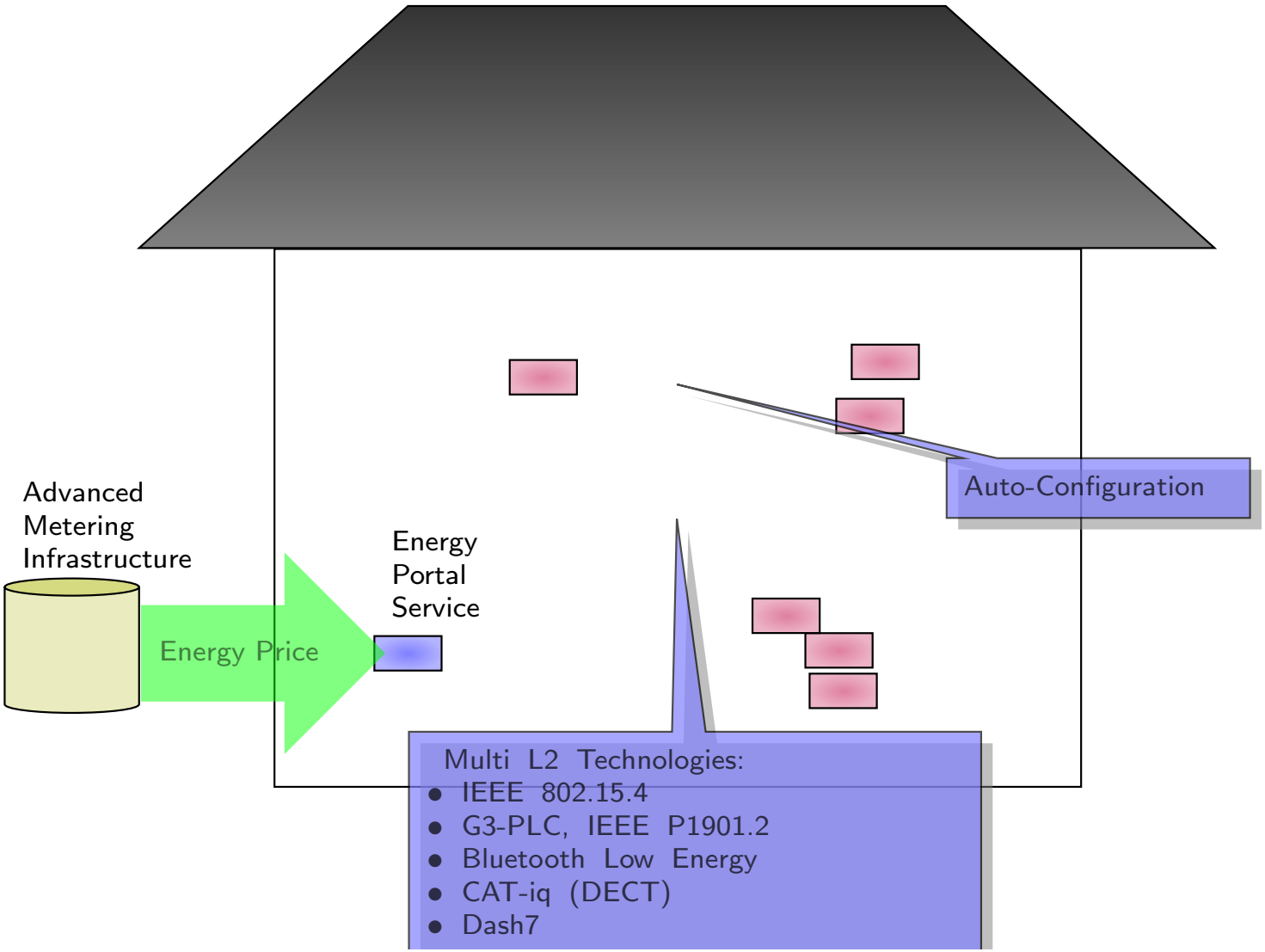
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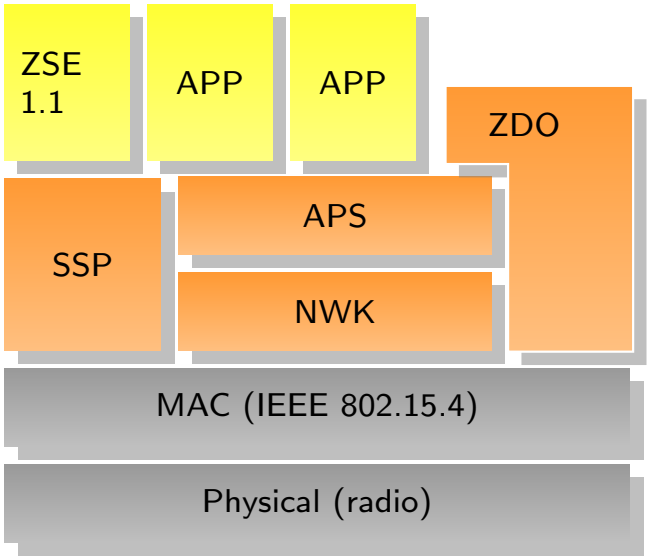
ZigBee SE 2.0

- ZigBee had its own stack
- Smart Energy Profile move to IPv6



adapted from: ZigBee Alliance www.zigbee.org/imwp/download.asp?ContentID=18995;

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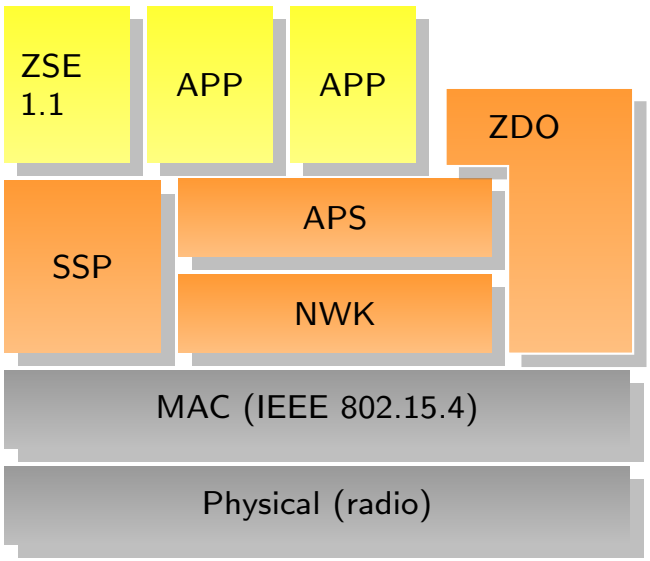

