



PHOENIX

***Adapt-&-Play Holistic cOst-Effective and user-frieNdly
Innovations with high replicability to upgrade
smartness of eXisting buildings with legacy
equipment***

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Smart Buildings Workshop 28th October 2020

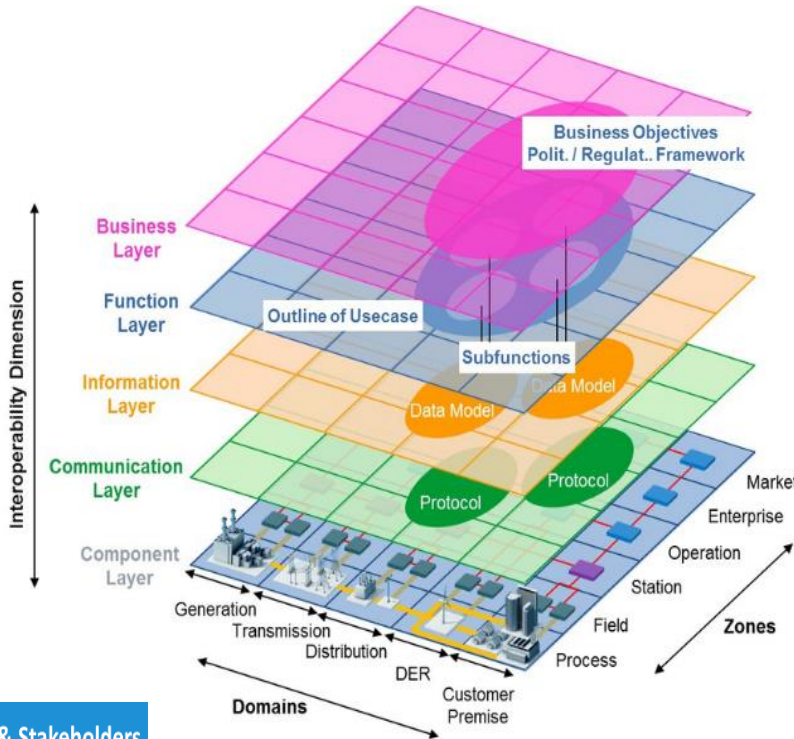
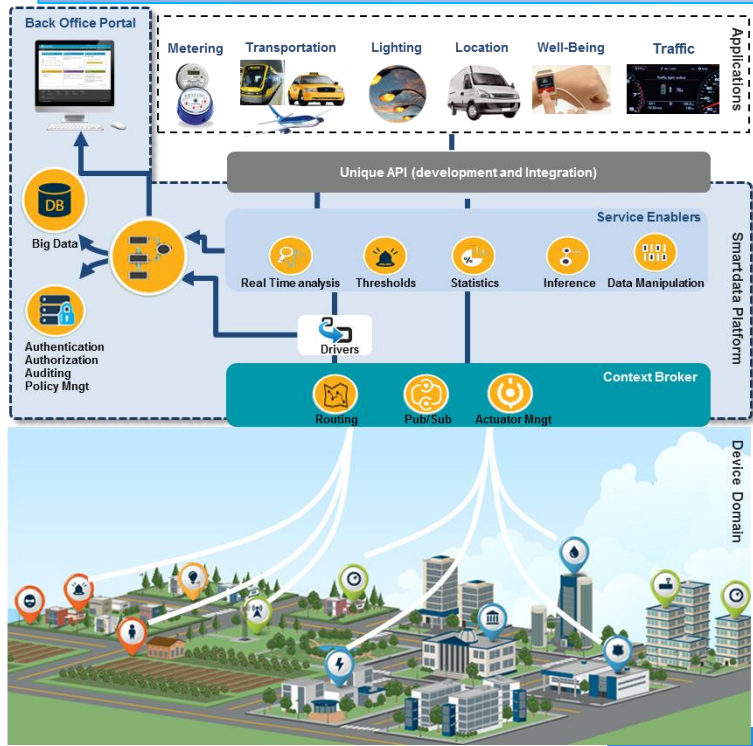


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- Big Data Infrastructure
- Fine-grained access control for privacy-sensitive data, based on attribute-based encryption (ABE)
- Minimal disclosure

