

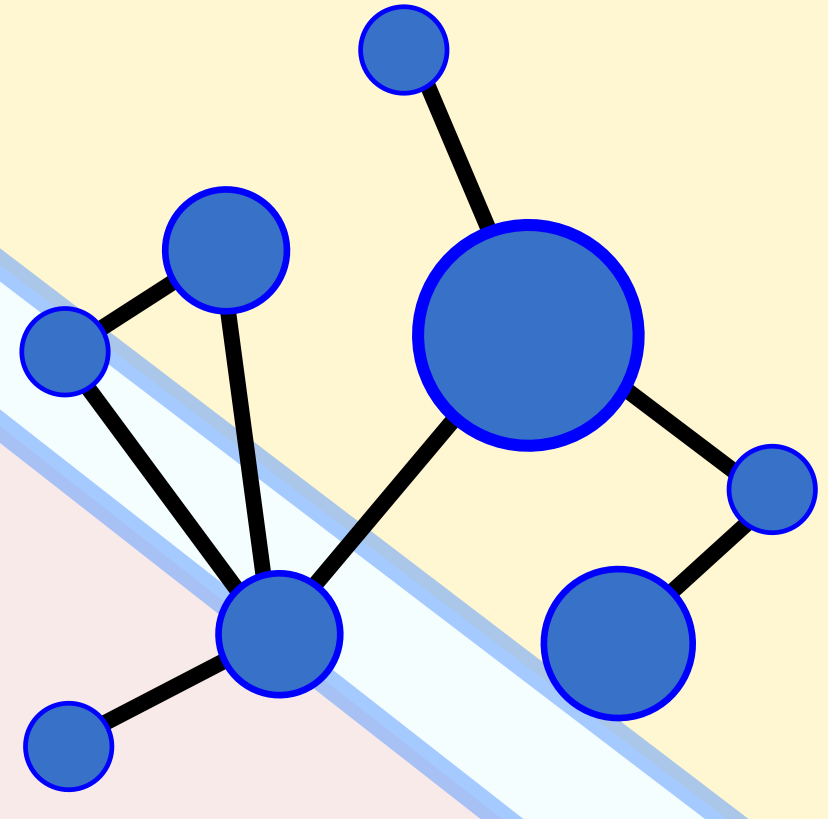
Knowledge-driven

Data Exchange

and Validation

for Smart Buildings

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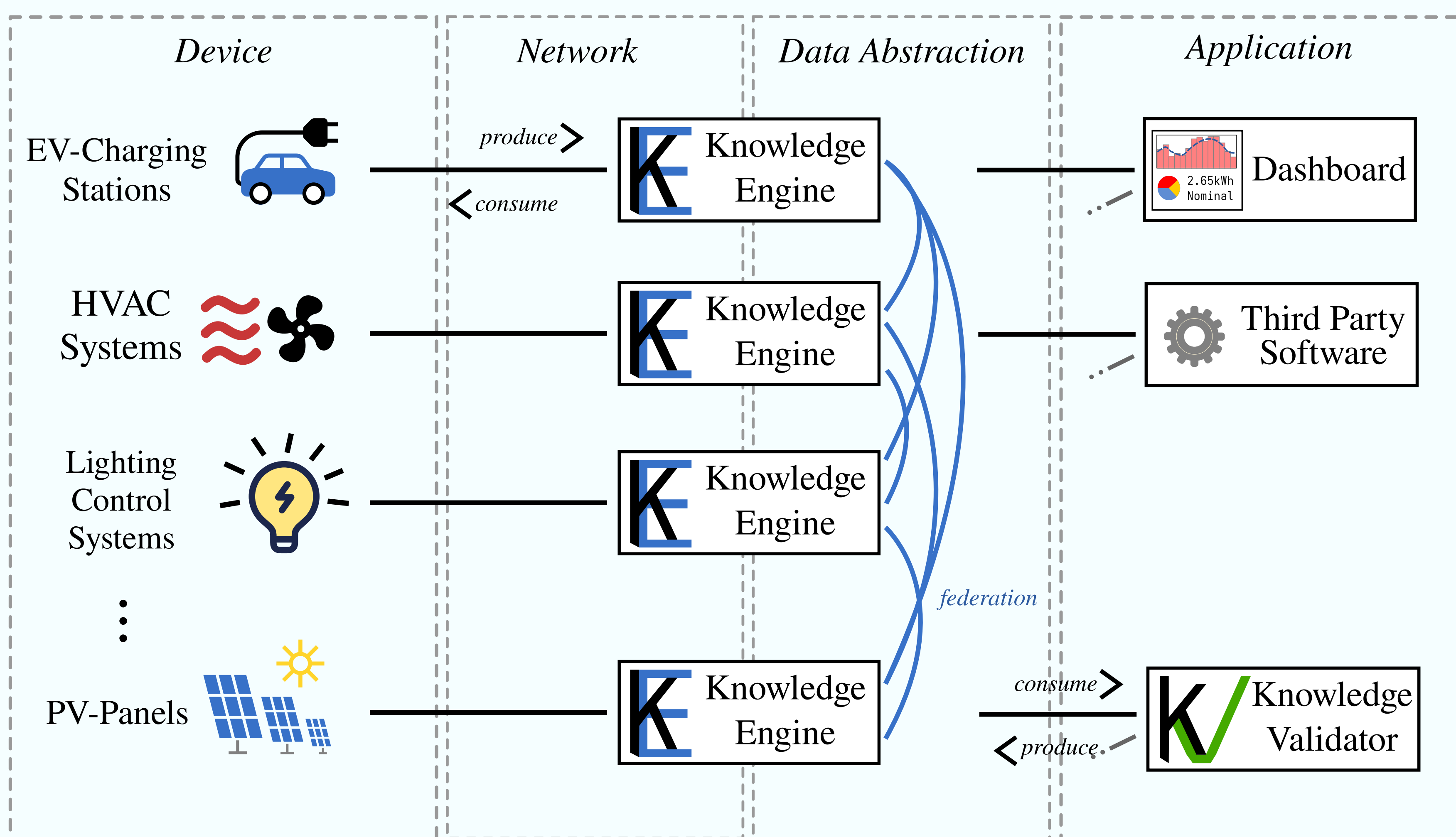
USE CASE

- pilot on the **Electricity Campus at Arnhems Buiten**
- improving **resilience** and **flexibility** on the **electric grid**
- contributing partner in the EU's **HEDGE-IoT** [1] project

[1] hedgeiot.eu

OBJECTIVES

- 1) facilitate **transparent data exchange** of graph data between smart devices in **semantic IoT environments**
- 2) provide seamless **interoperability** and data **sustainability** via **open standards** and **domain ontologies**
- 3) offer **anomaly detection** and **predictive maintenance** through **eXplainable AI** over semantic data streams



Knowledge Engine [2]

- a **semantic gateway** that acts as **information broker** between devices
- **smart adaptors** translate between device-specific and semantic formats
- multiple instances can be connected to offer **federated data exchange**

[2] github.com/TNO/knowledge-engine

Knowledge Validator [3]

- facilitates **graph anomaly detection** on semantic IoT streams
- employs (sub-) **symbolic learning** in a **continuous online learning** setting
- produces **SHACL validation report** with **human-readable explanations**

[3] github.com/wxwilcke/gladoss

