eTEACHER Technical and Legal Challenges

Behavioural change towards energy efficiency by utilizing ICT tools Workshop

28th October 2020, Digital Event

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CONTENT

- Introduction
- Monitoring technology
- Data quality
- System interoperability
- Data processing (WiA)

INTRODUCTION

TOOLS OVERVIEW

INPUT LAYER

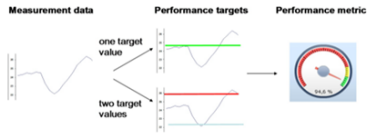
COMFORT FEEDBACK

MONITORING

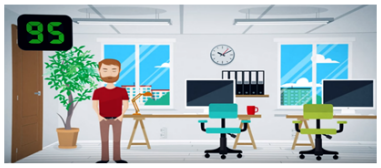
BACS COMMUNICATION LAYER

UBCI

ANALYSIS LAYER



METRIX



PULSE

WHAT-IF ANALYSIS

USER INTERFACE LAYER

USER APP

Monitoring Technology

PROBLEMS, SOLUTIONS AND LESSONS LEARNED

Poor technology performance:

- Wireless technology is not ready for big buildings
- Devices do not meet commercial specifications

Main problems:

- Users manipulate devices: connect and disconnect.
- Lack of signal coverage
- Short duration of devices batteries.

Solutions:

- Weekly maintenance of monitoring devices
- Data validation based on three steps
- High involvement of technical support
- Many site visits fore technical leads for installation & maintenance

Monitoring Technology

PROBLEMS, SOLUTIONS AND LESSONS LEARNED

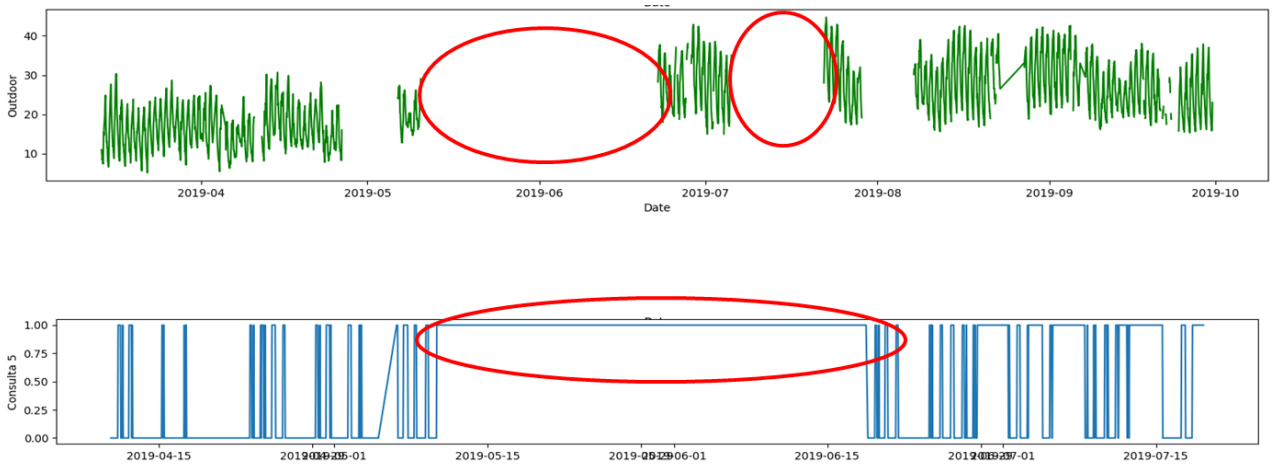
Lessons learned

- The maintenance is critical for the good running of the monitoring system.
- Most wireless technology should be used for small buildings (e.g. residential buildings).
- A high number of sensors reduce the performance. Only the most critical parameters should be monitored and the rest of them should be calculated indirectly
- In the apartment monitoring: it is easier to overcome technical problems/issues than to work with apartments owners/tenants that have very different backgrounds and attitudes.