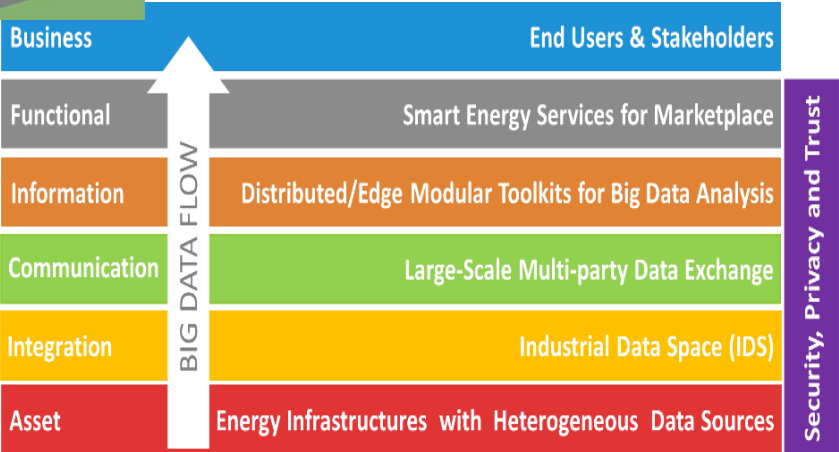
- Authentication
- Authorization
- API Token issuer
- Delegation
- Identity Governance

Where we come?



