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IntelliGrid

IntelliGrid

A platform for load-balancing the electricity grid using private households

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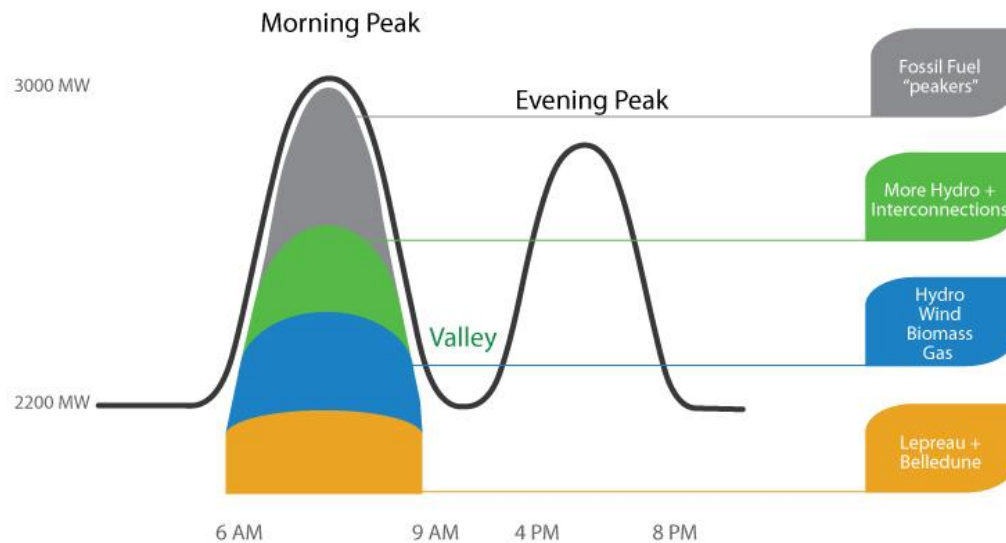
IntelliGrid is funded by Interreg Deutschland-Danmark with funds from the European Regional Development Fund. Find out more about Interreg Deutschland-Danmark at www.interreg5a.eu

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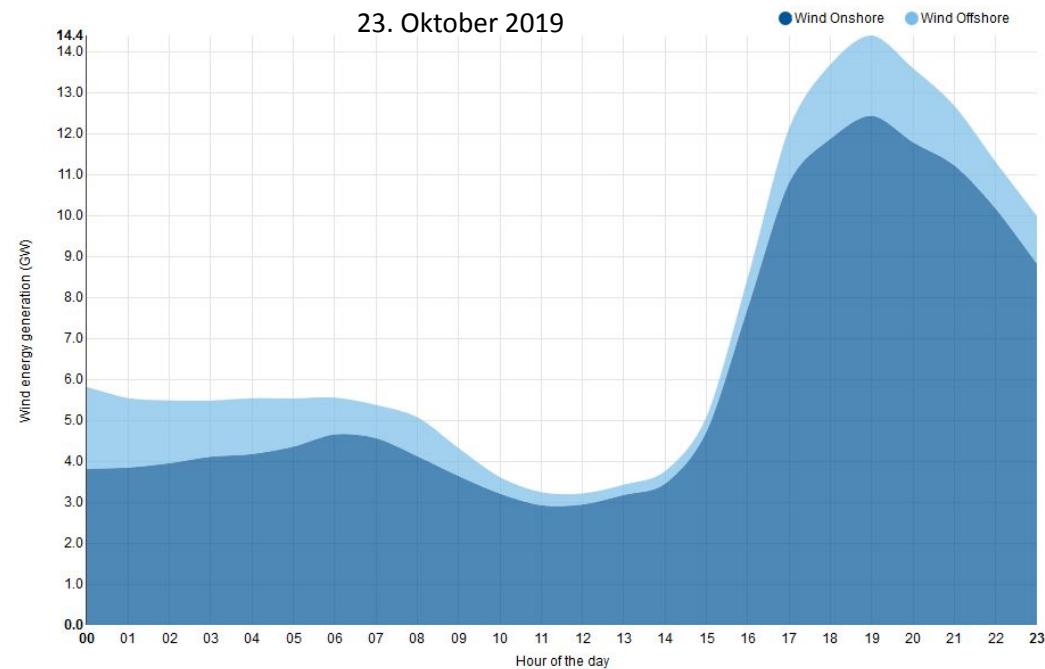
Load-Balancing

