

Energy monitoring and Internet of Things

Almada/2018.10.24

By G. HUSSON - Liberasys

Energy monitoring and Internet of Things
the role of energy monitoring in “digitalized” cities
HOW TO CHOOSE A MONITORING SYSTEM



Introduction

- Why energy monitoring is essential to consumption reduction ?
- What sort of improvements can you do when you have the monitoring ?
- How to choose a monitoring system ?

Energy monitoring : why

- Energy is not visible, you cannot touch it
- How to take conscience of energy consumption ?
- You have to monitor it at first
- Then you can see how energy is flowing
- Then you can compute indicators that have a mean for you
- And you can act for energy consumption reduction

energy monitoring : reducing consumption

Once you have energy monitoring you need, you can :

- Reduce energy consumption manually, ex :
 - See dumb energy consumers, ex : water heating system always on, maintaining its temperature, for no reason
→ power on electric water heating system only at the end of the night
- Reduce energy consumption by automation, ex :
 - Compute difference between solar production and consumption
 - → power on electric water heating system only when you produce more energy than you consume (or when water temperature is below 65°C for example)

energy monitoring : reducing consumption

- Reduction of energy consumption is one usage.
- Think about things like :
 - Smaller heating systems at a centralized place that starts and stops following needs, in order to achieve systems that costs less and that are more efficient. Linked to weather with IA system in order to optimize the ramp up/down.
 - You have noise measurement system and LED public lights, link them ? Power on light only when there is noise ?

energy monitoring : step to smart city

- Behind energy consumption reduction, you can achieve high level automation Ex :
 - Public light systems that adapts to weather (light on before when sky is cloudy and after when sky is clear)
 - You have a big show in your city, it eats a lot of electrical energy. You must shut down some stuff in order to avoid problems. For example : electric heaters in non essential zones. This can be automated
 - Start electric heating system and stop wood based heating system when pollution is too high in your city