❖ Previous Project

- ✓ Digitalization
- ✓ Smart IoT Based Platforms

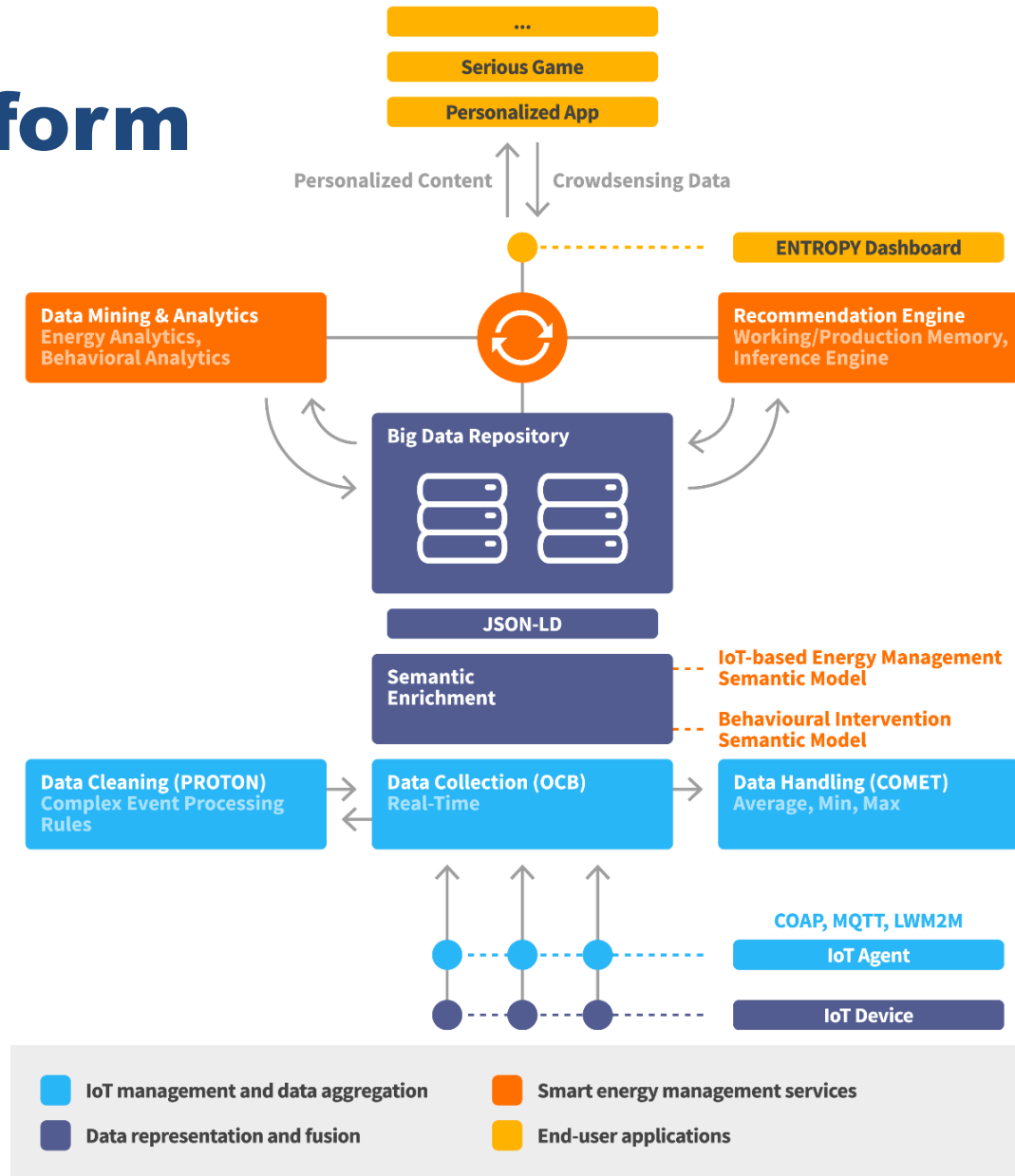
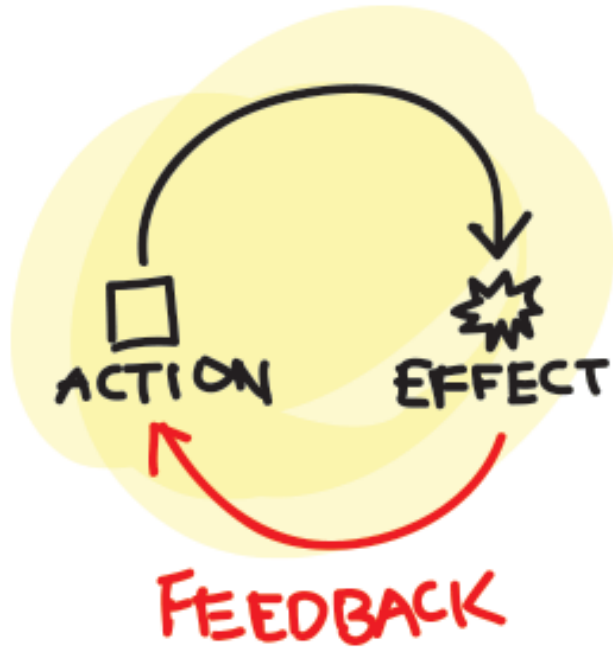