Data Quality

PROBLEMS

- **Lack of measurements**: Some monitoring measurements are not sent to the database for different reasons: users, wifi, etc.
- **Data gaps:** Some measurements present gaps during some periods of time
- Sensors sending **same value** during long periods of time



Data Quality

SOLUTIONS

Data Validation Procedures

- Automated procedure:
  - Algorithms for automatic data validation in local databases
- Semi-automated procedure:
  - STEP 1: Pilot coordinators check the sensors and data every week. If any issue is identified they report and solve as soon as possible.
  - STEP 2: Demo coordinator review the monitoring data and report on data quality issues every month.
  - STEP 3: Tools developers report on data quality issues identified during the supervision of their tools

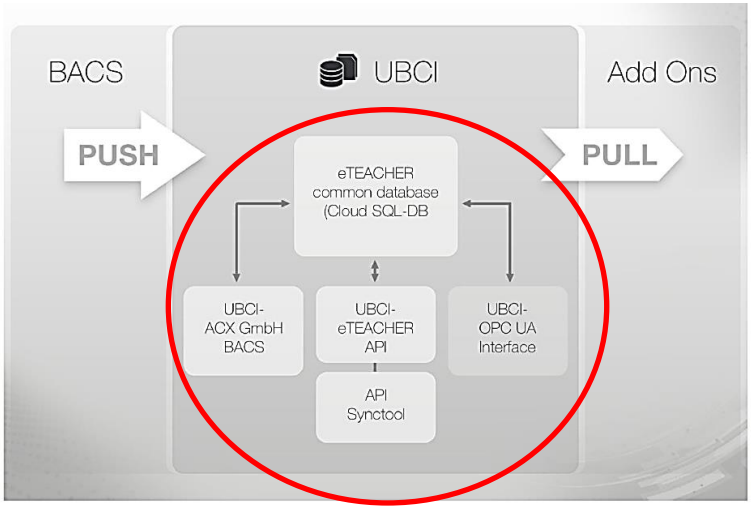
Interoperability

IO CHALLENGE

- Building (BACS or monitoring system)
- Tools: Metrix, pulse, wiA, app

SOLUTIONS

- Technical interoperability: Internet (gateways in demos)
- Syntactical interoperability: New data format specified as eTEACHER API
- Tools