OUR TWO-PEAK CHALLENGE



Quelle: What is peak power?, Energie NB Power, 19.01.2016, online:
<https://www.nbpower.com/blog/en/posts/2016/january/what-is-peak-power/>

Germany



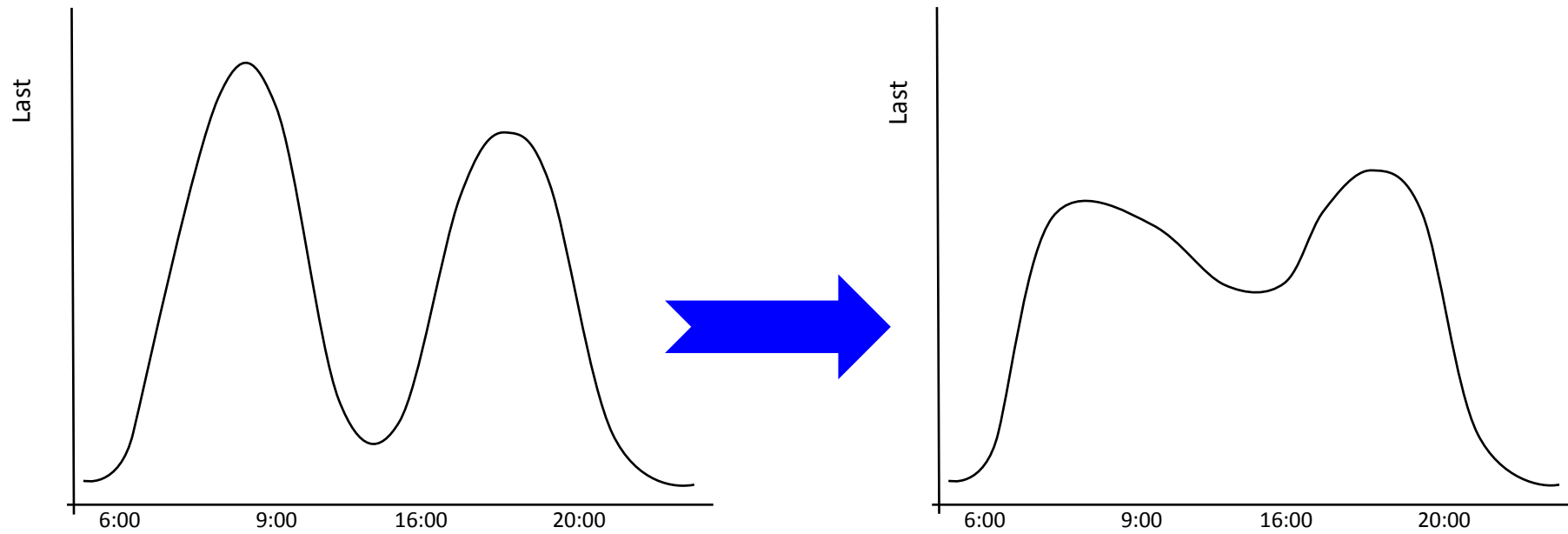
Quelle: Hourly wind energy generation, Wind Europe, online:
<https://windeurope.org/about-wind/daily-wind/hourly-generation?utf8=%E2%9C%93&areas=DE&commit=Apply+filters>