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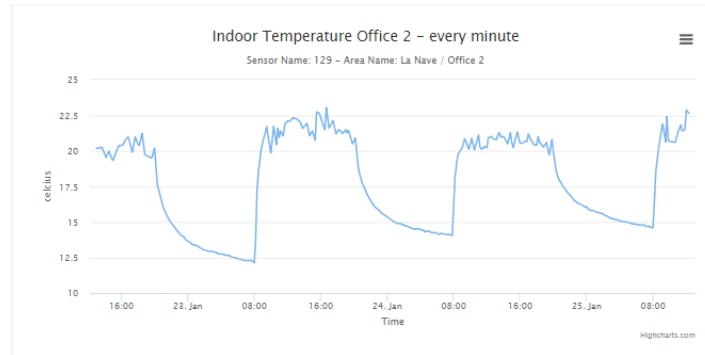


ENTROPY Platform

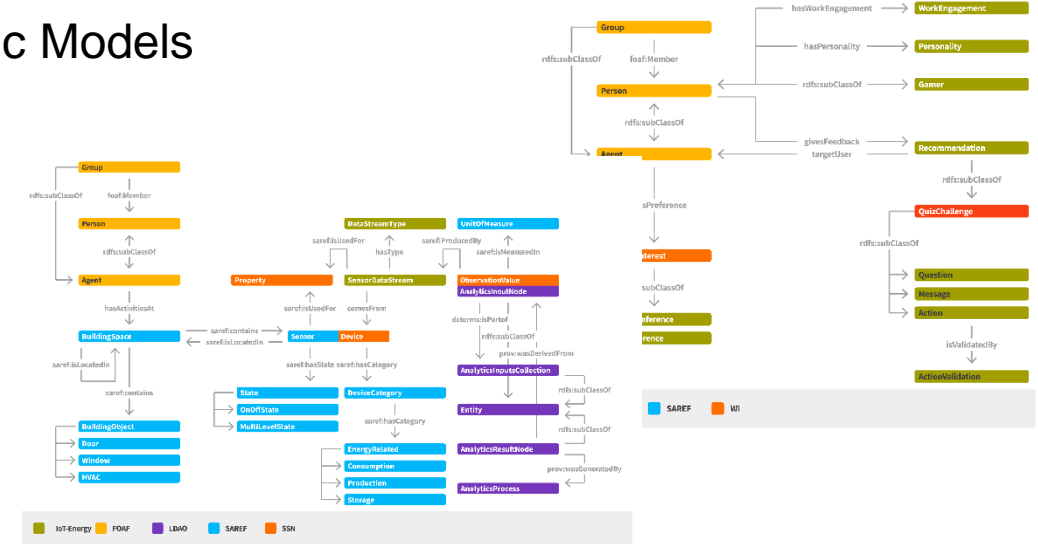


IoT Data Collection and Management

FIWARE Components



Semantic Models



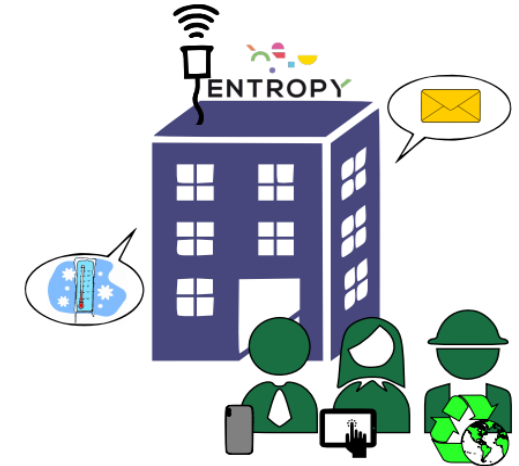
Homogenous data
Ease interlinking (JSON-LD)
Common access to data



