



OrtsNetz

G3 PLC Based load control by Swiss DSO

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Project goals

Grid expansion deferral

- Energy transition
 - Integrate local PV generation, EVs and heat pumps to the grid
- Avoid grid cost explosion
 - Achieve grid friendly behavior through tariffs and load control
 - Increase local consumption of locally produced energy
- Test different concepts to determine what should be rolled out in the next decade, in particular as replacement of ripple control technology



OrtsNetz approaches

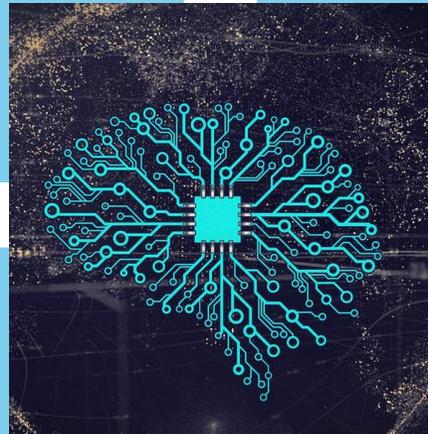
Tariffs

- Certificates of origin
- **Grid tariffs**

Load control

Customer platform

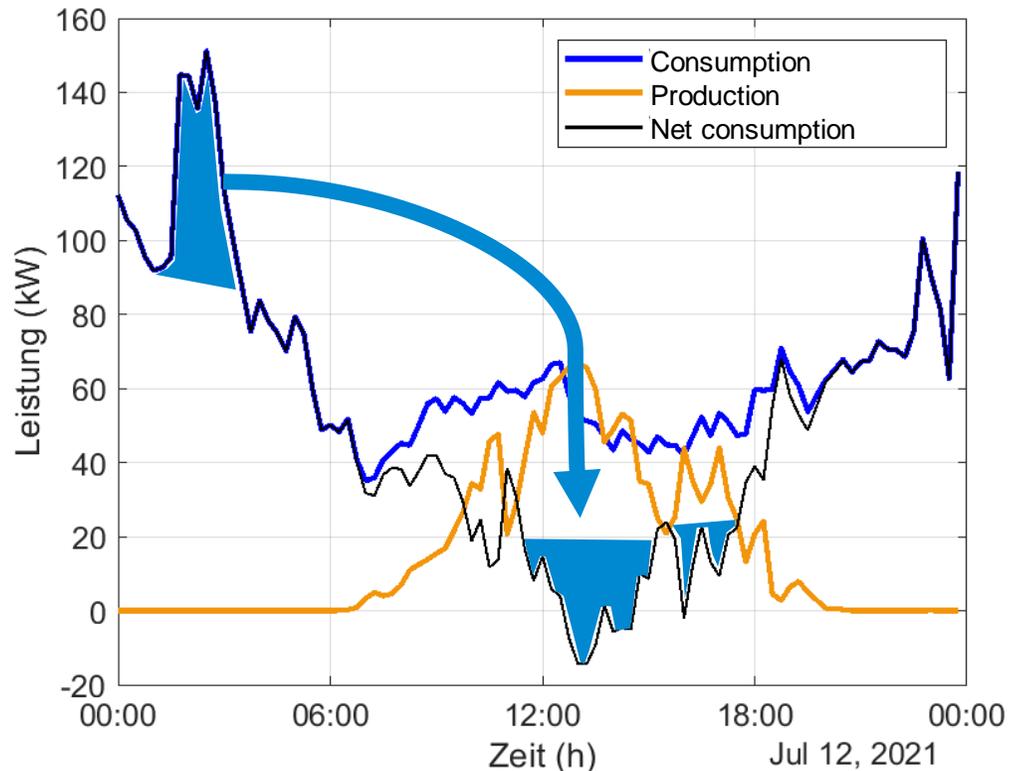
Battery storage



Load Control