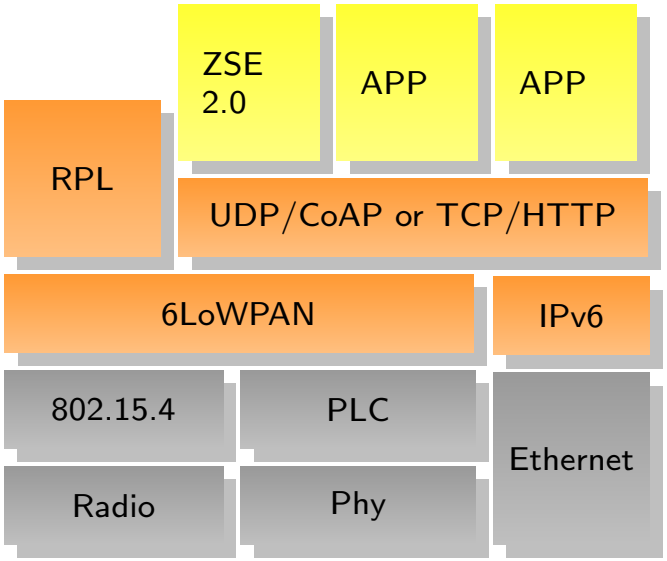

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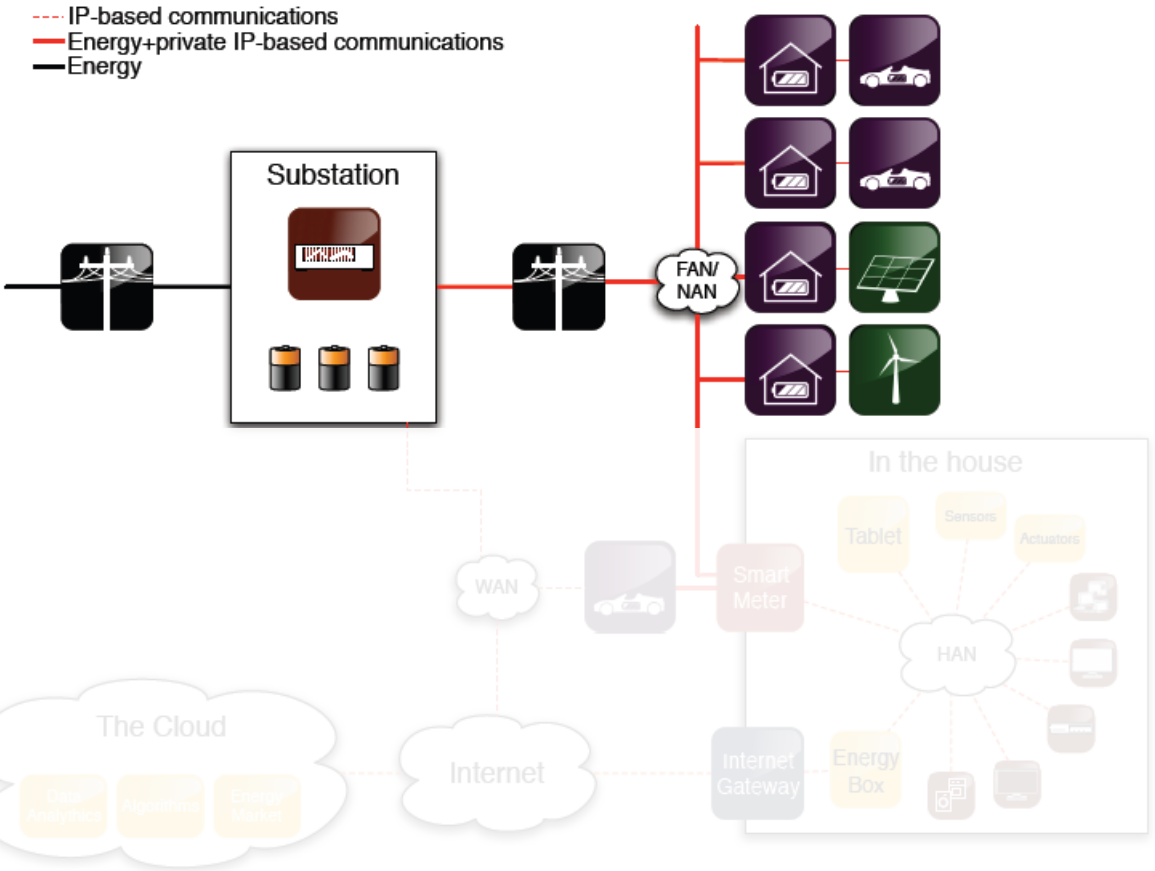
Example: SmartGrid



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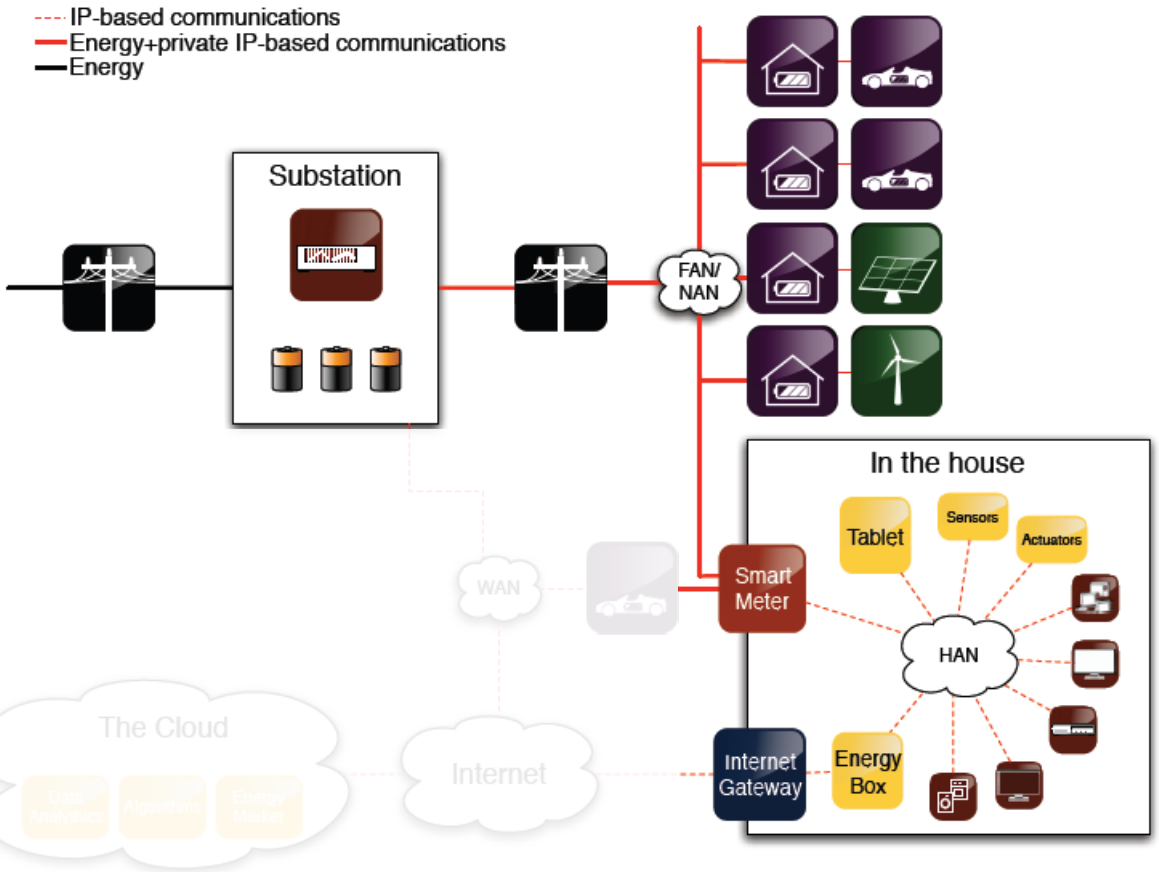