Regular behavior
Regular perception

Estimated energy consumption
through predictive models

VS

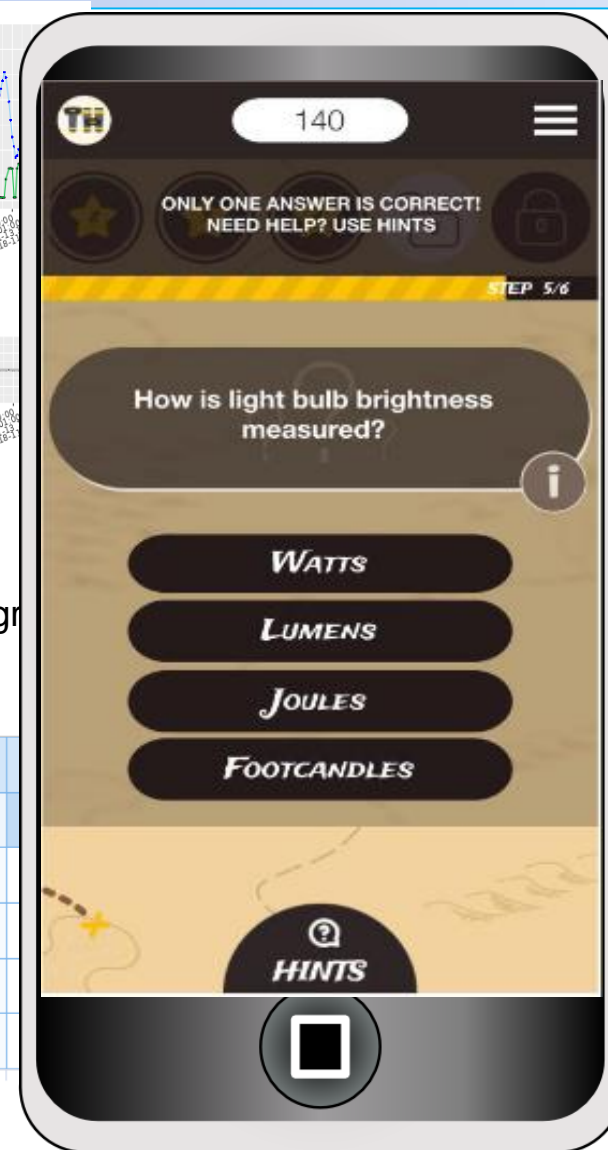
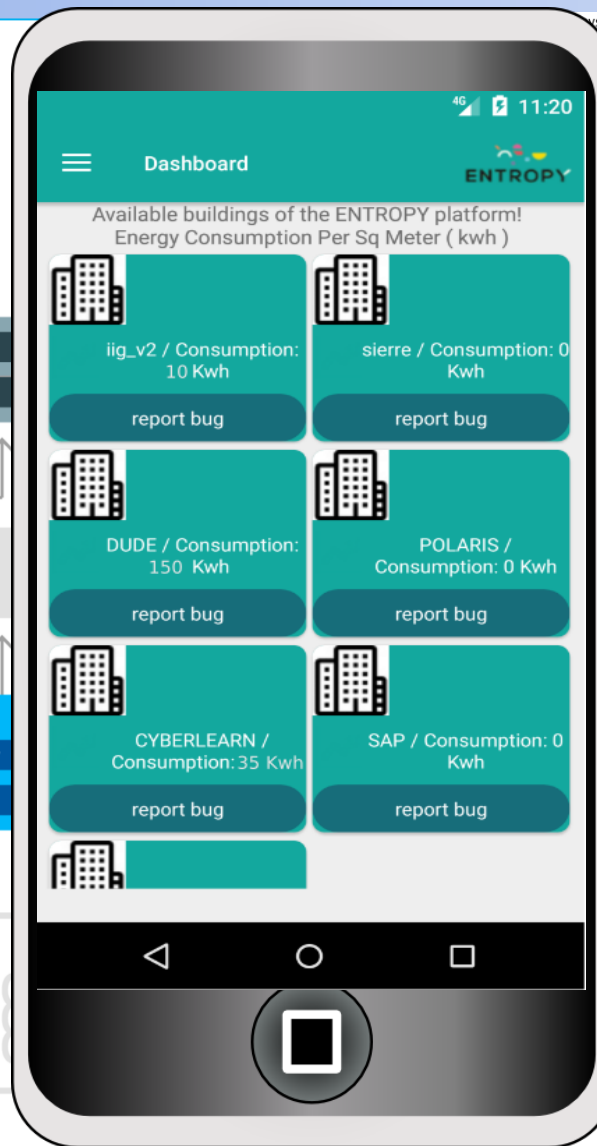
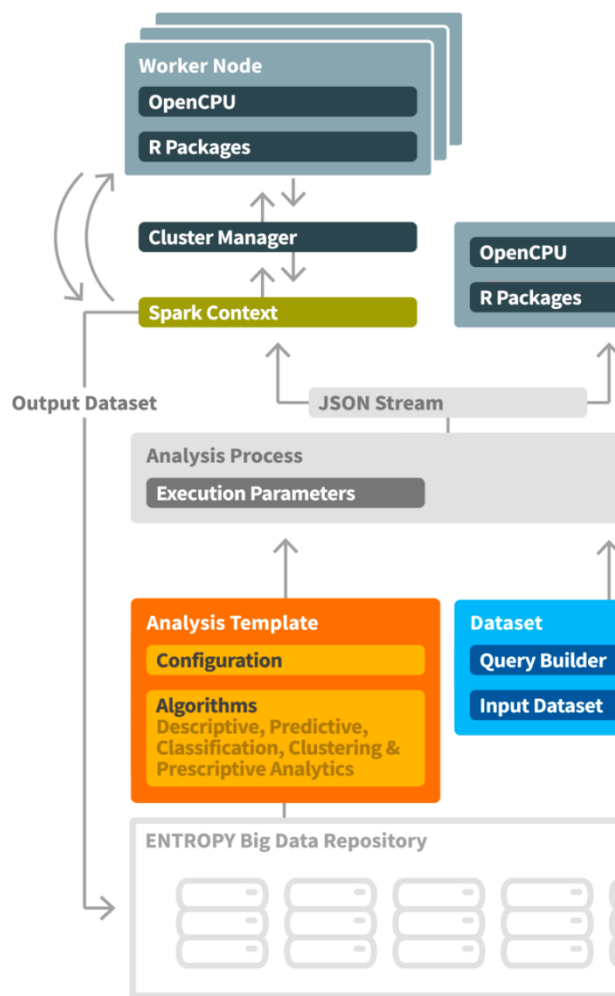


