



N5GEH: Semantic Interoperability in the Building Energy Domain

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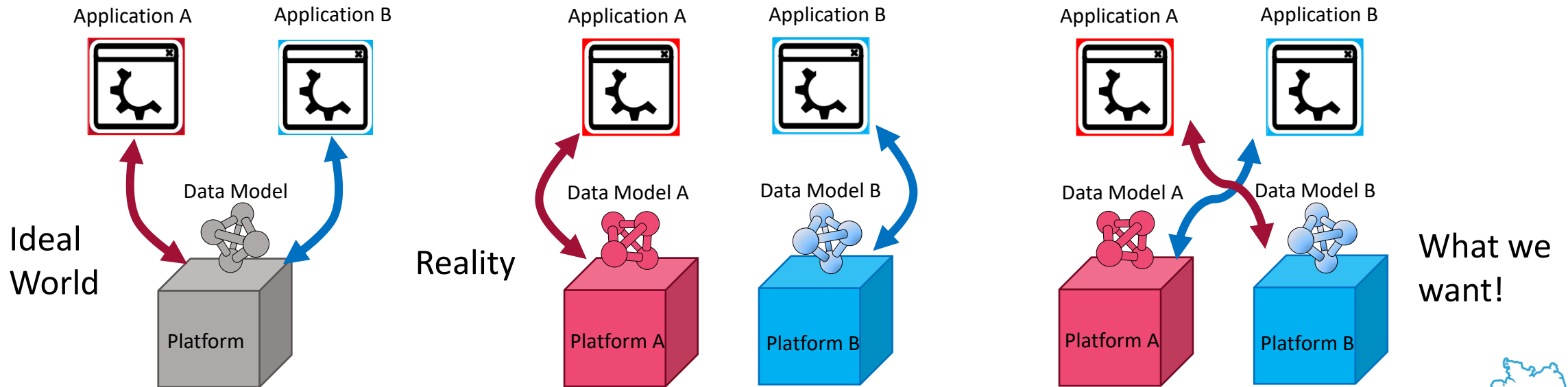
What is Semantic Interoperability?

■ Syntactic vs Semantic Interoperability

- ≡ Syntactic interoperability: same things must be written the same way
- ≡ Semantic interoperability: some things can be written different but have the same meaning

■ Different scenarios:

- ≡ 2 applications use same data model in same platform (ideal scenario but things do not work like this in real world)
- ≡ 2 applications use 2 different data models on 2 platforms
- ≡ Each application shall be capable of using the data model and platform of the other one



How to realize Semantic Interoperability?

■ **Solution 1:** Reengineering every application to fit the model of the other one or a common data model

- ≡ Too much effort, rather unwanted by software providers
- ≡ Common data model as a data standard is a good thing that forces software providers in doing it, but still very time-consuming and need influence of standardization communities
- ≡ Establishing data standards or common data models still something necessary anyway ► actions by FIWARE? By N5GEH? External standards?



■ **Solution 2:** Keep applications as they are and rather align their data models