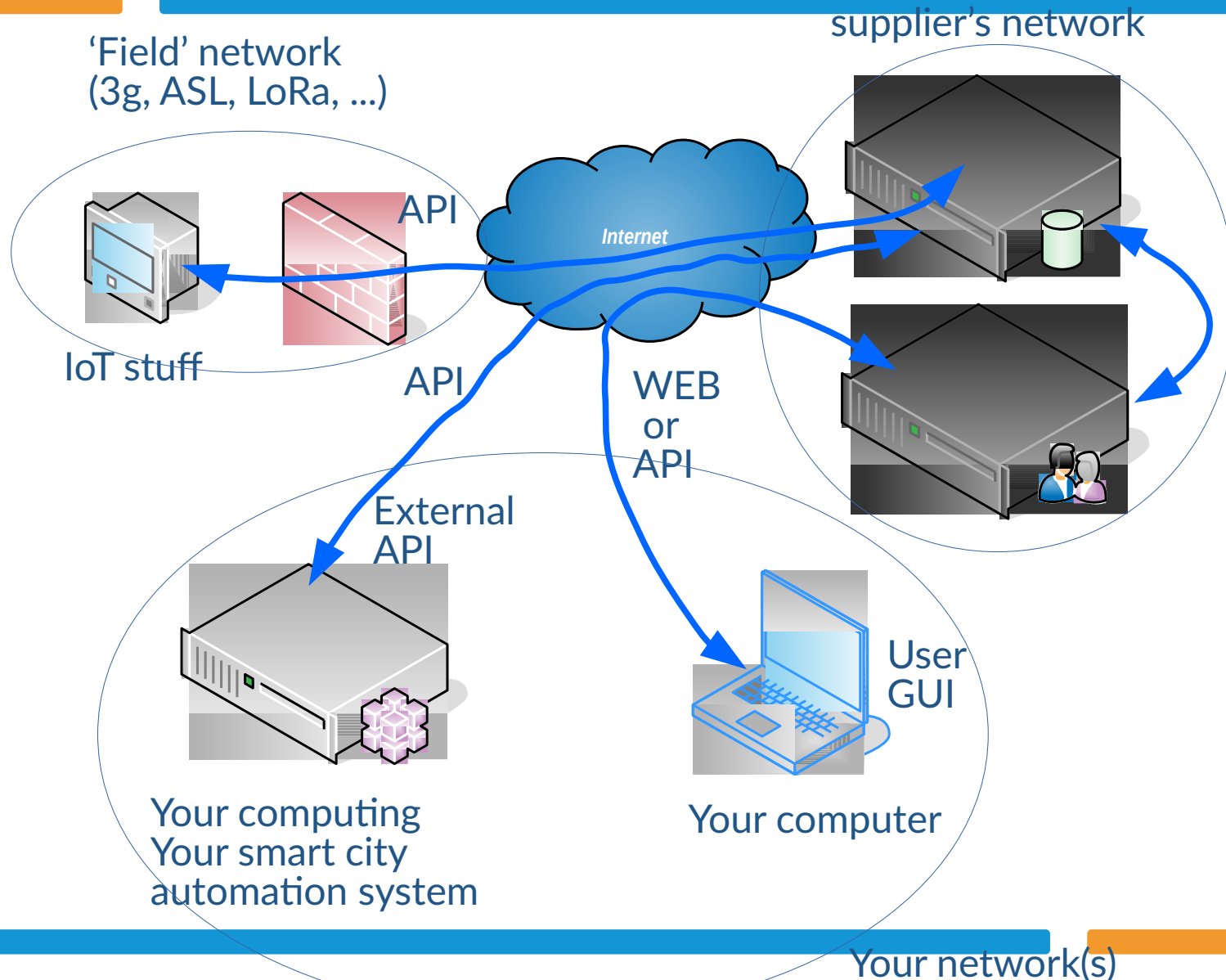
energy monitoring : IoT

- Monitoring and smart city needs Internet Of Things (IoT) for sensors and actuators
- IoT is like home automation
- Technically not so costly anymore :
 - plenty of cheap sensors
 - several data networks to make them communicate
- But still complex to integrate everything :
 - several communication means
 - several data protocols, sometimes not open

energy monitoring : IoT

- You need IoT for smart cities, right.
- You want long lasting systems that doesn't cost you too much, right
- So how to choose ?

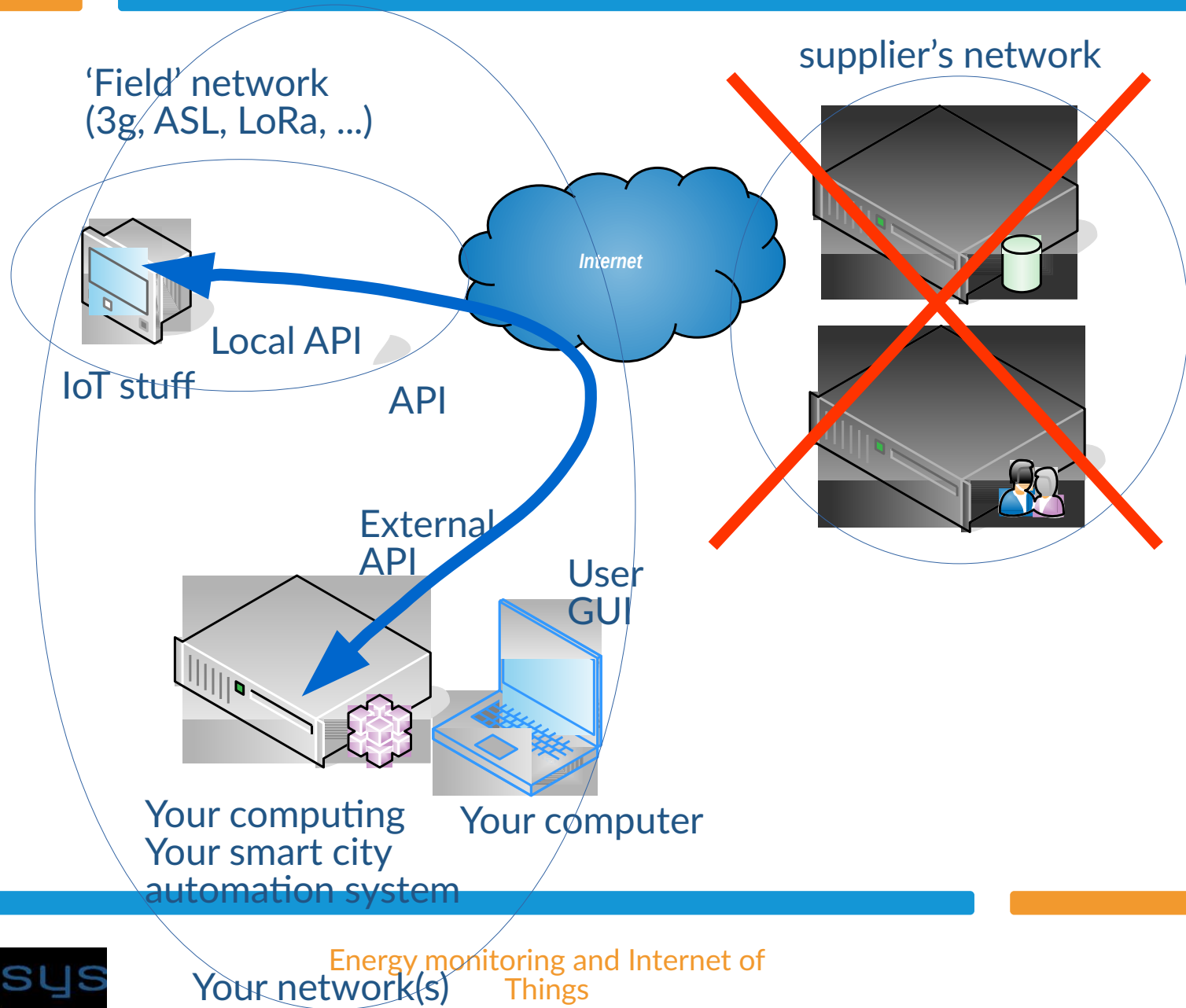
energy monitoring : architecture vs lockin