Shifting loads for grid expansion deferral

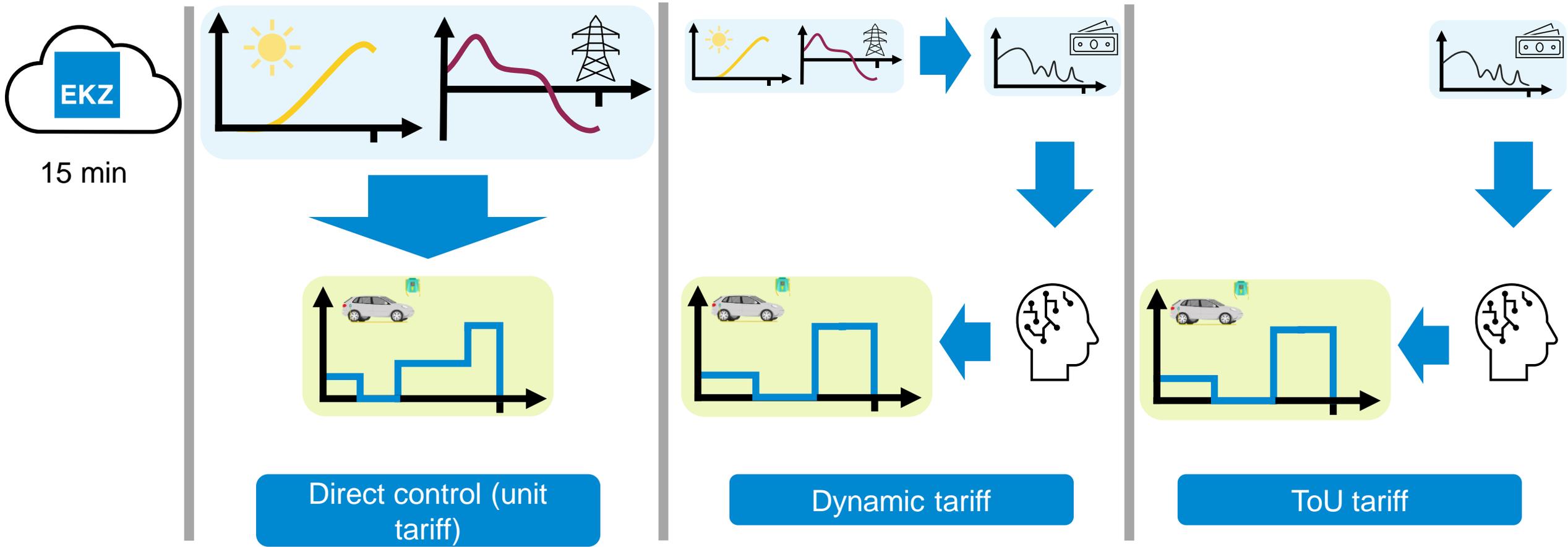
Transformer station in OrtsNetz



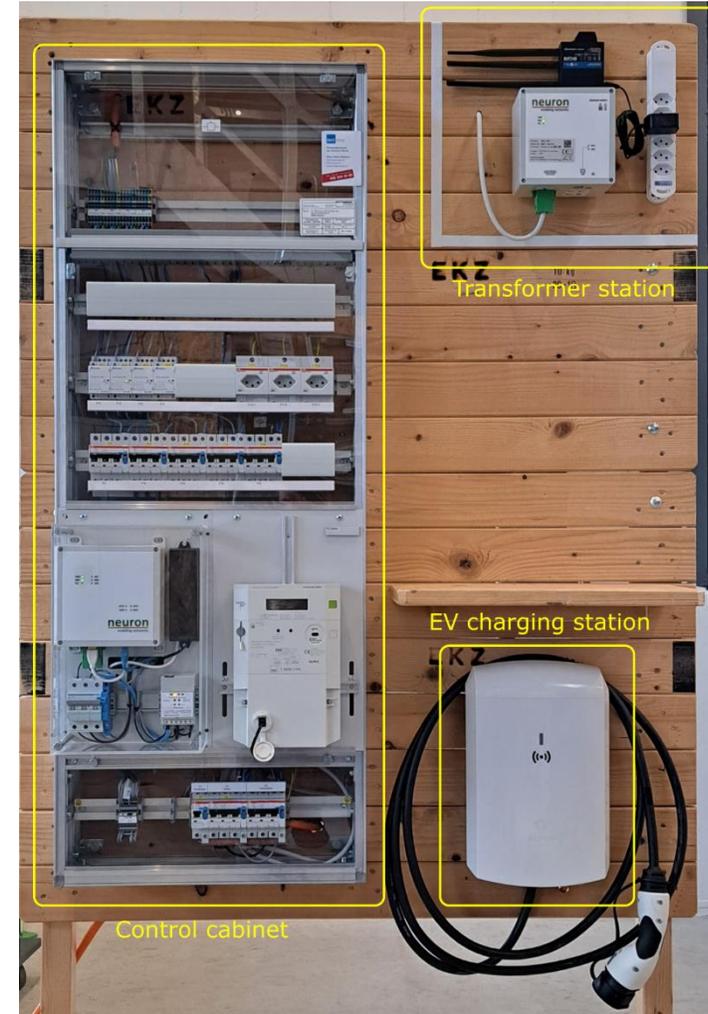
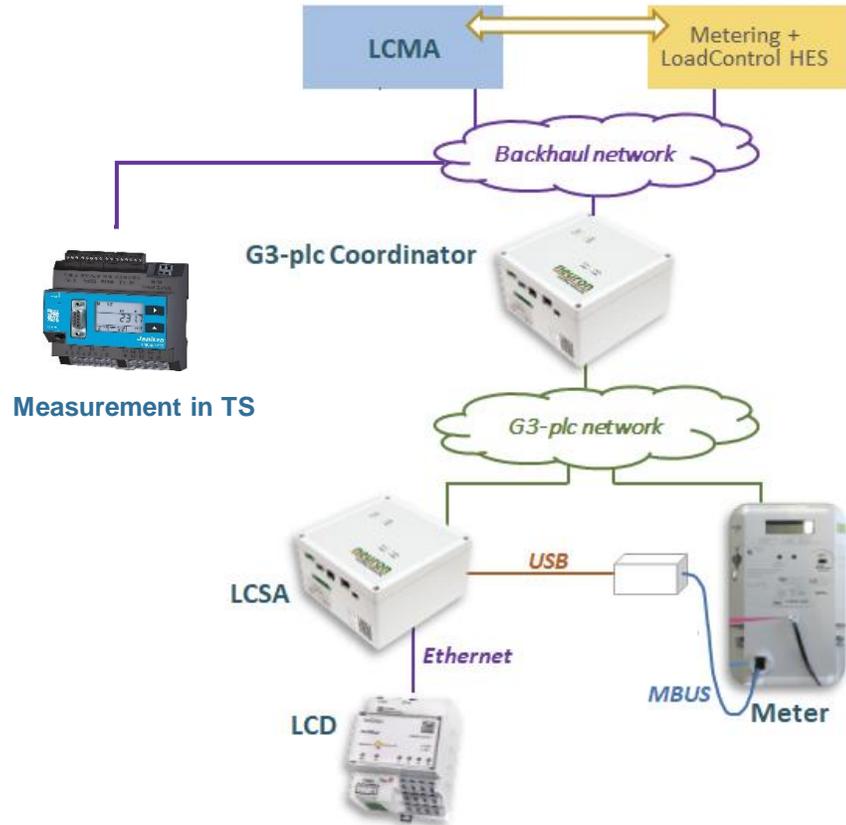
- **Grid friendly load control:**
Reduce load and production peaks
- **Controlled devices**
 - Behind the meter:
 - Electric water heater
 - Heat pump
 - EVs
 - Battery storage at transformer station