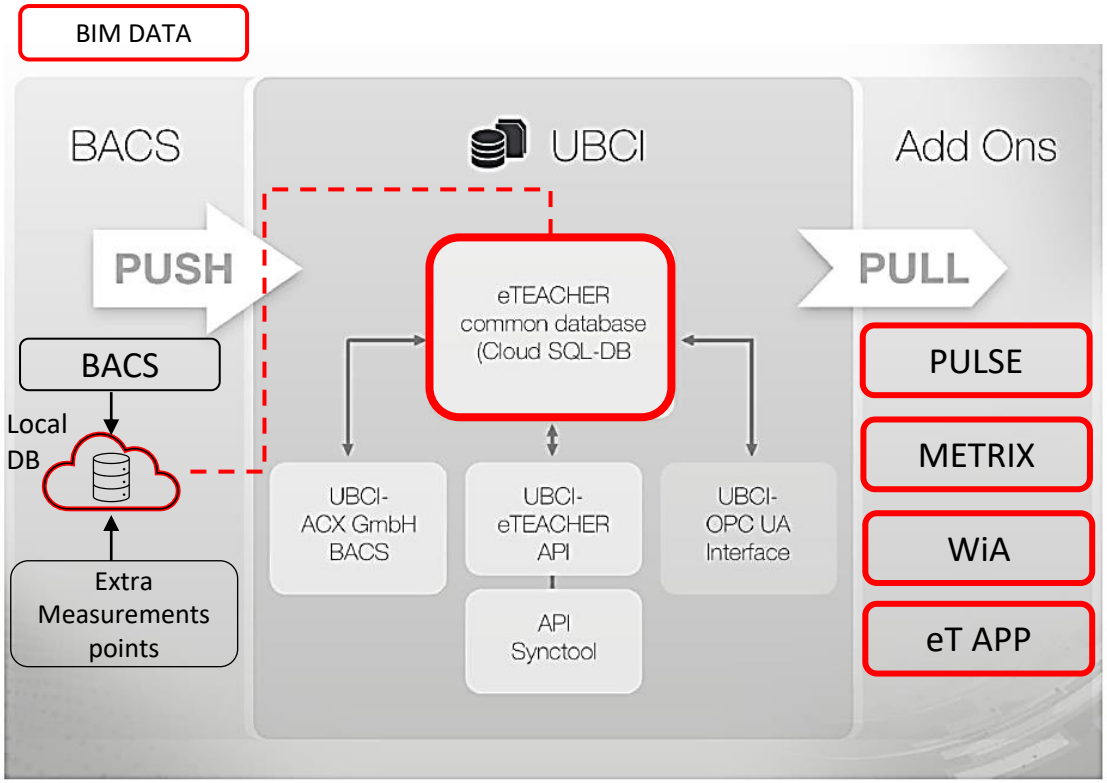


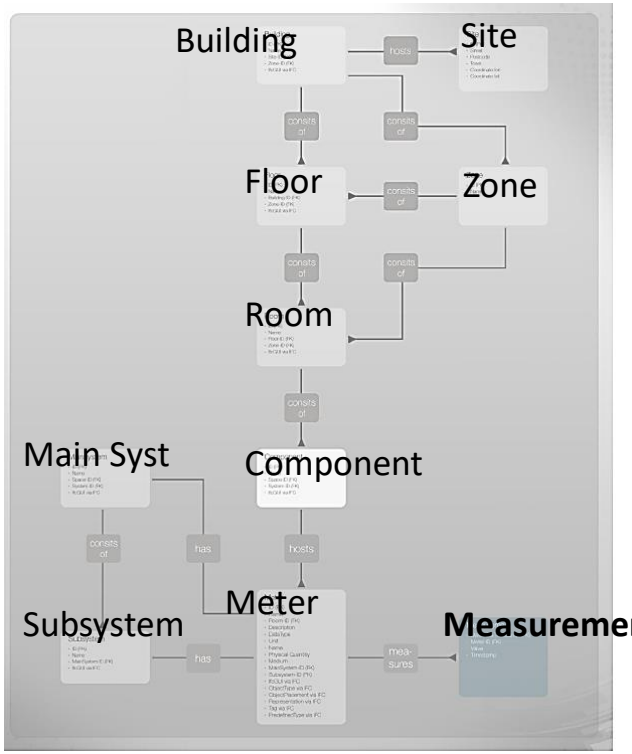
Interoperability

TOOLS

Common database

- Relational database (Cloud SQL-DB)
- Entity Relationship Model

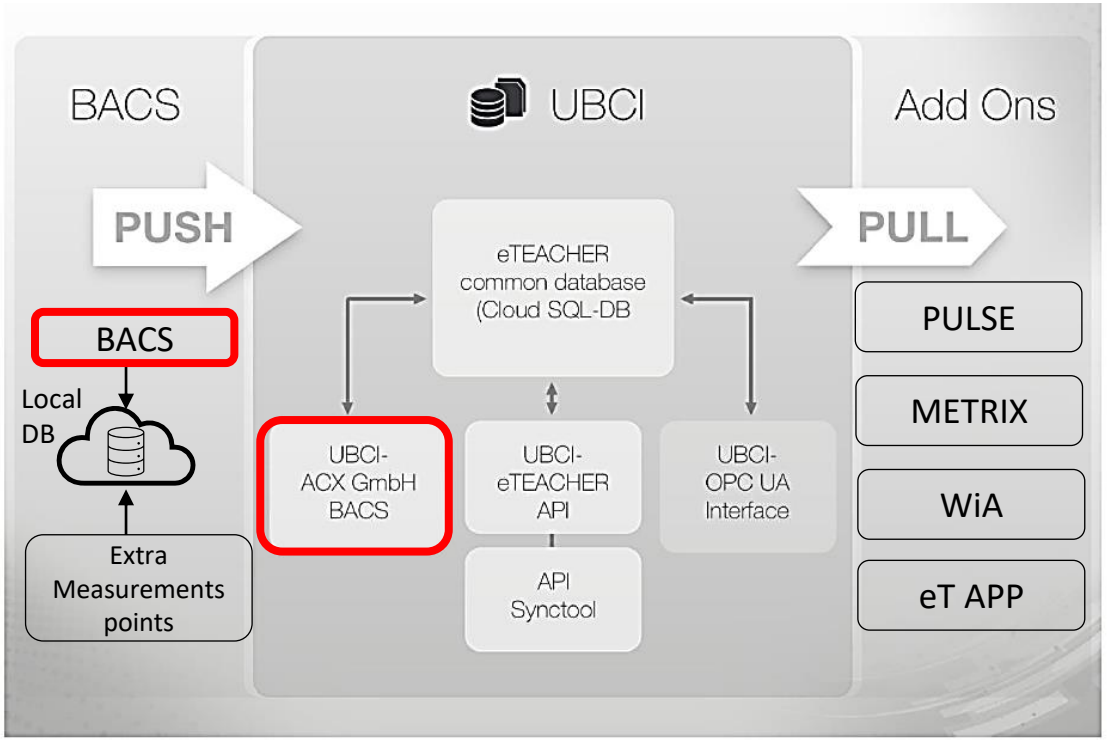




Interoperability

TOOLS

- **eTACHER ACX BACS** for interoperability with existing BACS



Interoperability