Change of behavior
Change of perception

Energy consumption under
ENTROPY conditions

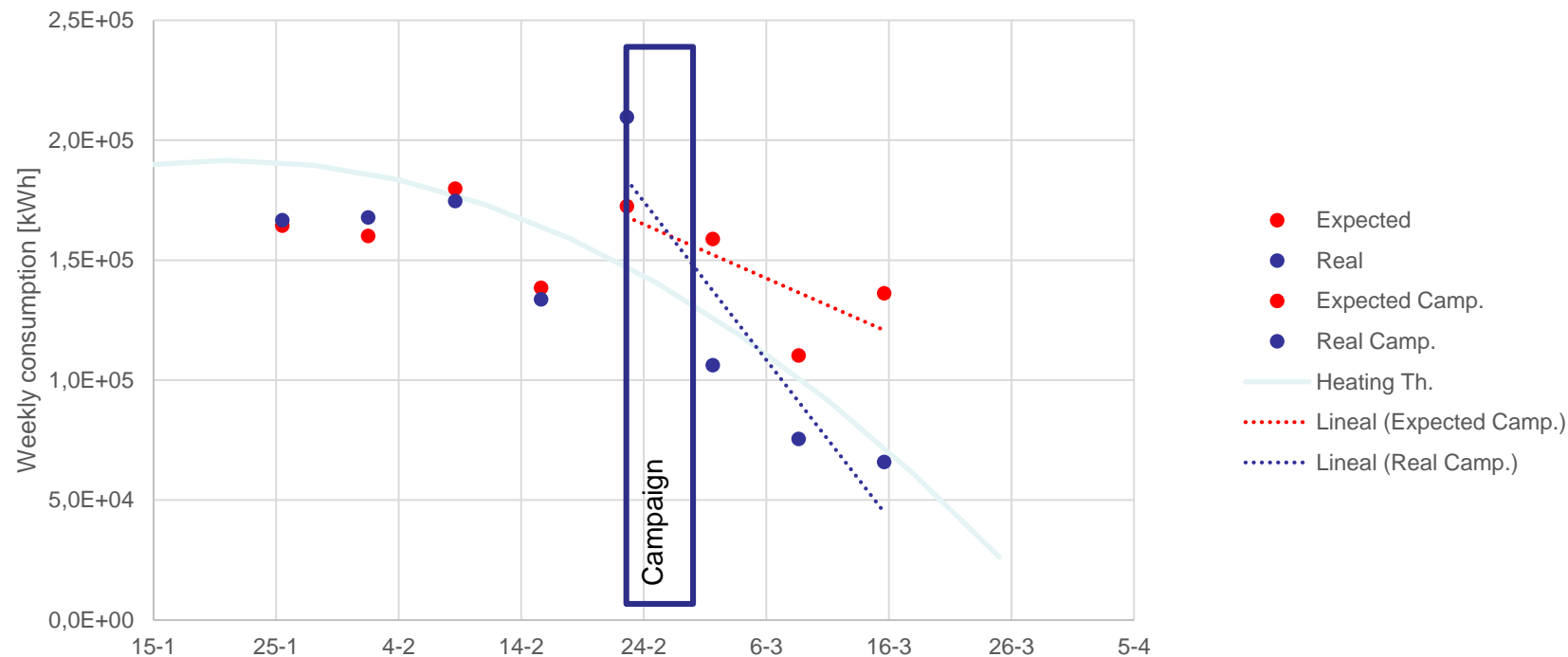
VS

Energy and Behavioral Data Analytics



Heatmap with behavioral characteristics

Educated behavior brings energy savings



Example of the results on one of ENTROPY Pilot where a 20.8% saving was induced thanks to feedback compared to the forecasted consumption in BaU



What we are going to do

Project in a nutshell

Adapt-&-Play Holistic cOst-Effective and user-frieNdly Innovations with high replicability to upgrade smartness of eXisting buildings with legacy equipment

Vision: PHOENIX aims at changing the role of buildings from unorganised energy consumers to active agents orchestrating and optimising their energy consumption, production and storage, with the goal of increasing energy performance, maximising occupants' benefit, and facilitating grid operation.