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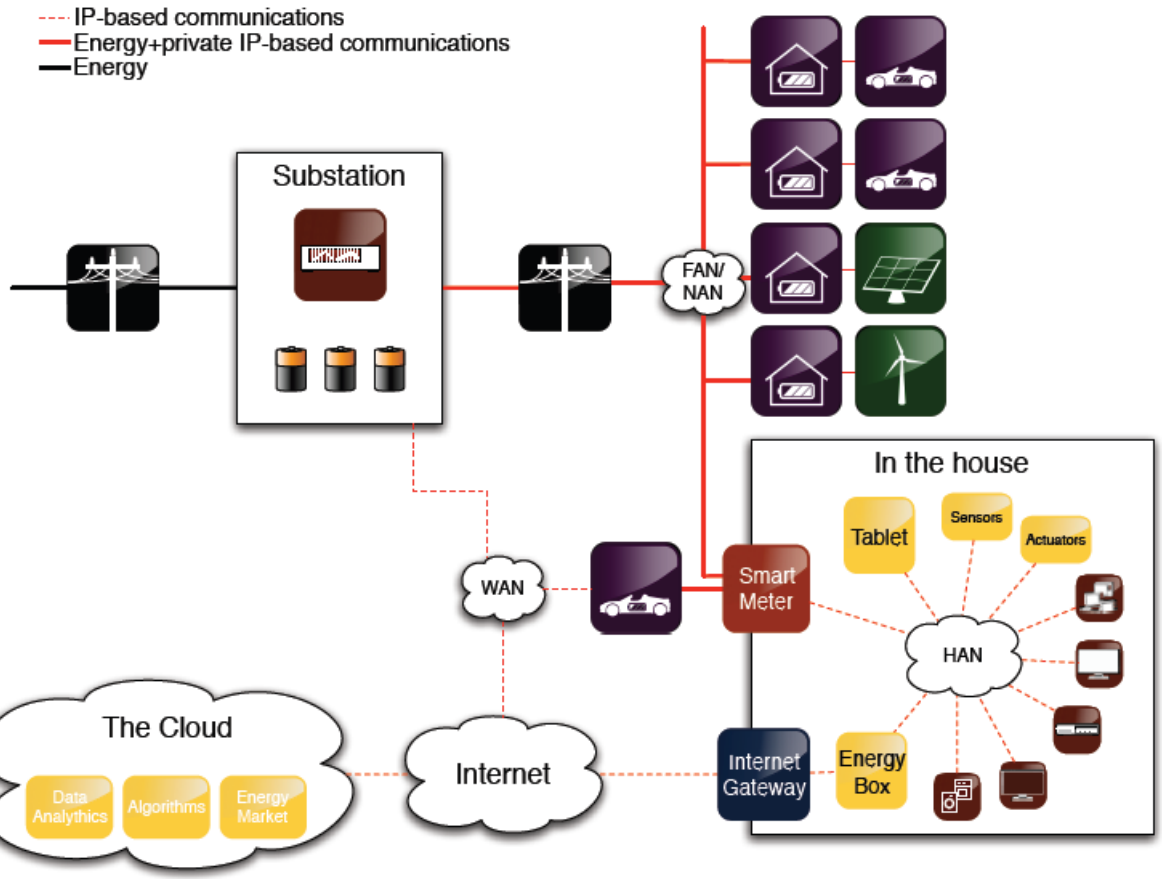
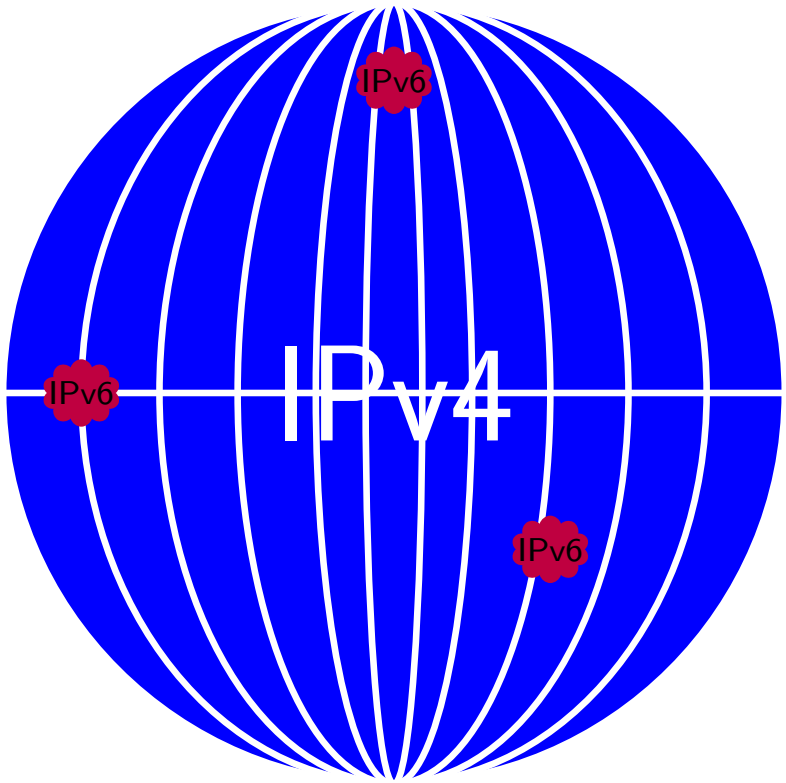