Load-Balancing

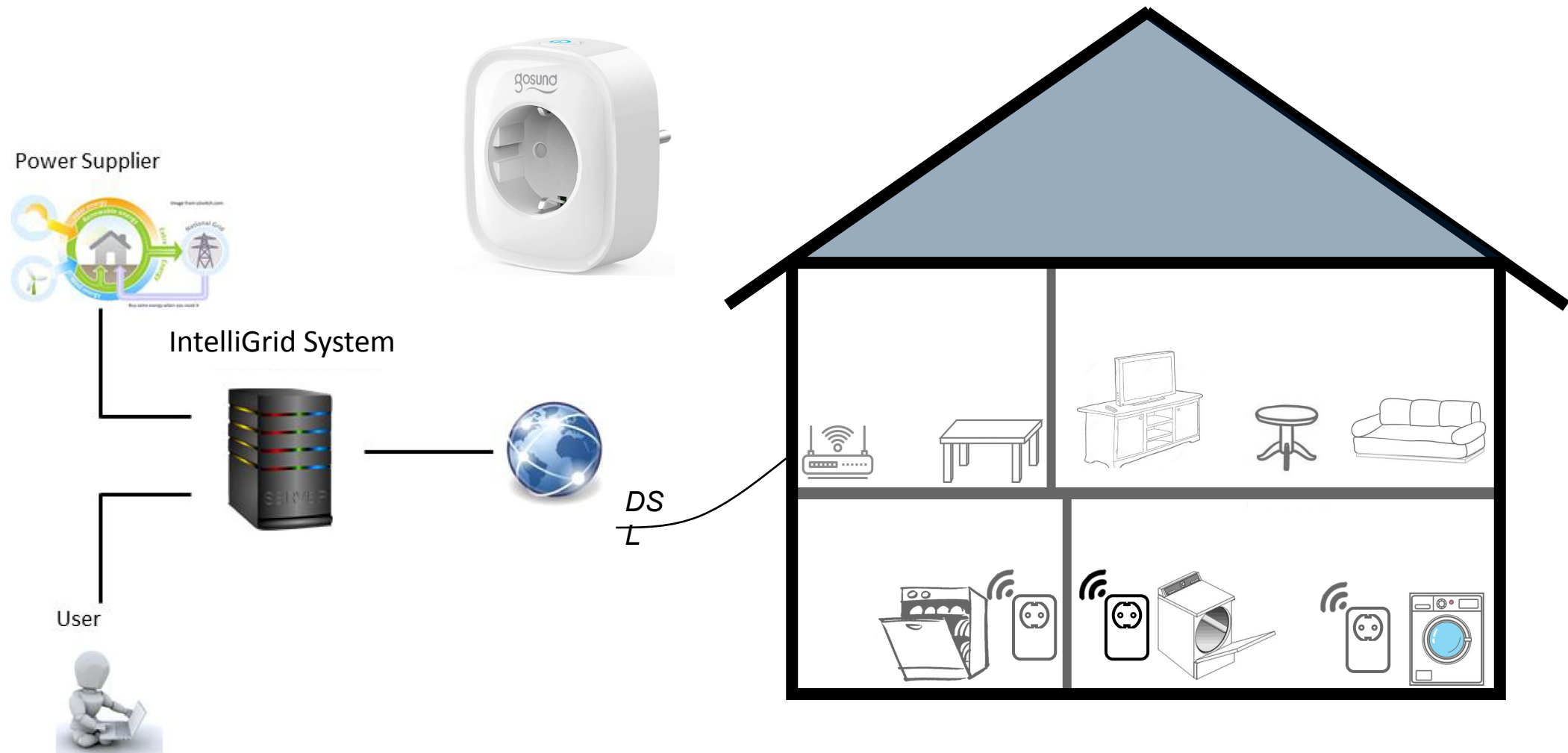
Can private households contribute to balancing the load?

Can we move the load peaks to better match the production?