Mission: PHOENIX will provide a portfolio of ICT solutions to increase the smartness of legacy systems and appliances in existing buildings which will increase the SRI and energy efficiency. These improvements will translate in human-centric new services for building users and an improvement on both execution of grid operations and data sharing.



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Mission: PHOENIX will provide a portfolio of ICT solutions to increase the smartness of legacy systems and appliances in existing buildings which will increase the SRI and energy efficiency. These improvements will translate in human-centric new services for building users and an improvement on both execution of grid operations and data sharing.

KO1: Allow Adapt-&-Play seamless integration of domestic appliances, legacy equipment and building systems

KO2: Create building knowledge with innovative techniques to upgrade the smartness of existing buildings

KO3: Enable real-time communication with energy stakeholders to optimise the grid operation.

KO4: Provide cost-effective services for building end-users to maximize the energy efficiency and overall performance.

KO5: Allow security and privacy of building data regarding the revised EPBD and the GDPR law

KO6: Create suitable business models and exploitation strategies to target the broad market of smart building

KO7: Develop human-centric approach and training/awareness activities to prepare citizens for smart buildings

This means:

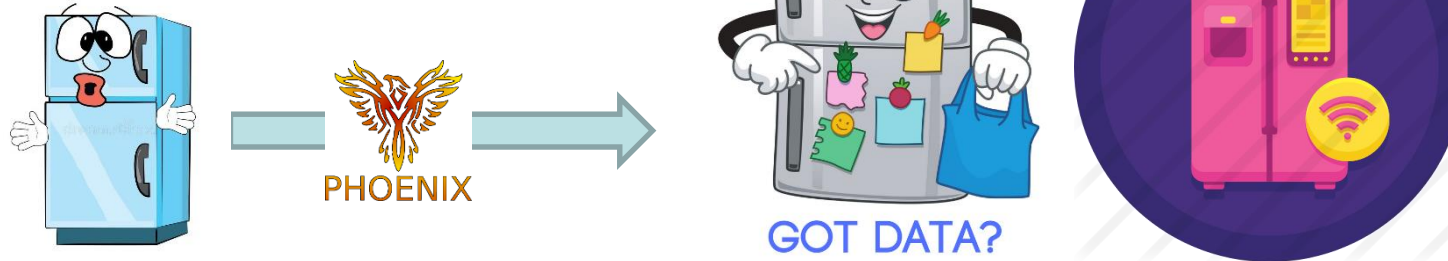
- We need the software, the platform, and the connection means
- We need the hardware
- We need to apply it all to pilots
- And we need to draw conclusions (with good results)

Technical approach

Project in a nutshell

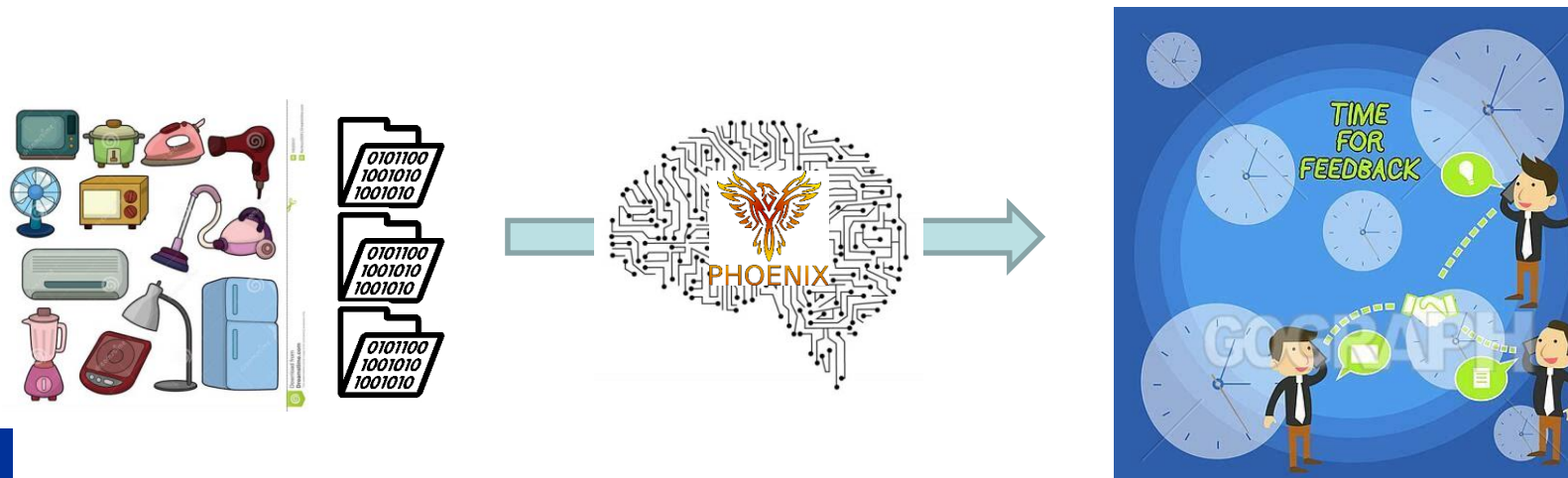
KO1: Allow Adapt-&-Play seamless integration of domestic appliances, legacy equipment and building systems