Interconnection at HTTP level



Client Server: REST

Client

Server

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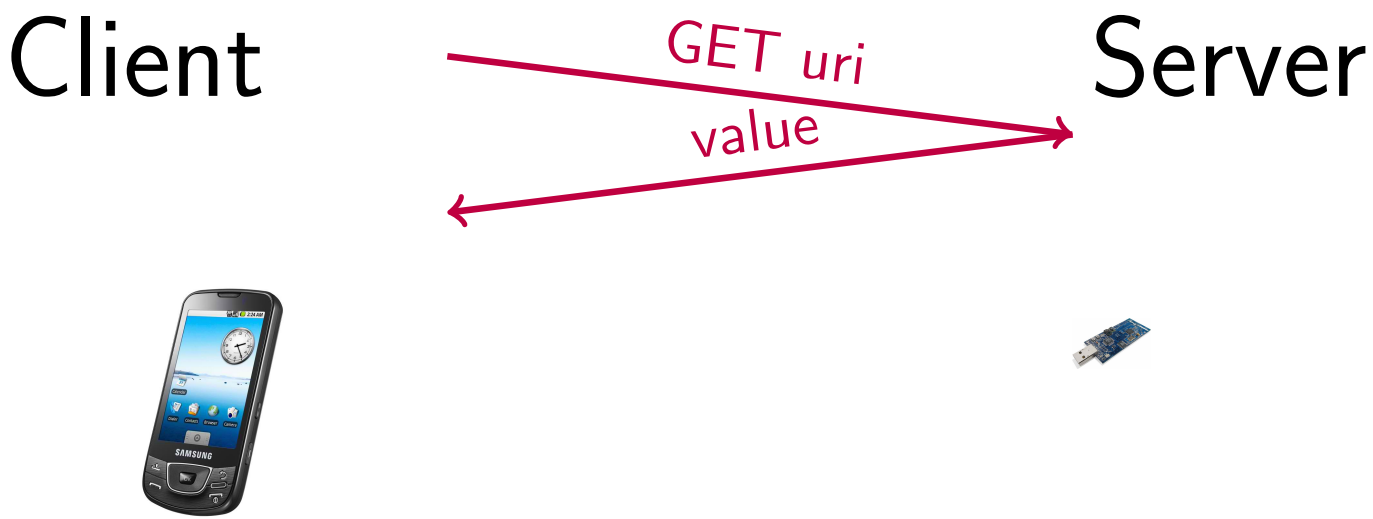

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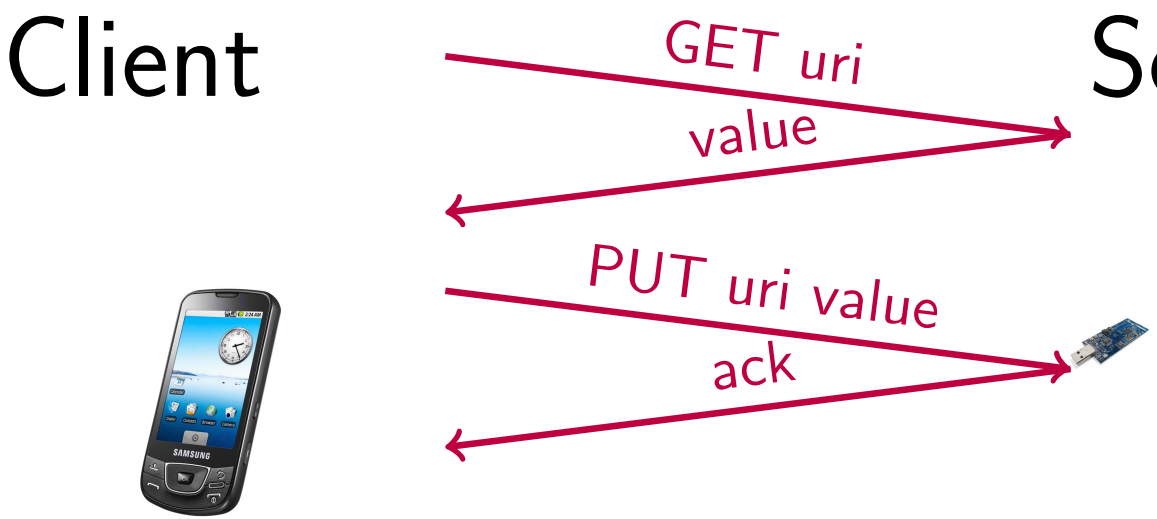

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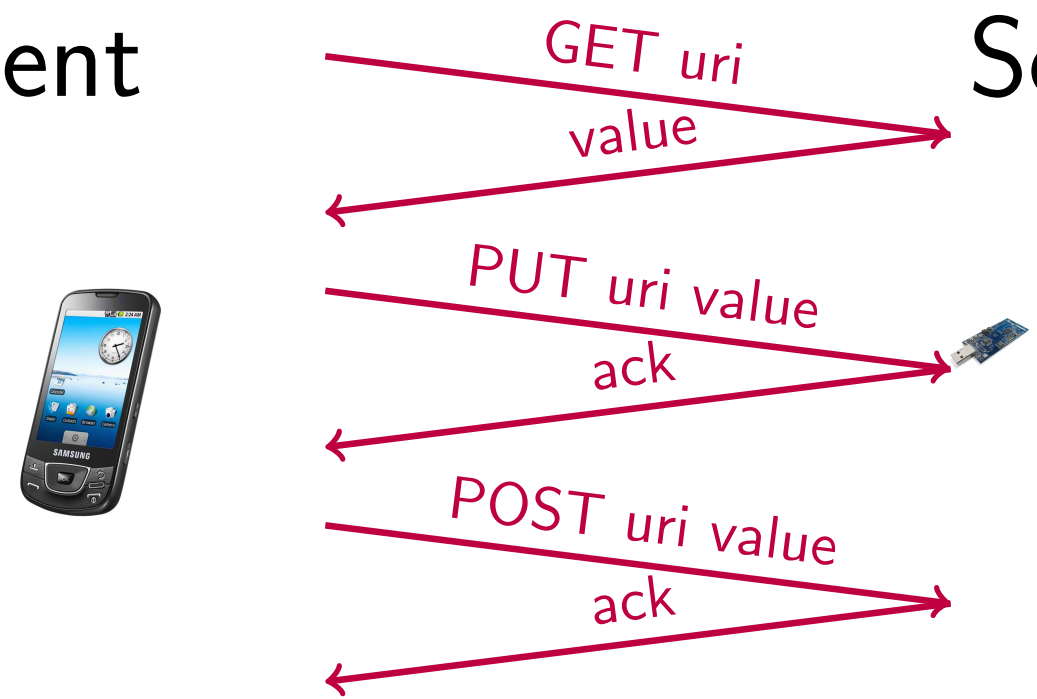