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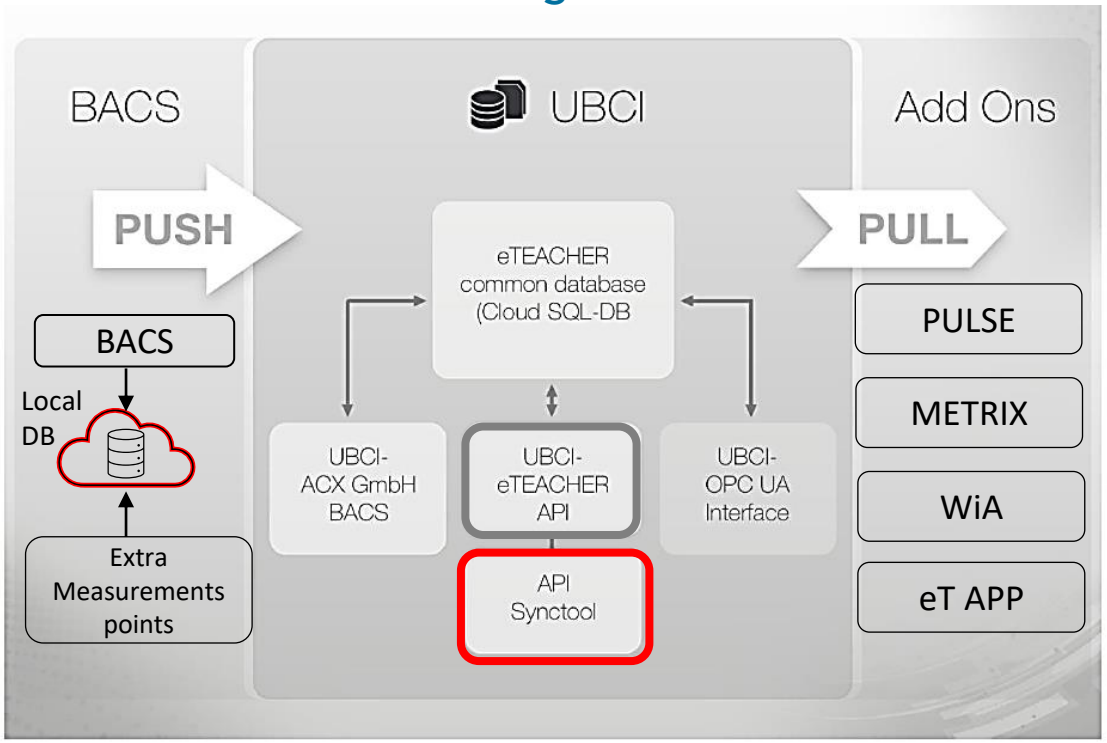
- **eTACHER ACX BACS** for interoperability with existing BACS

- **eTEACHER SyncTool** to synchronise the national local databases with the common database. The SyncTool queries the national databases and updates the common database with the results through the eTEACHER API.