A possible solution





Functionality

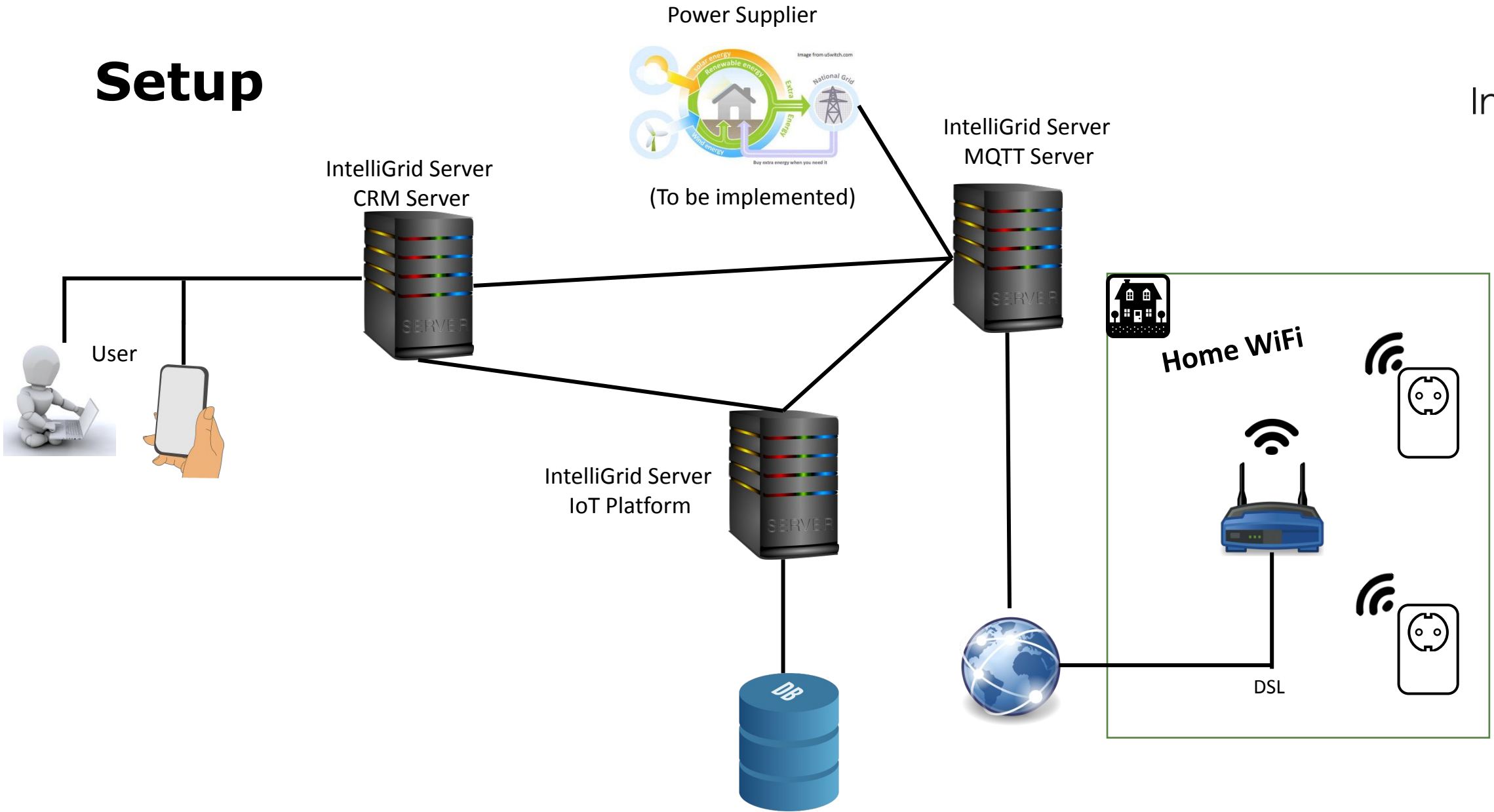
- Users
 - add smart plugs to the home network and create schedules
 - turn on their appliances as usual
 - can observe and compare the energy consumption
 - Receives information about energy savings

- IntelliGrid system
 - detects the start of an appliance
 - selects the "best" time slot for the appliances and starts it accordingly
 - monitors the energy consumption