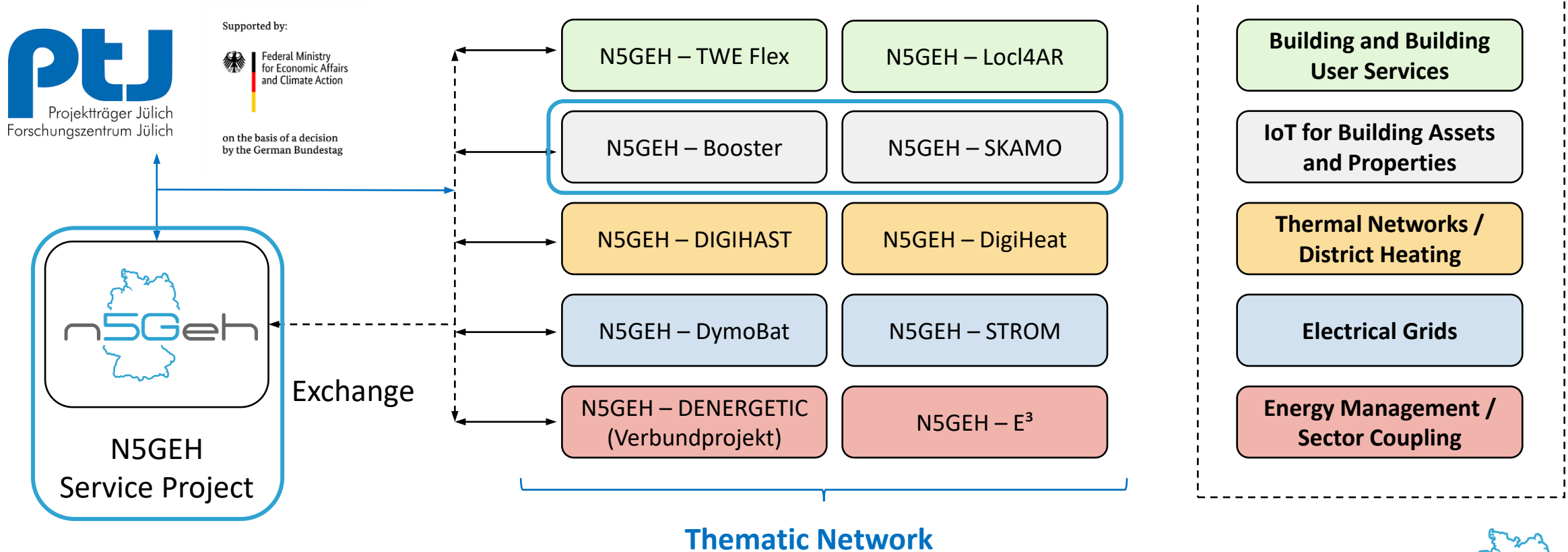
- ≡ Semantic Web provides great technologies for so called „Linked Data“
- ≡ Based on Graphs and Ontologies
- ≡ Possibility to define alignments as translation agents between different data models



Initiative of the Federal Ministry for Economic Affairs and Climate Action to Digitize Energy Technologies