Different schemes in different transformer stations

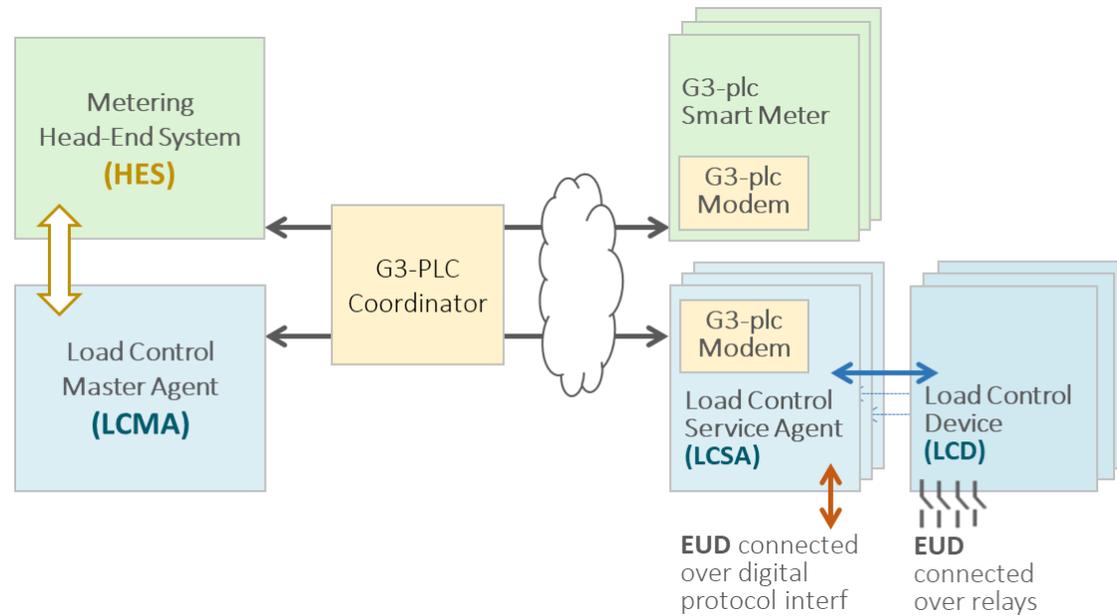
Direct vs. indirect control



OrtsNetz System



OrtsNetz System Concept



Legend: Different Sub-systems

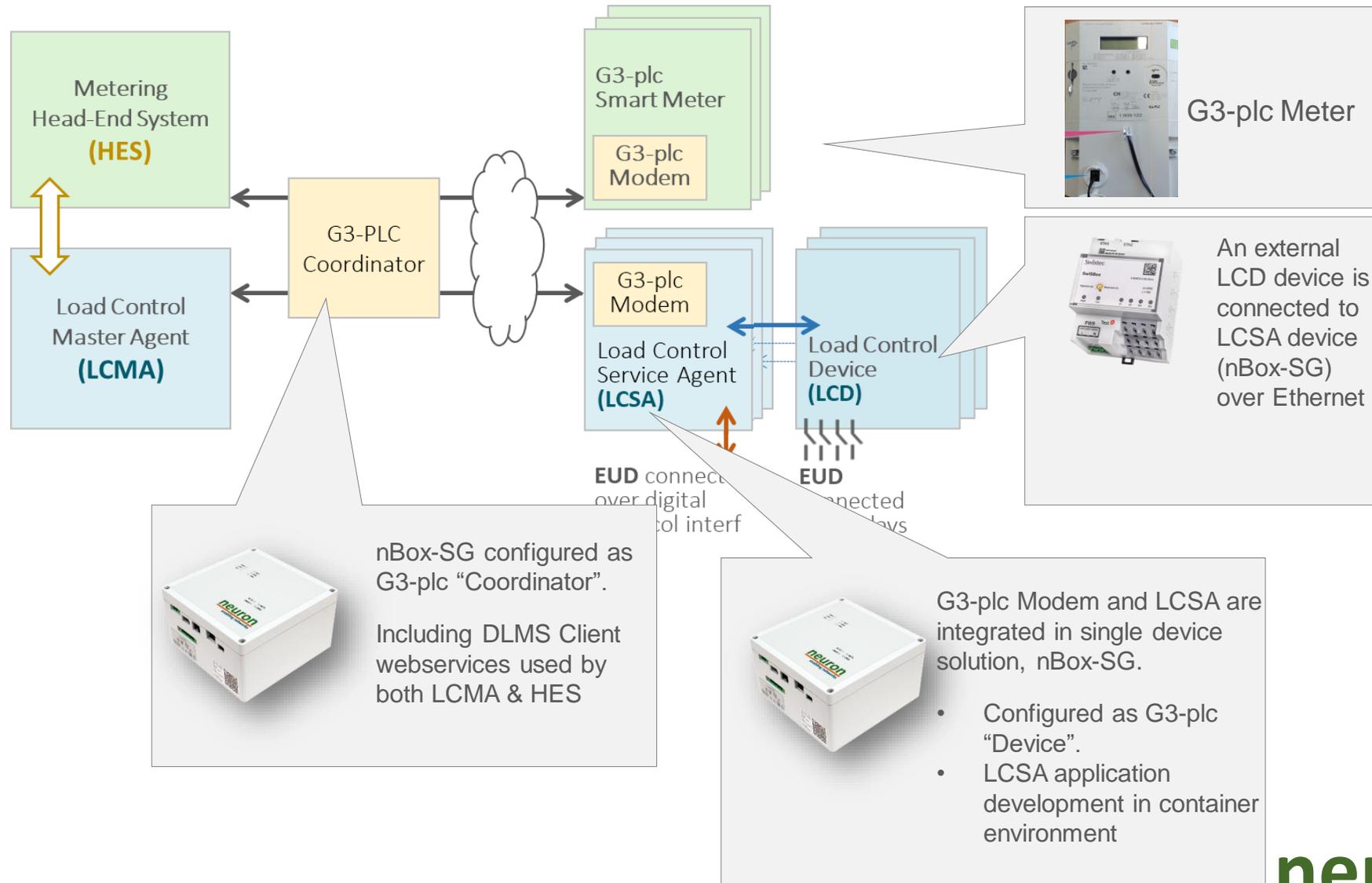
- Load-Control
- G3-plc communication
- Smart Metering