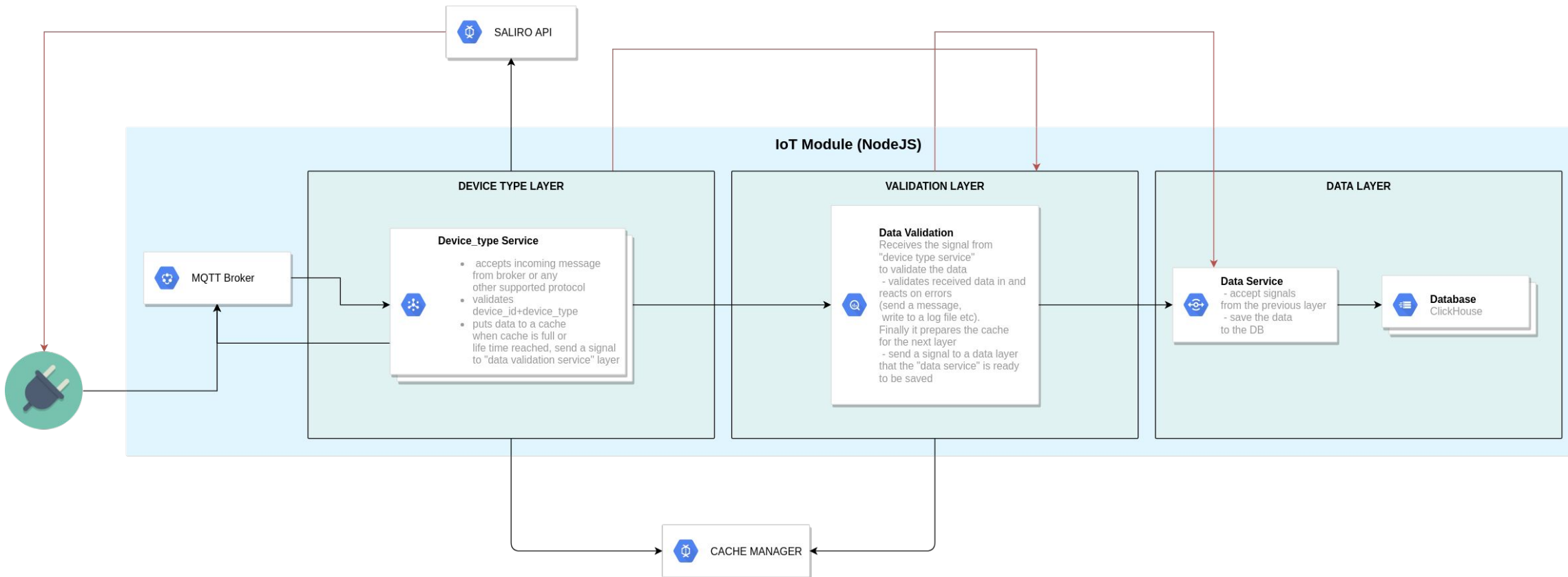
Setup



IntelliGrid



IoT Platform Architecture





IntelliGrid - Testing

- Development preliminary testing
 - Stress tests with 50 plugs (1/5/10 sec measurements)
 - UX testing via mobile app is ongoing (bug fixing)
 - 10 mil+ data points generated in current test phase
- Field tests
 - 50 Households (approx. 150 plugs)
 - 25 households in Germany, 25 households in Denmark
 - User feedback
 - 1 month monitoring



Conclusion

- Extendable IoT Data Collection platform (Interface define the device - e.g. plug)
- Scalable production ready setup (Dockers, NGINX load balancer)
- Microservice architecture (Adaptable for different use cases)
- Can be fully used as a SaaS platform
- Data accumulation can be used for process modelling yielding better predictions
- The IntelliGrid system provides a way to support the load-balancing by bringing the private households into the equation
- Transparent usage. No need to use the mobile phone every time
- Scheduling logic can be used on a large scale as orchestrator of the consumption plan



Project partners



<https://intelligrid.eu>

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