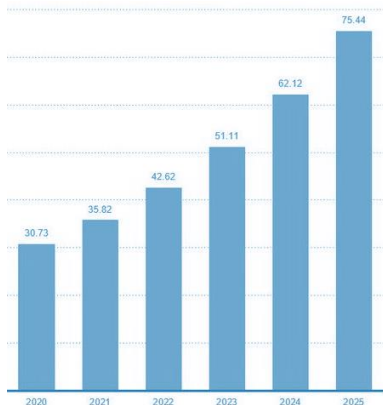**IoT is complex**   **We simplify it...**

September 11, 2020
Five years from now – Key Scenarios and Emerging needs in Edge IoT in Smart Energy
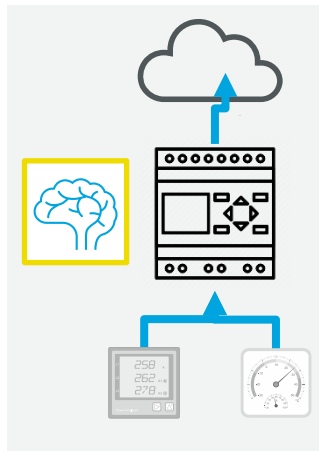**Oliver van der Mond (CEO Lemonbeat)**

With billions of devices in a complex energy infrastructure the traditional approach to IoT needs to be revisited…
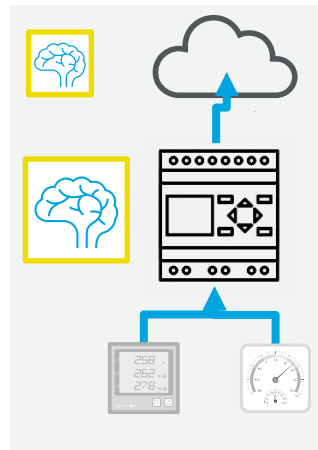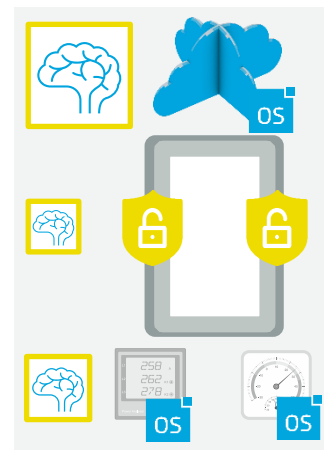

IoT-devices (in bn):