Legend: Application protocols

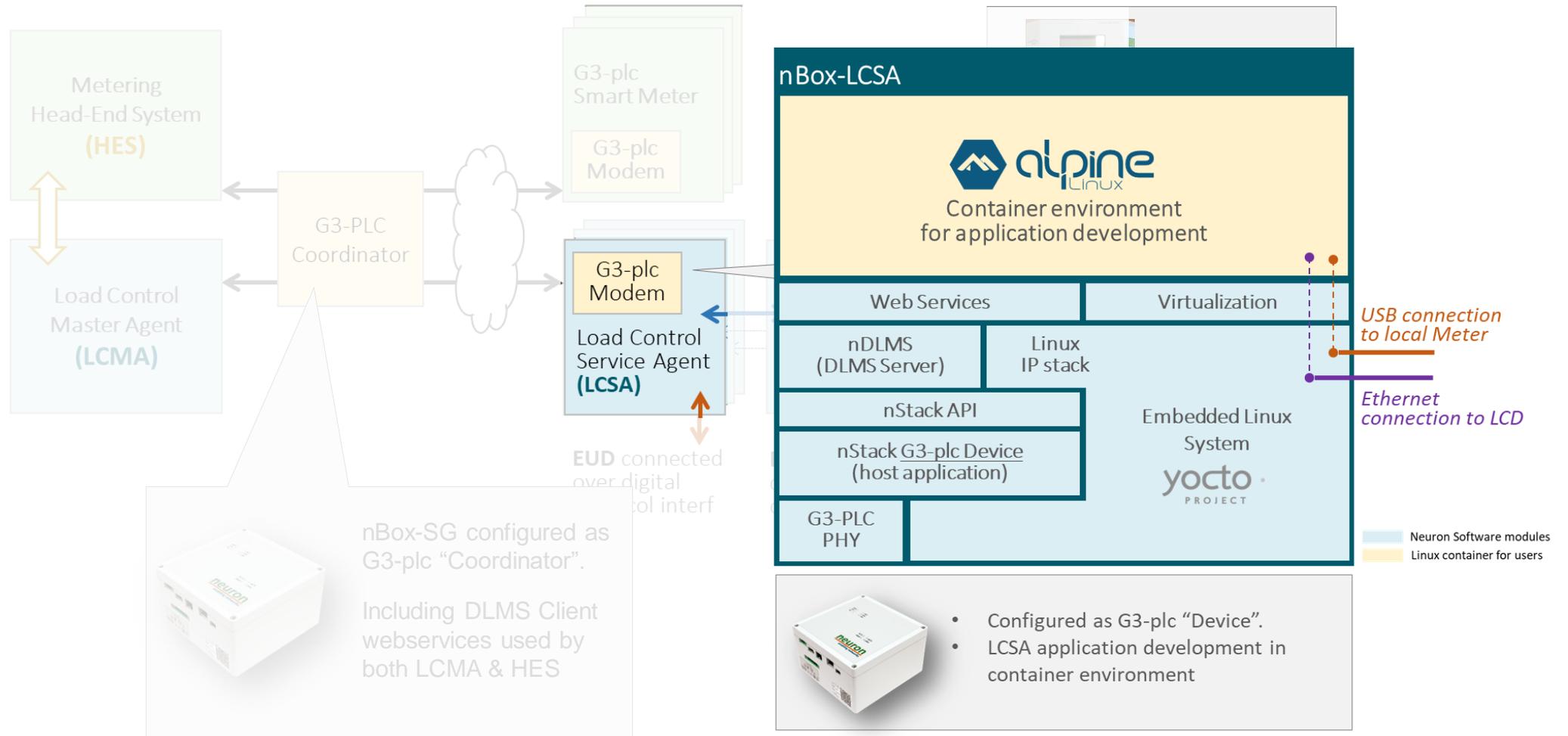
- DLMS (Metering & Load Control)
- OCPP and other protocols
- MQTT (interface to LCD)
- Metering HES – LCMA interface