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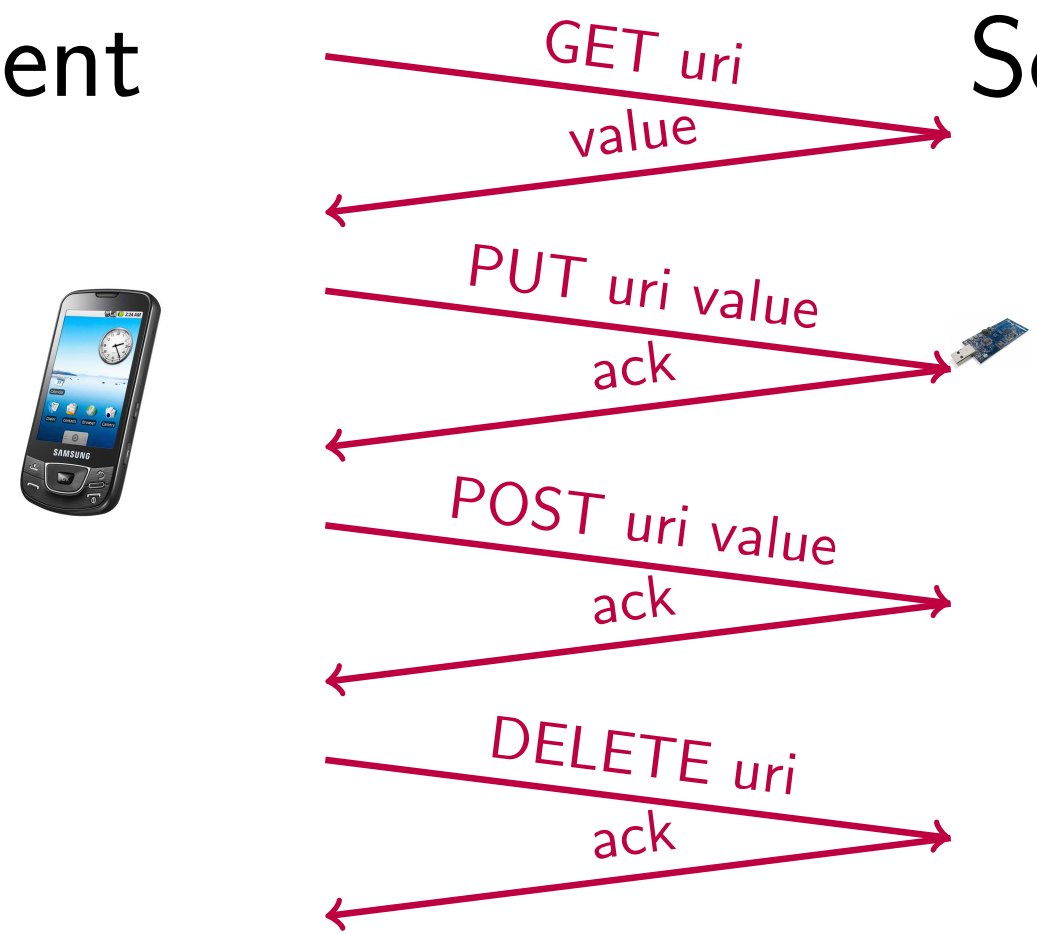

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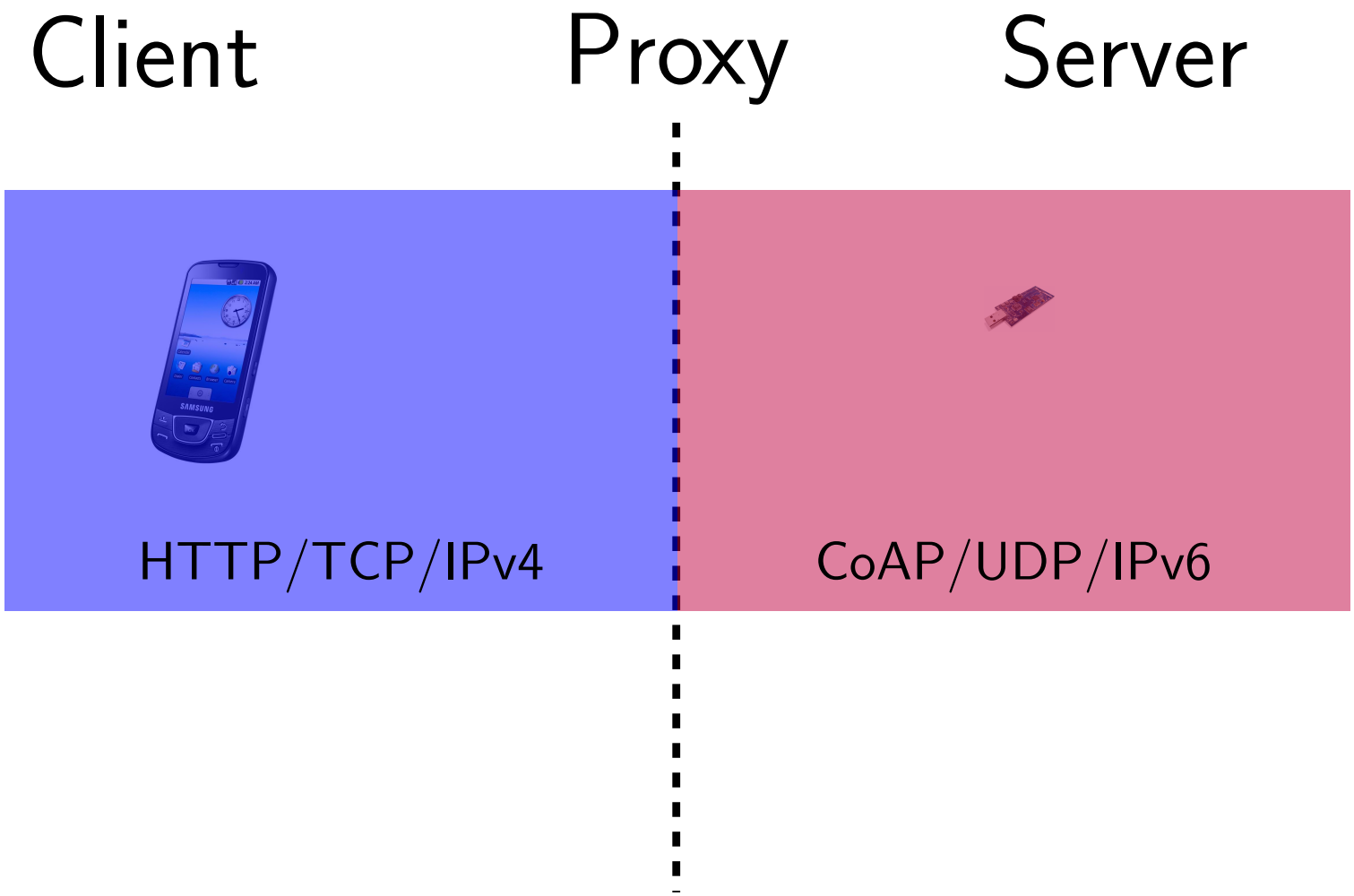
Client