Old world » Nowadays » (Near) Future

The need for intelligence increases and will be distributed differently: parts move into the cloud, parts into the far edge
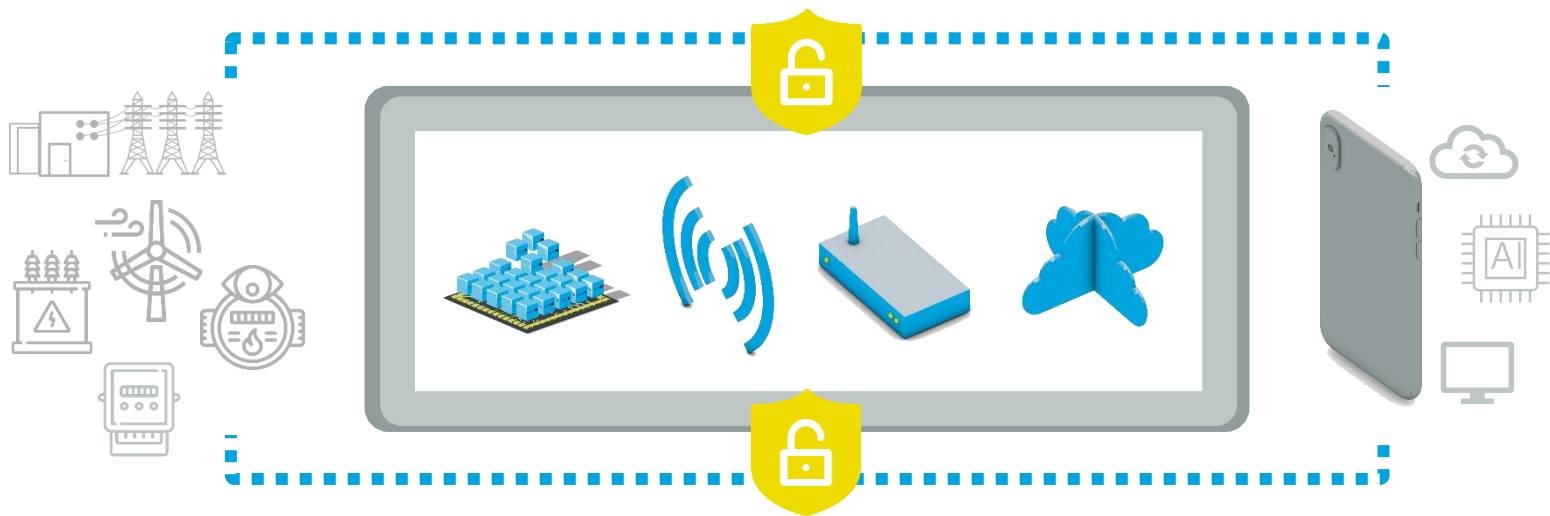
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For this to be realized large scaling IoT solutions like in the Energy utility sector need a strong foundation at their core...
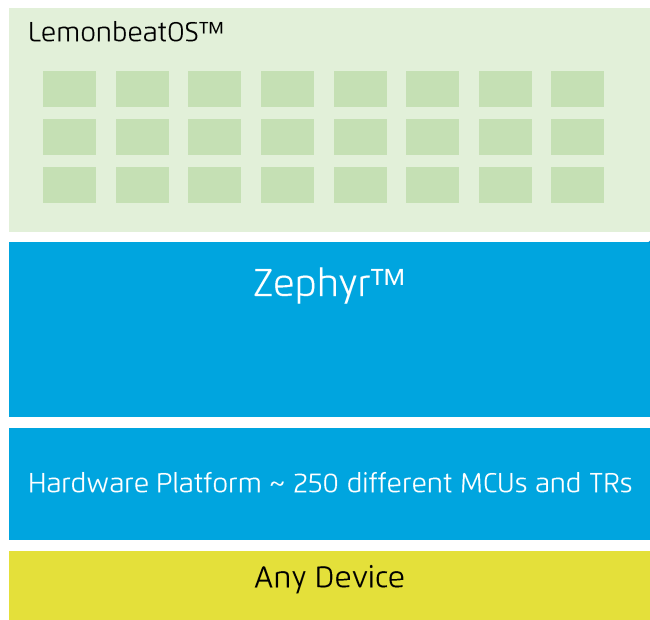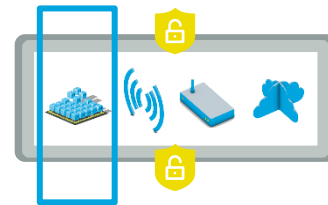
Assets & Devices

IoT Communication Backbone
(Device Integration, Connectivity, Gateways, Cloud Integration, Network Management & Security)
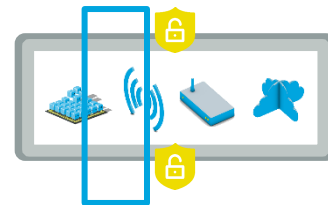
UX/UI, Backend, Data Analysis, Value Add

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For device integration and gateways hardware independence is key and promoting European players can reduce security concerns

LemonbeatOS™

Zephyr™

Hardware Platform ~ 250 different MCUs and TRs

Any Device

Zephyr™
THE LINUX FOUNDATION PROJECTS

- Lemonbeat is a strong contributor to the Zephyr project which is also supported by many European HW vendors like Nordic, NXP, etc.