- Metering and Load Control share the same G3-plc infrastructure.
- If required, G3-plc Coordinator can prioritize Load Control traffic over Metering
- LCMA Software and LCSA Software are developed independently. It has AI/ML based decision-making to communicate load-control decisions.
- LCMA and LCSA communicate using DLMS with a specific definition of COSEM objects
 - LCSA runs DLMS Server

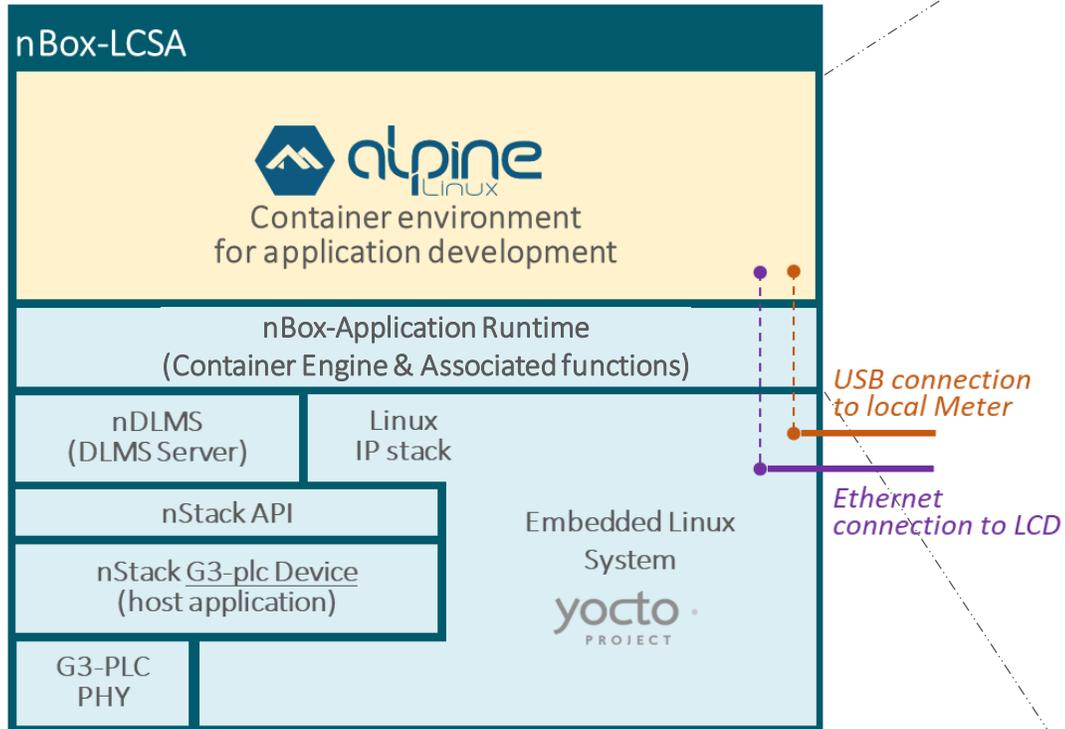
OrtsNetz System Concept



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OrtsNetz: LCSA



- 3rd party packages (partial list):
 - Python, py-pip
 - Tensorflow Lite
 - SQLite
 - Mosquitto MQTT
 - Smartmeter-datacollector
- LCSA Software application
 - AI/ML logic to take local-decisions
 - LCMA application protocol logic, including ability to override local-decisions
- Application Gateway to interface LCSA with Load-Control device using MQTT
- Ability to upgrade the Load-Control device.

**Thank you
for your attention**