Proxy

Server

Client Server: REST



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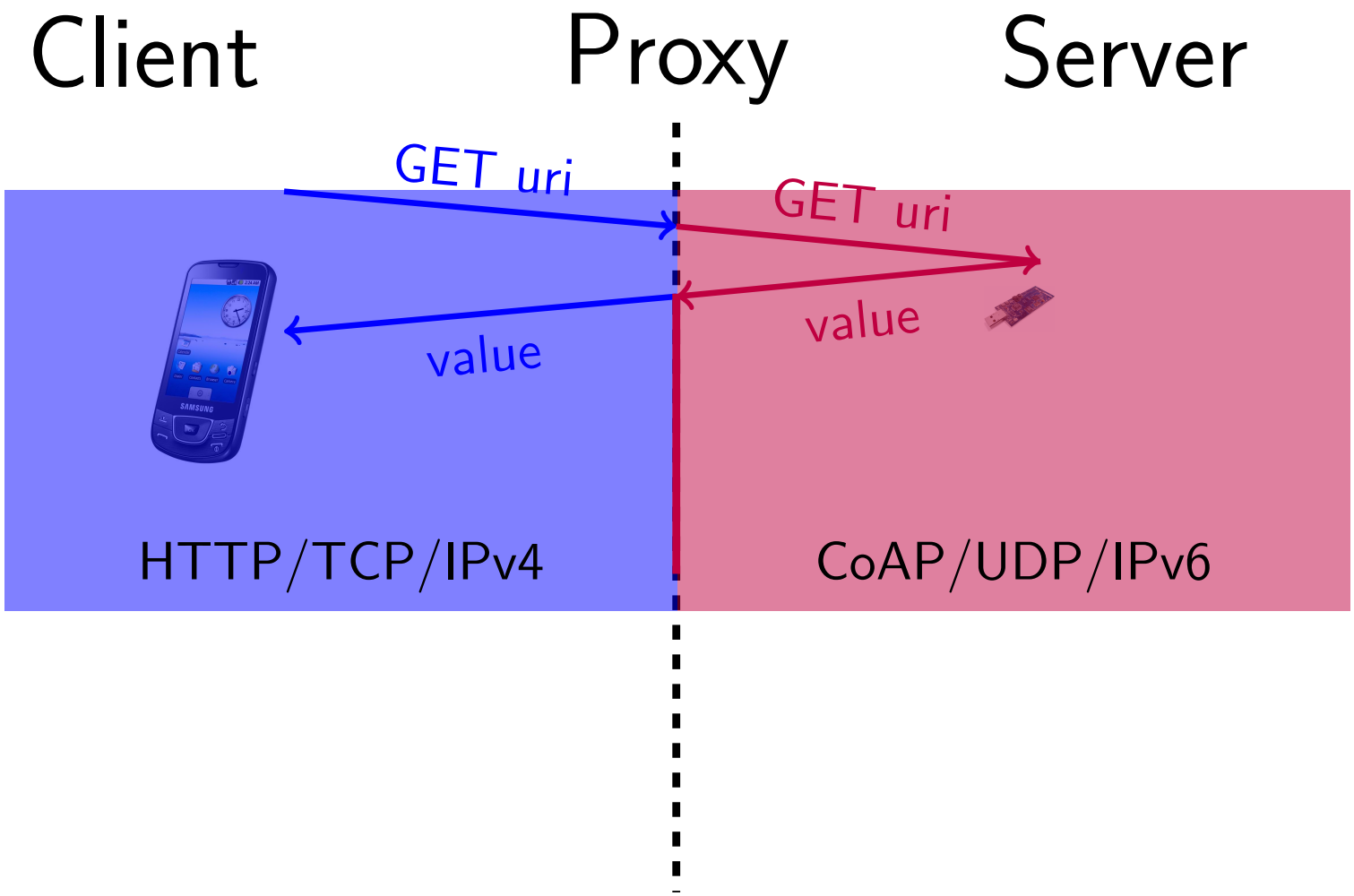

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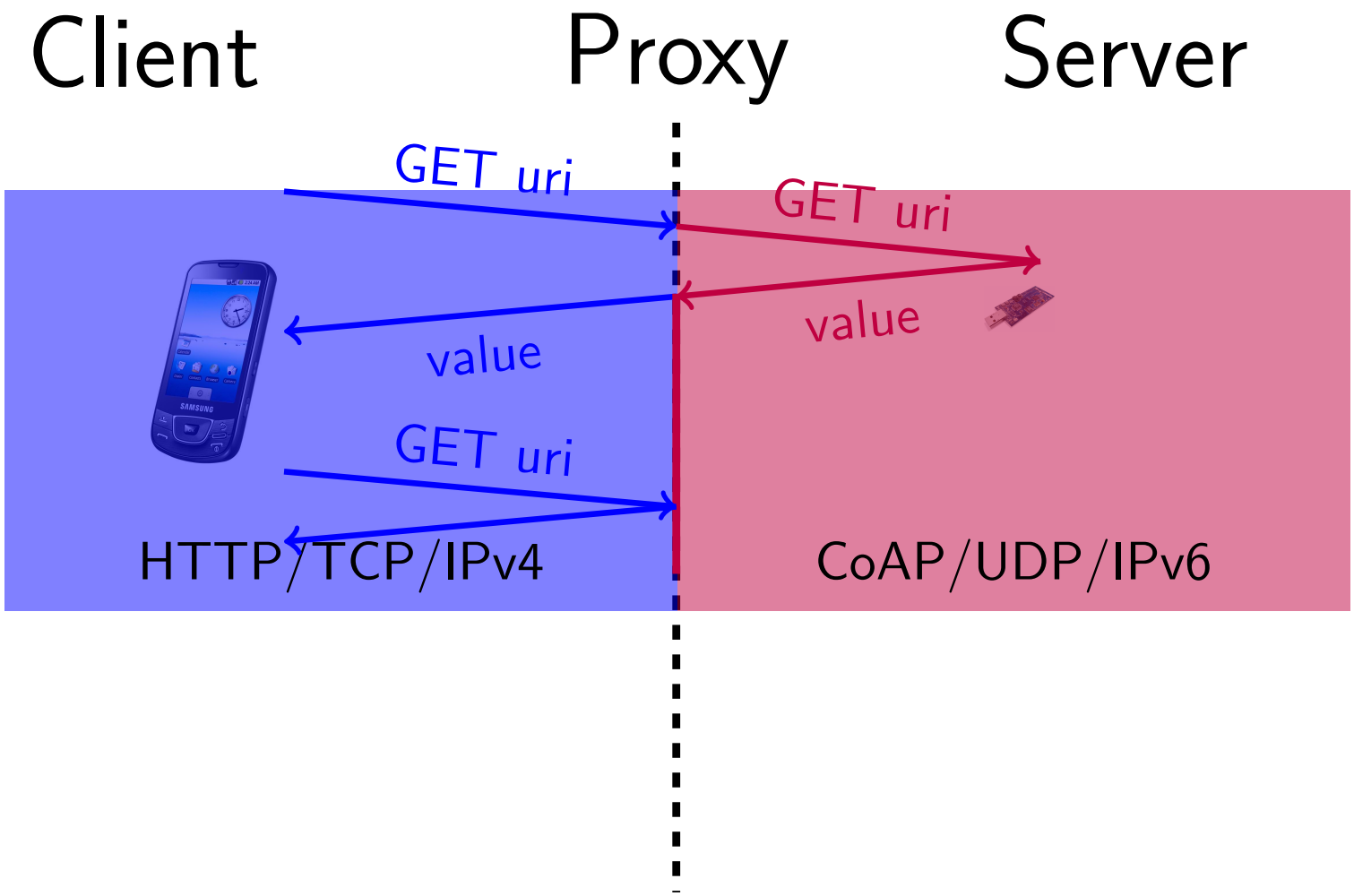