energy monitoring : architecture vs lockin

- Supplier servers and software are not yours
- When server definitively closes down, your IoT sensors goes to trash.
- Locked with the service (price and it's evolution, hardware/software updates, at the supplier's mercy)

energy monitoring : architecture vs lockin



energy monitoring : architecture vs lockin

Recommendations :

- Avoid cloud only communication
- Ask for local API
- Use open source when possible
- Have your own server instance when possible, or be sure to get reversibility (easily move from the supplier server to your server)

energy monitoring : built in (or not) obsolescence

- Product lifetime (updates until when)
- System security (linked to updates)
- Shutting down network, ex : ISDN, telephony by cable
- Protocols (proprietary, tied to supplier infrastructure)

energy monitoring : what to ask finally ?

- What to ask to your supplier :
 - Is there a free and documented local API on the IoT stuff (sensor/actuator) ?
 - Can I run my own server infrastructure ? Is there full reversibility possibility ?
 - What is the maintenance cost and lifetime of the product ?
 - How is it secured ?
 - How am I tied to your software or infrastructure or updates ?

energy monitoring : a word about the what

- We have seen the how, now a bit about the what :
 - What measures you need ?
 - At what frequency ?
 - How long do you want to keep the data ?
 - Data on long term could be averaged (ex : per hour or per day) ? What computation is needed ?
 - We can then deduce computation needs and storage needs (dimensions of the server) and the cost
 - Who can have access to which data ?

energy monitoring : a word about the why

- But why ?
- I see plenty of IT monitoring systems made to monitor the most thing as possible. But who look at that ? Waste of time and hardware resources !
- Think by usage :
 - Audit / debug (precise energy metrics)
 - Follow day by day (know how energy is used)
 - Aims reaching (statistics and indicators)
 - Long term analysis / pro-activity
 - Alerting (what, who)

energy monitoring : conclusion

- Now what :
- You have the sensors/actuators, the network and the protocols or API you need and for longtime
- Maybe you invested a bit more
- You can build smart city on this strong base
- ie : deploy new sensors and increase smartness rather than replace and pay per use
- Use case limits are your only imagination !

energy monitoring : why a raspberry pi ?

- A bit oversize, but still cheap
- Big and reactive community (security, improvements, updates, DIY examples, ..)
- Linux based, so plenty of free software available (already compiled and distributed)
- Big number of users / buyers + big community = system that will last in time
- No built in obsolescence, reusable for other projects

End of presentation

Thank you for your attention
??? Do you have questions ???

Link of this presentation (license : EUPL v1.2)
(hybrid PDF, use LibreOffice Impress to edit it)
((of course LibreOffice is a free software :-)))



https://www.liberasys.com/diffusion/iot_and_smart_cities_almada_201810.pdf

Contact :

<https://www.liberasys.com> || g.husson_empower@liberasys.com