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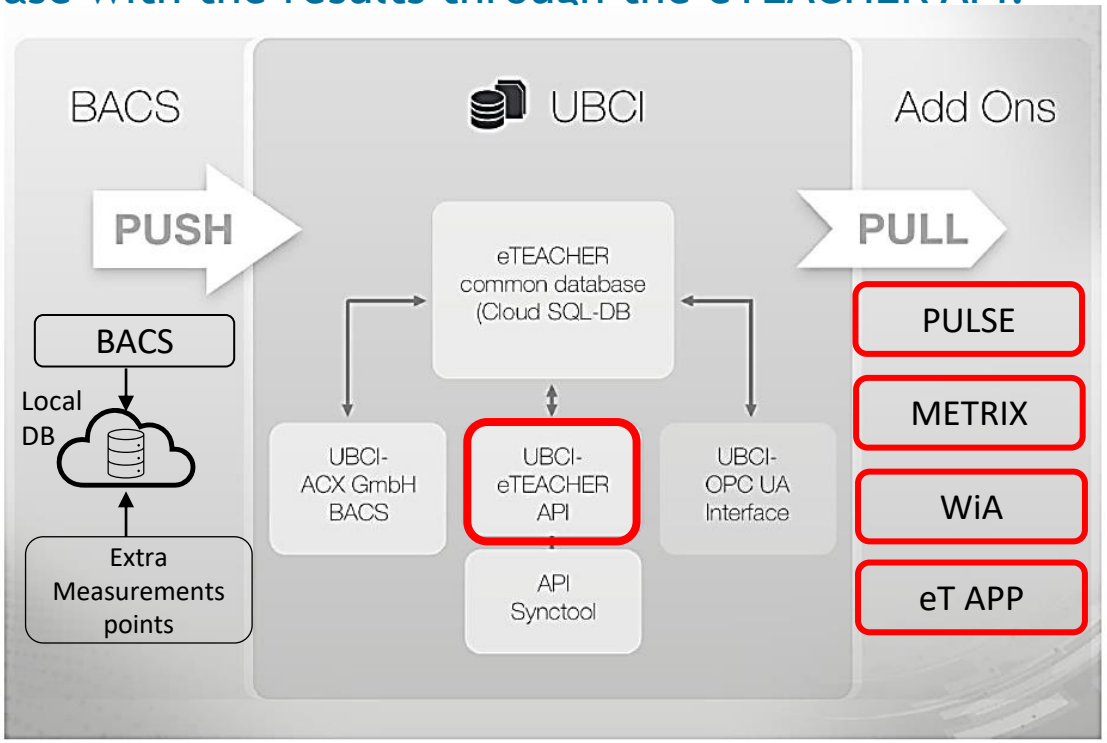
- **eTEACHER API** for exchanging data between the tools