➔ National 5G Energy Hub

Goal: Provision of Modern ICT Structures in Energy Technologies

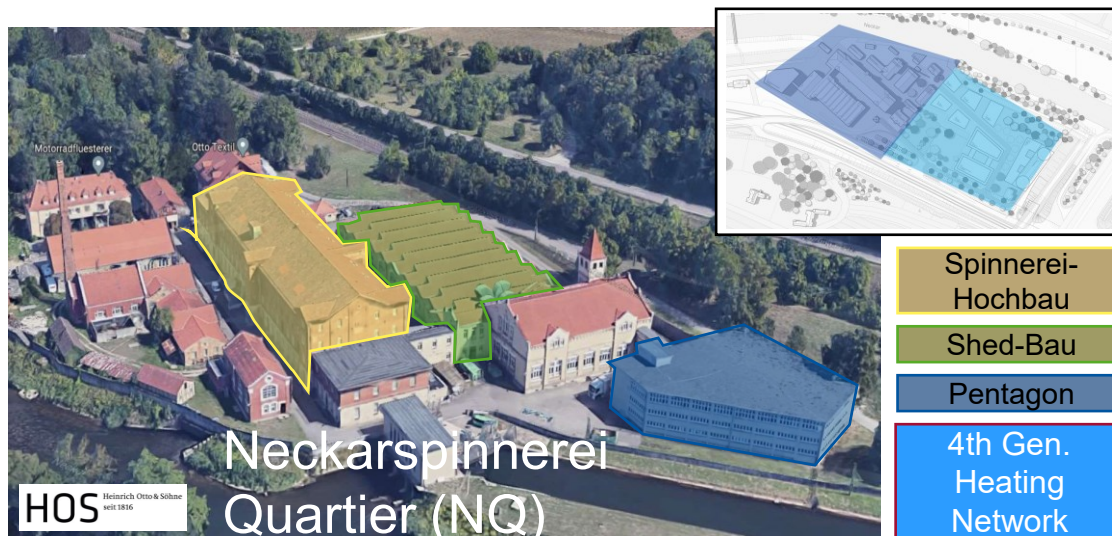


N5GEH – BOOSTER

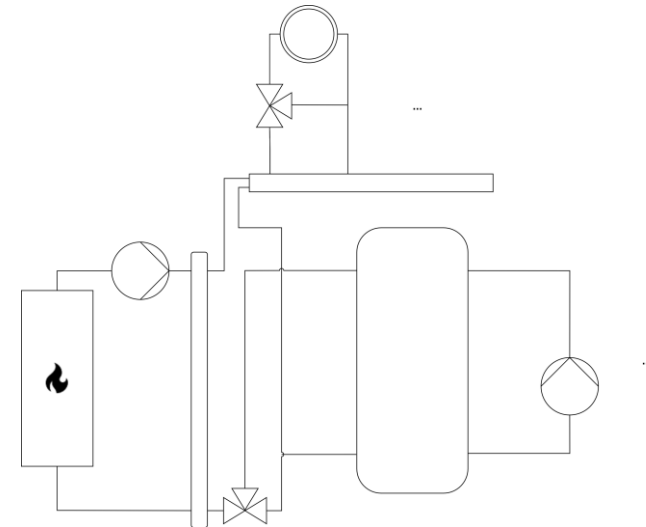
■ IoT-Based Operational Optimization for Sustainable Energy systems

- ≡ Digitize diverse building energy system information
- ≡ Develop production-ready FIWARE-based platform
- ≡ Develop scalable services
 - = Model predictive control
 - = Monitoring and alerting

■ Use of known ontologies: BrickSchema (SENSE, BASont, CTRLont)



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Semantic Interoperability in our projects

■ „Linked Data“ (LD):