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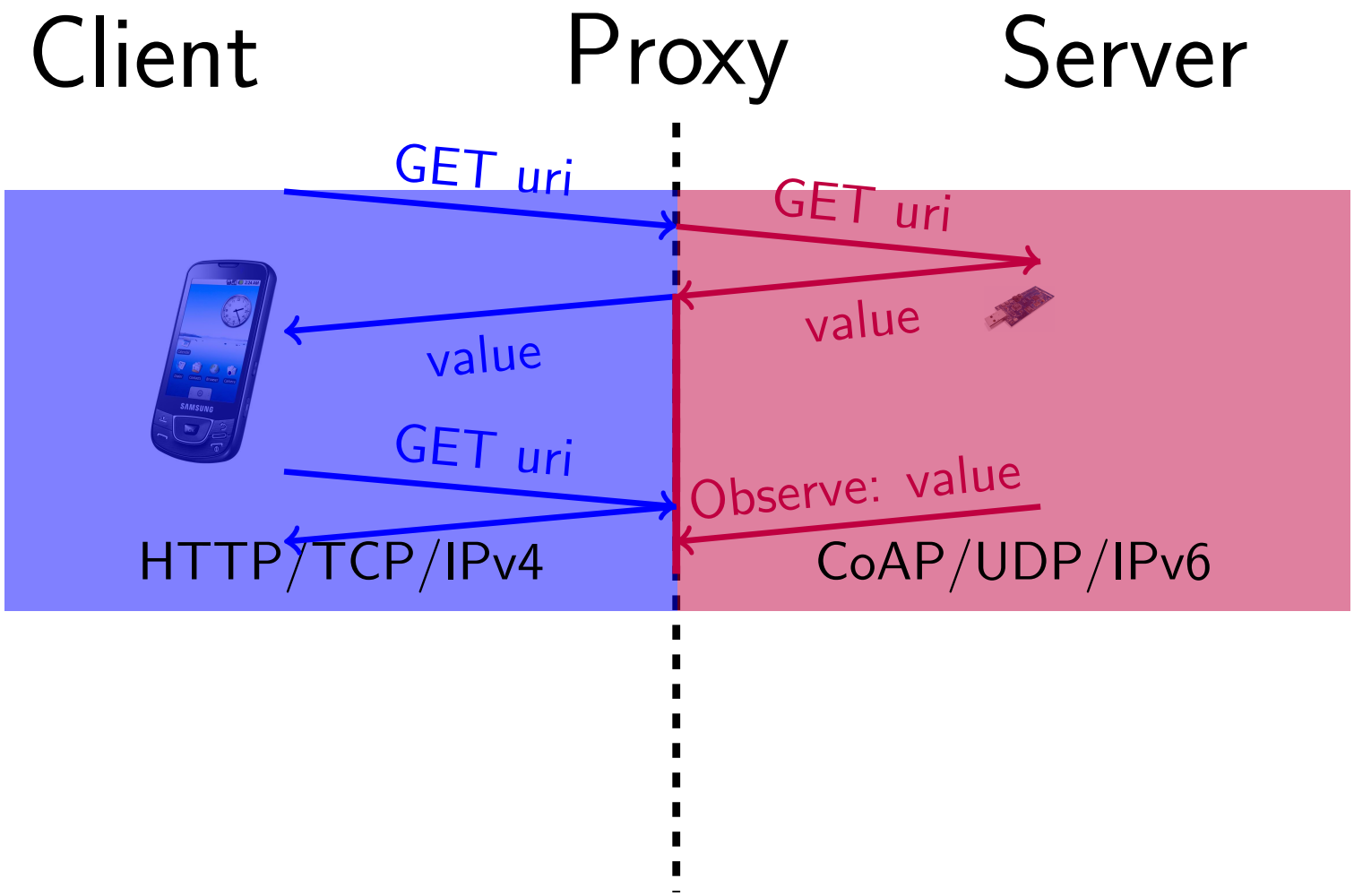

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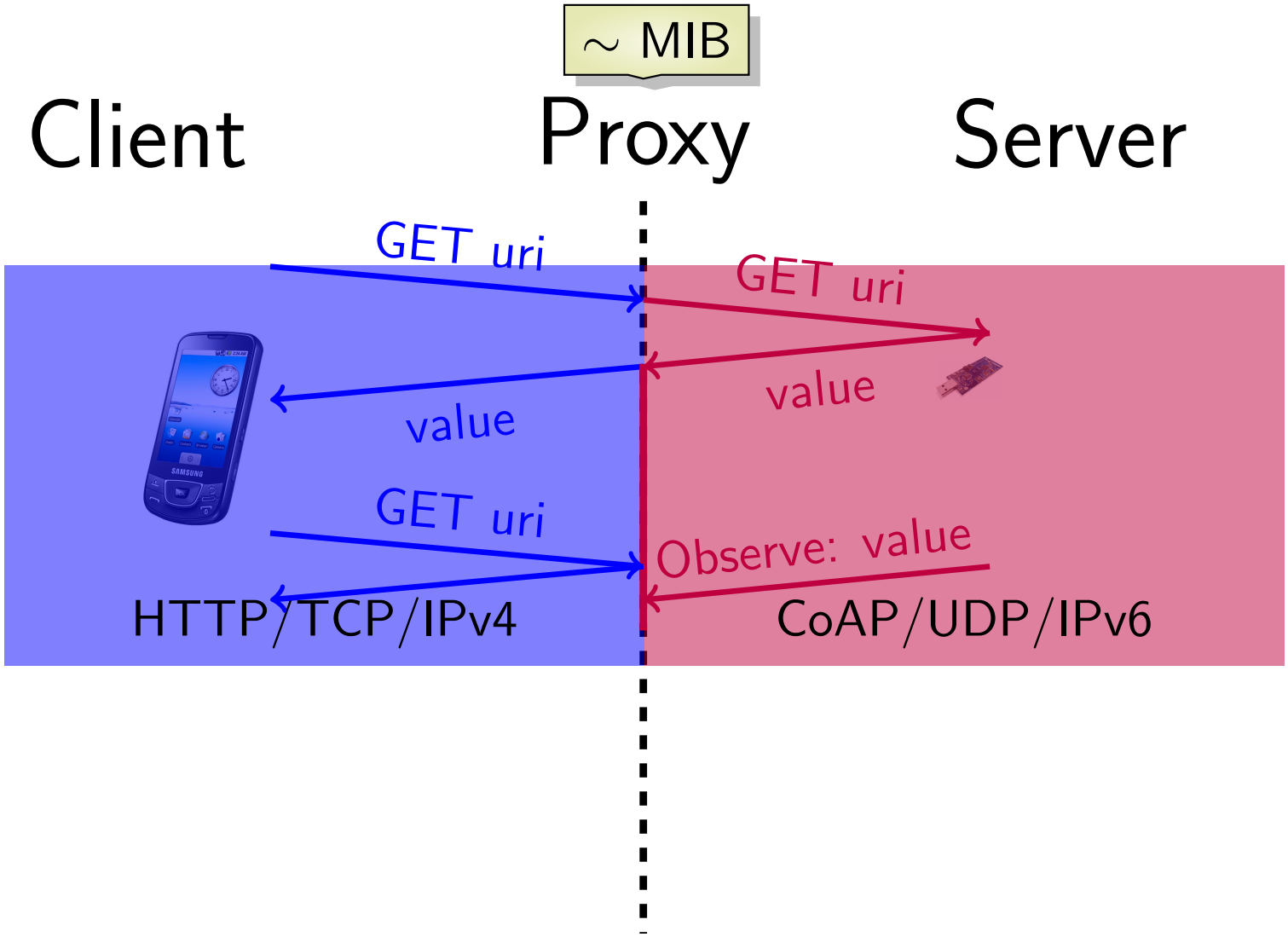