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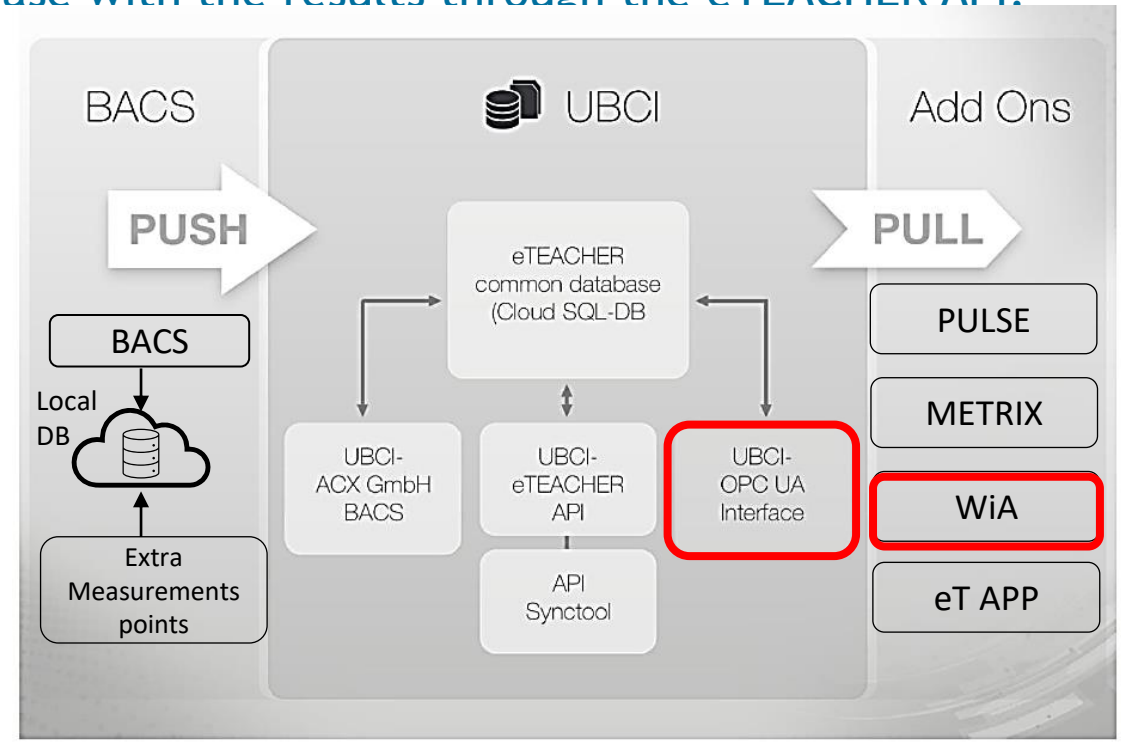
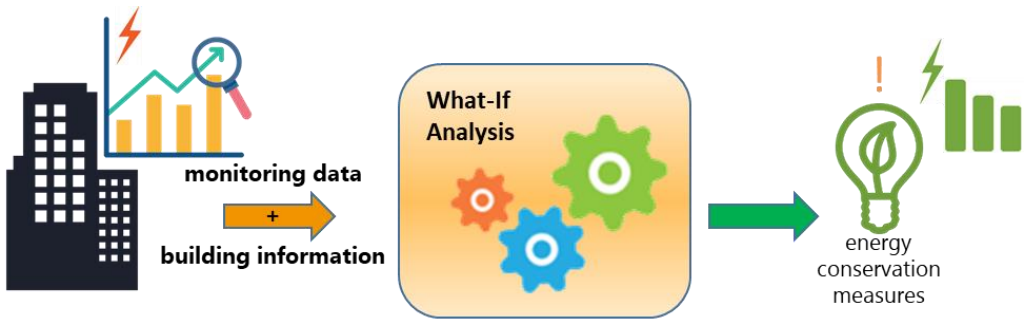
- **eTEACHER OPC UA add-on** to provide meta information over the available data.



Data Processing (WiA)

CHALLENGES

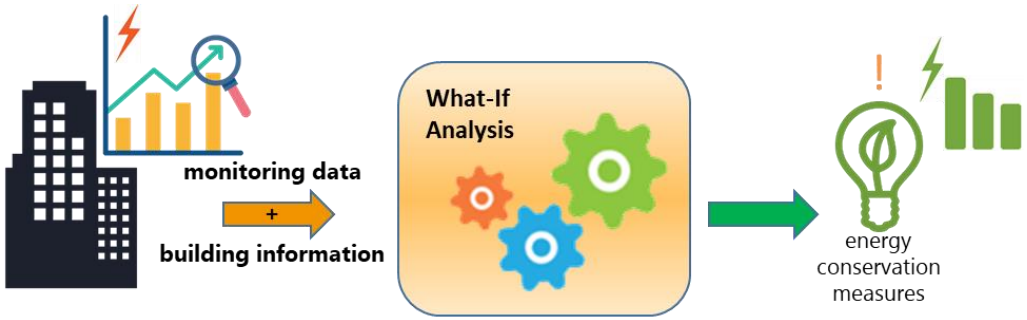
1. **Applicability:** regardless data available
2. **Availability:** the system has to be continuously available and applied in real time during building operation.
3. **Versatility:** flexibility to be applied to any kind of building
4. **Scalability:** depends on versatility, and ability to be applied by amounts of facilities and data



What-If Anlysis

APPROACH

1. The tool can be used **with or without existing monitoring data**: generic hints for saving energy vs more detailed energy conservation measures
2. This is executed in a **SaaS architecture** (Software as a Service) independently from the App platform itself and in a virtualized runtime environment, which is continuously available. Internet connection by the App host is necessary.
3. Algorithms rely on **metadata about the building and its monitoring system** that allow to drive the WiA for a specific building.
4. WiA has **low computational effort** that allows for analysis of high amounts of data and fast response.



THANK YOU

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