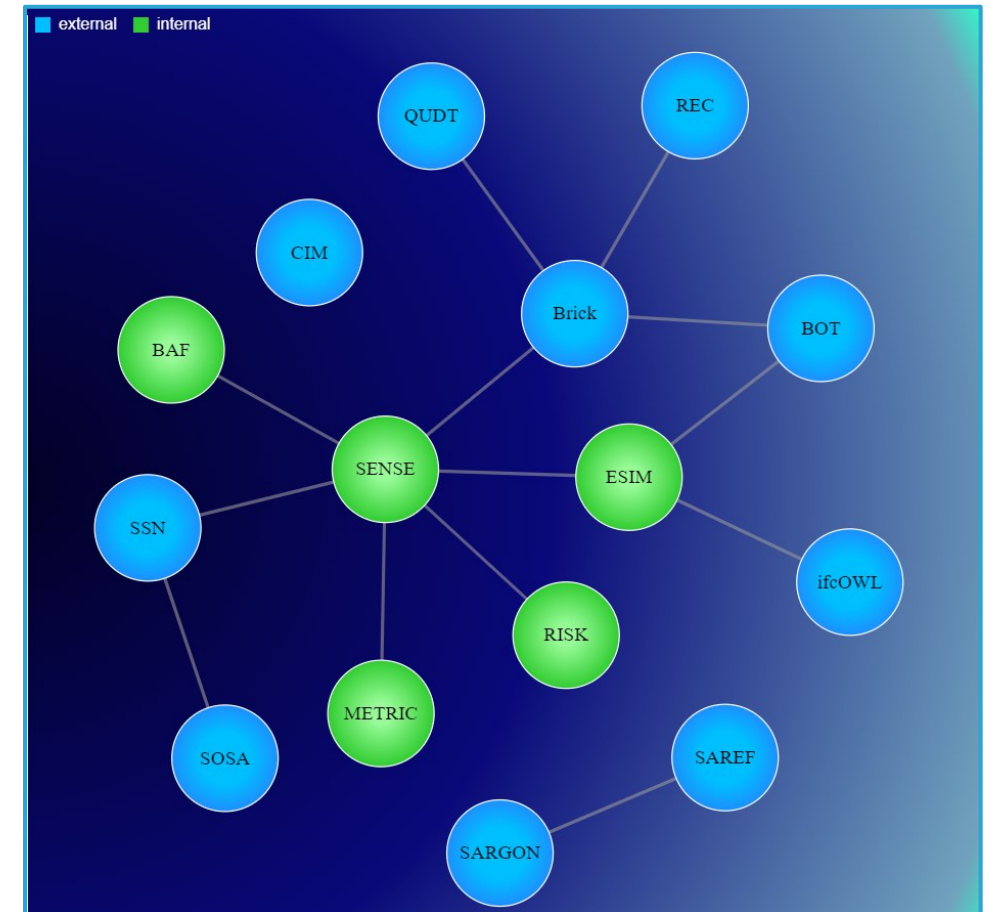
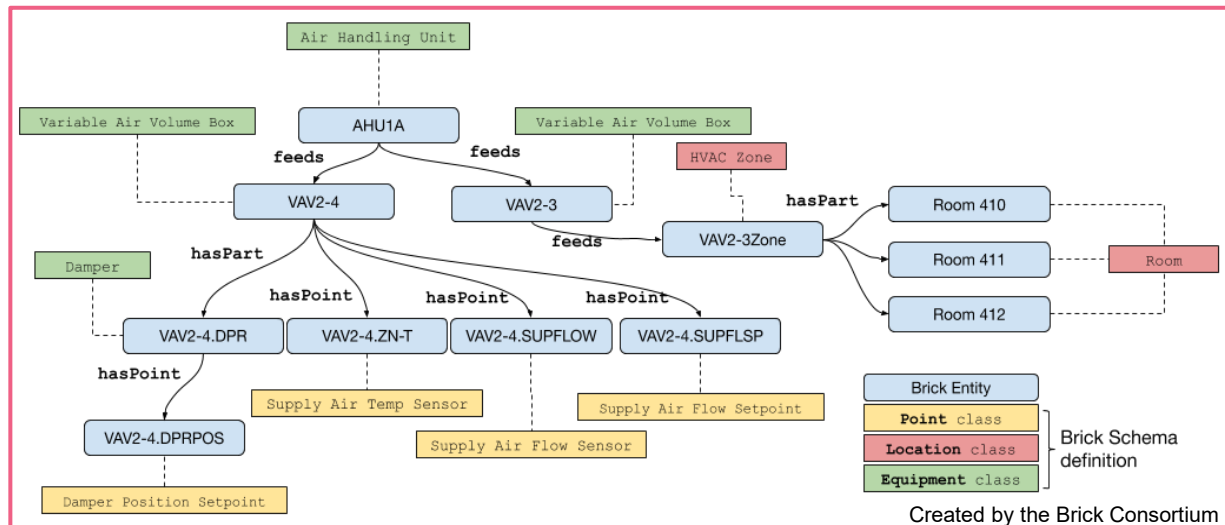
- ≡ Invented for solving Semantic Interoperability issues on the Web
- ≡ Provides means of aligning different data models
- ≡ compatible with FIWARE's LD Brokers

■ Our solution:

- ≡ Provide ways of adapting context files according to applications' needs
- ≡ Provide core concepts from several ontologies into a common data model