IPSO

2.6. Light Control

This function set is used to control a light source, such as a LED or other light. It allows a light to be turned on or off and its dimmer setting to be control as a % between 0 and 100. Not all lights are expected to have a dimmer control (for example simple LEDs).

Type	Path	RT	IF	Type	Unit
Light Control	/lt/{#}/on	ipso.lt.on	a	b	
Light Dimmer	/lt/{#}/dim	ipso.lt.dim	a	i	0-100 %

Light Control: This resource represents a light, which can be controlled, the setting of which is a Boolean value (1,0) where 1 is on and 0 is off. A GET on the resource returns the current state of the light, and a PUT on the resource sets a new state.

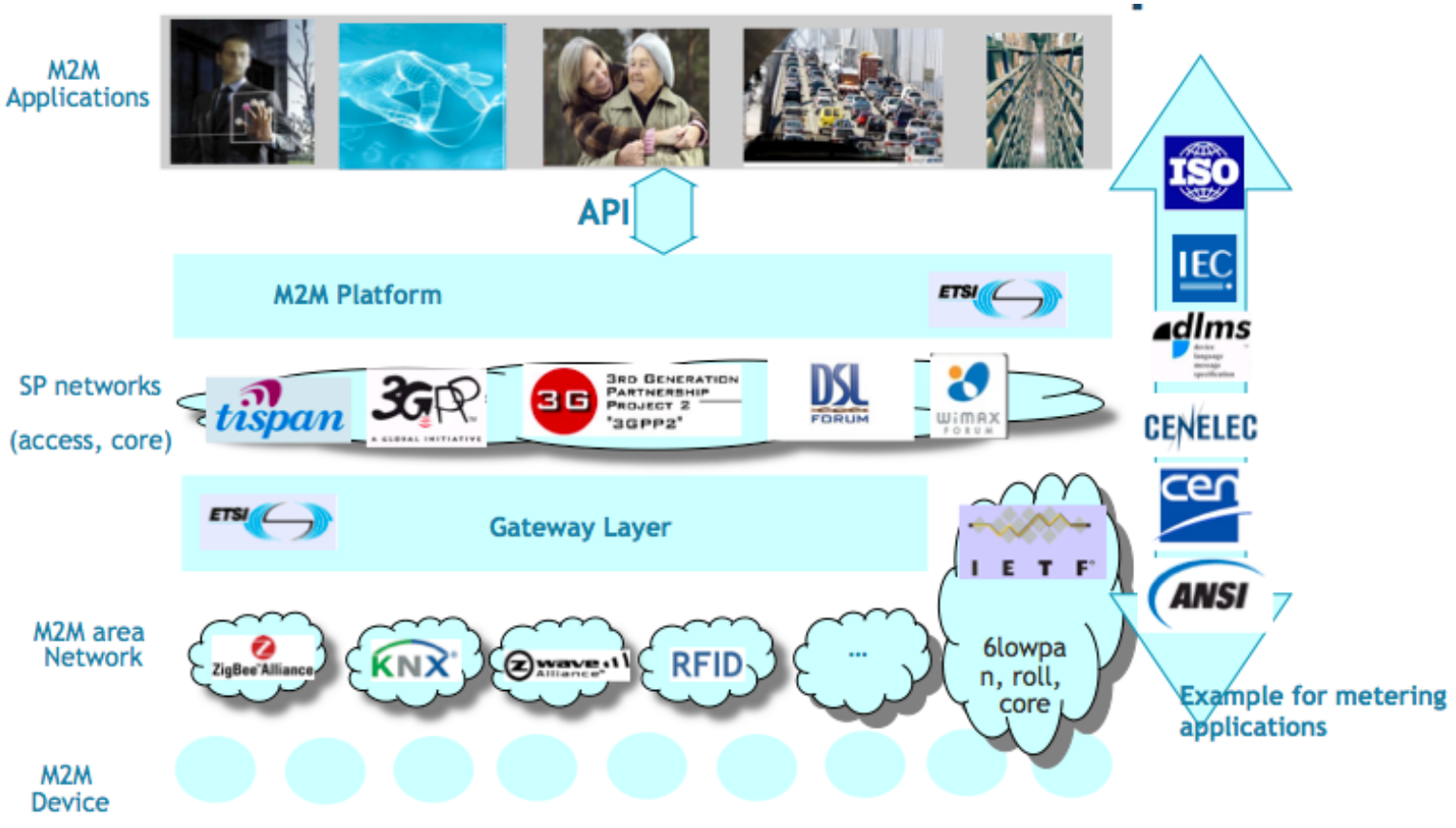
Light Dimmer: This resource represents a light dimmer setting, which has an Integer value between 0 and 100 as a percentage. A GET on the resource returns the current state of the dimmer, and a PUT on the resource sets a new state.

ETSI TC M2M has the responsibility:

- to collect and specify M2M requirements;
- to develop an end-to-end high level architecture for M2M;
- to identify gaps and provide specifications and standards to fill these gaps;
- to provide the ETSI main centre of expertise in the area of M2M;
- to co-ordinate ETSI's M2M activity; with that of other standardization groups and fora.

source: Omar Elloumi (Alcatel-Lucent); Jesus Bernat Vercher (Telefonica)

ETSI Landscape



Conclusions

History repeating ?

- Unix: reference stack, helped the rapid deployment of IP
- Contiki: micro IPv6 stack
  - include 6LoWPAN, RPL and CoAP
  - BSD licence
  - optimized for constrained objects
- Work done at Télécom Bretagne
  - Integration on different environments
    - ★ Port to new environments, optimize code, new routing policies
  - Included in LABFAB projects
  - Open Source for Arduino see

https://github.com/telecombretagne/Arduino-IPv6Stack

Challenges

- Reduce IP impact in term of:
  - code size,
  - energy consumption
- Network topology
  - Star topology
  - Meshed
    - ★ L2 mesh versus Routing
- Millions of objects generating individually small traffic:
  - LTE is not adapted to IoT
- Auto-configuration
- Interoperability
  - Plugtest IPSO & ETSI
- Security and Privacy

Questions ?
Bérengère Amiot : http://berengereamiot.com/objets/dew-et-dawn/