Standards for protocols reduce uncertainties which holds back necessary investments

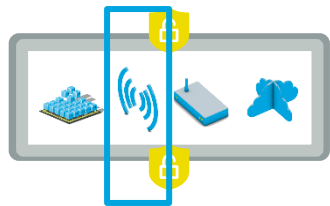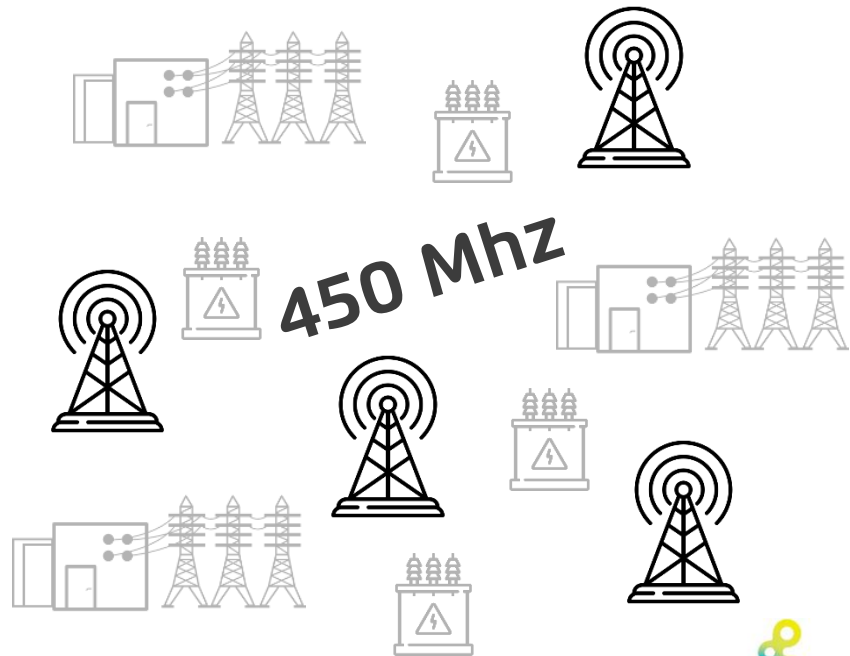| Application layer	Lemonbeat smart device language (open to public)
Network functionality	(TCP/IP | IPv6 | UDP)
Physical transmission	

- To not lose speed agreeing on standards on the various levels of a protocol stack is better than waiting for the worldwide "gold standard" for everything

- Lemonbeat tries to build its stack as modular as possible and has published the specification of the parts which were necessary to bind those modules together.

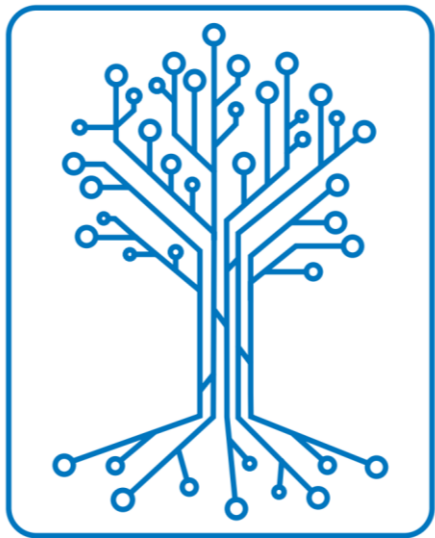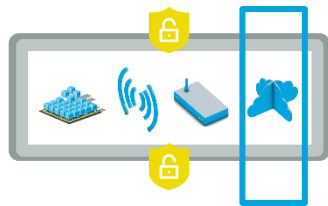LoRa™   LTE-M

NB-IoT   CDMA/LTE 450

For the most critical parts of the energy infrastructure a reserved radio frequency @450Mhz is superior to other cellular networks

- High range due to the low frequency
- Good penetration of radio signals from outside to inside
- In combination with low power hardware and protocols (NB-IoT + LTE-M) suitable for brown out cases
- Lemonbeat has a long standing experience with communication protocols and battery powered devices and an infrastructure to serve this

450 Mhz

GAIA-X for a European cloud infrastructure is a good approach – however...

- Still in its infancy
- Very large interest group which might slow down progress
- For the time being Lemonbeat tries to be as cloud agnostic as possible so that the communication architecture can switch easily from one cloud to the other
- With this we can ensure data sovereignity as much as possible until the GAIA-X cloud services are available on a broader basis

GAIA-X