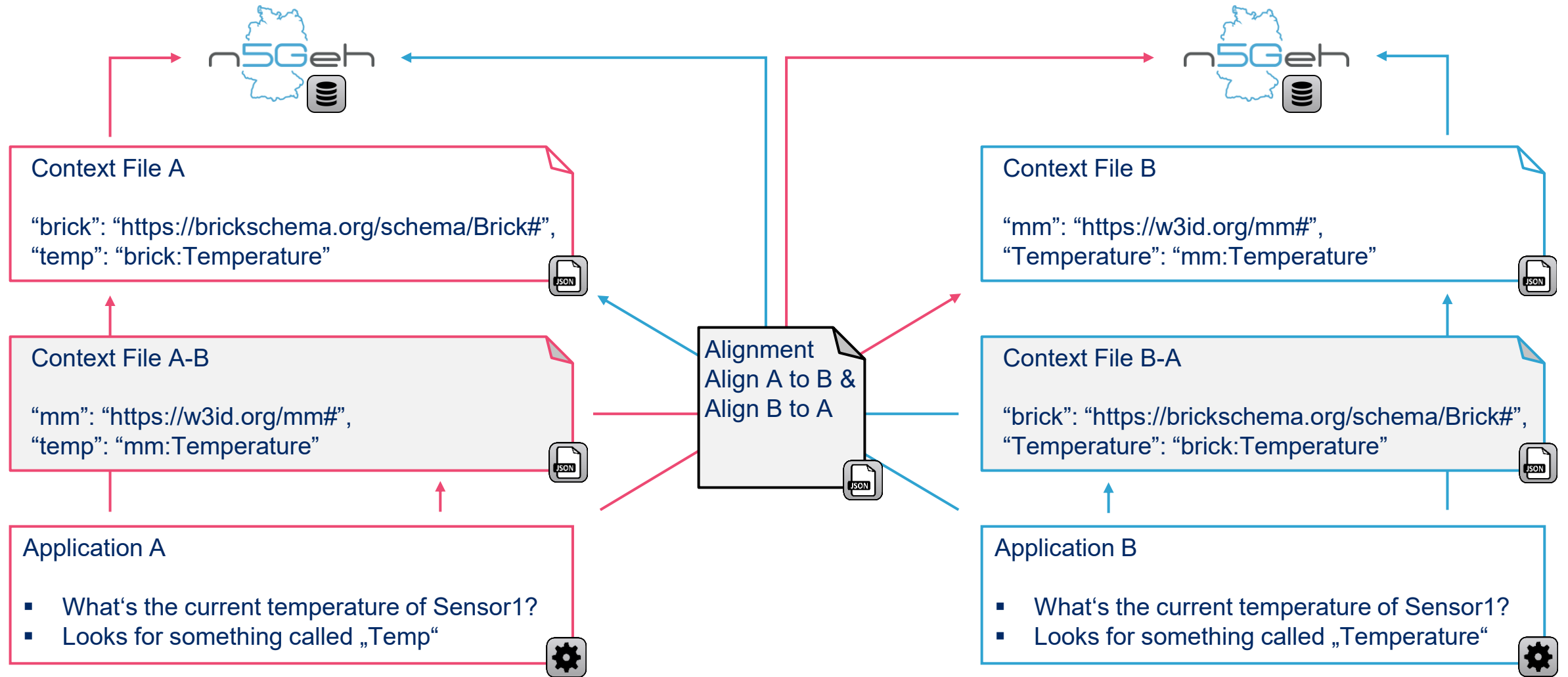
= <https://brickschema.org/>

= <https://w3id.org/sense/>



And in case of existing data?

(Intermediate) Interoperability using FIWARE



What is: Web of Things?

■ W3C Recommendation

■ Challenges by IoT projects:

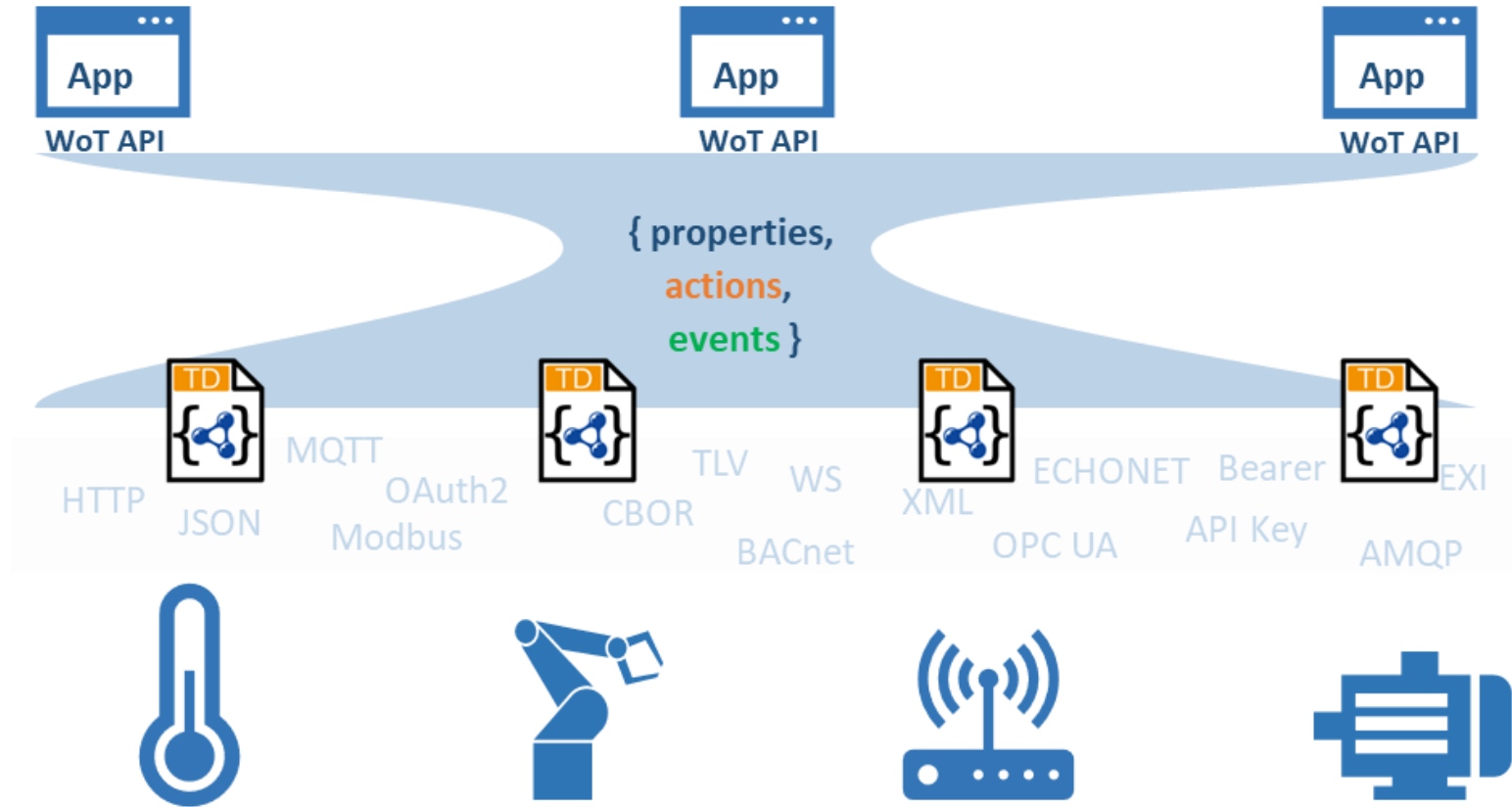
- ≡ heterogeneous technology landscape.
- ≡ systems and services from different vendors and manufacturers.
- ≡ various communication protocols, data models, data exchange and security requirements.
- ≡ IoT applications usually developed using high effort applied to a narrow and specific use case.

■ WoT in a Nutshell:

- ≡ provides a set of standardized technology building blocks to simplify IoT application development.
- ≡ increase flexibility and interoperability, especially for cross-domain applications.
- ≡ enable reuse of established standards and tool.

■ Useful sources →

- ≡ W3C Web of Things: <https://www.w3.org/WoT/>
- ≡ Web of Things (WoT) Thing Description: <https://www.w3.org/TR/wot-thing-description11/>
- ≡ Web of Things (WoT) Use Cases and Requirements: <https://www.w3.org/TR/wot-usecases/>



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We Appreciate Your Feedback

FIWARE Library for Python (FiLiP) https://pypi.org/project/filip/ 	Frameworks, tutorials, and tools, including Entirety https://github.com/N5GEH 	Project webpage with additional information https://n5geh.com 
Web of Things Use Case https://www.w3.org/TR/wot-usecases/#smart-building-things 	BrickSchema https://brickschema.org/ 	Sense https://w3id.org/sense/ 

FIWARE Global Summit 10

Thanks!



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