Objective 1: The concept of Adapt&Play



KO2: Create building knowledge with innovative techniques to upgrade the smartness of existing buildings

Objective 2: The concept of The Building Smartness-Hub



Objective 3: Creating a lingua franca



KO3: Enable real-time communication with energy stakeholders to optimise the grid operation.

Objective 4: Developing the tools for people that will help us using less energy and improve wellbeing



KO4: Provide cost-effective services for building end-users to maximize the energy efficiency and overall performance.

Objective 5: Ensuring that more connectivity does not imply more vulnerability

KO5: Allow security and privacy of building data regarding the revised EPBD and the GDPR law



Objective 6: The best way of elongating PHOENIX shadow in the future is teaching it how to fly solo

KO6: Create suitable business models and exploitation strategies to target the broad market of smart building



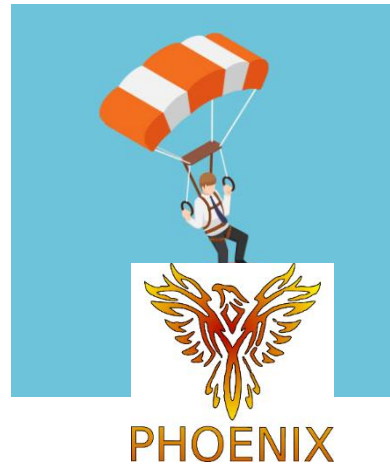


Technical approach

Project in a nutshell

Objective 7: PHOENIX will only work, if people understand it the concept of soft-landing

KO7: Develop human-centric approach and training/awareness activities to prepare citizens for smart buildings



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Some Research Lines followed

IoT gateways for the integration of equipment and Human-machine-interactions

Use of automatic semantic labelling, open APIs, Human-Building interaction technologies.

Data Analytics and artificial intelligence

Algorithms tailored for Energy Efficiency of Buildings, development of a Building Smartness Hub, smart Energy Efficiency Service.

Security Privacy and Trust

Solutions such as authN/authZ, Fi-Ware Security Enablers, block chain-based Distributed Ledger Technology Control DCapBAC), XACML authorization framework.

Stakeholders engagement co-creation and new business models

Novel smart-services from a data driven economy, Co-creation and co-decision processes in development.

Building occupants' behavioural change

Behavioural change, Ajzen theory of planned behaviour and the development of soft-landing for smart buildings, and smart services.

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5 Pilots realization

Project in a nutshell

PoC Pilot Case – UMU



Pilot Case – ARDEN



(a)



(b)

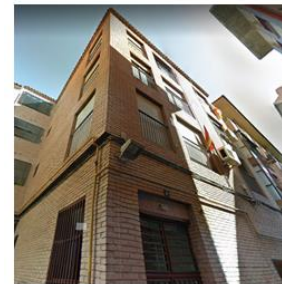
Pilot Case - KaMa



Pilot Case - MIWENERGIA



Pilot Case - LTU

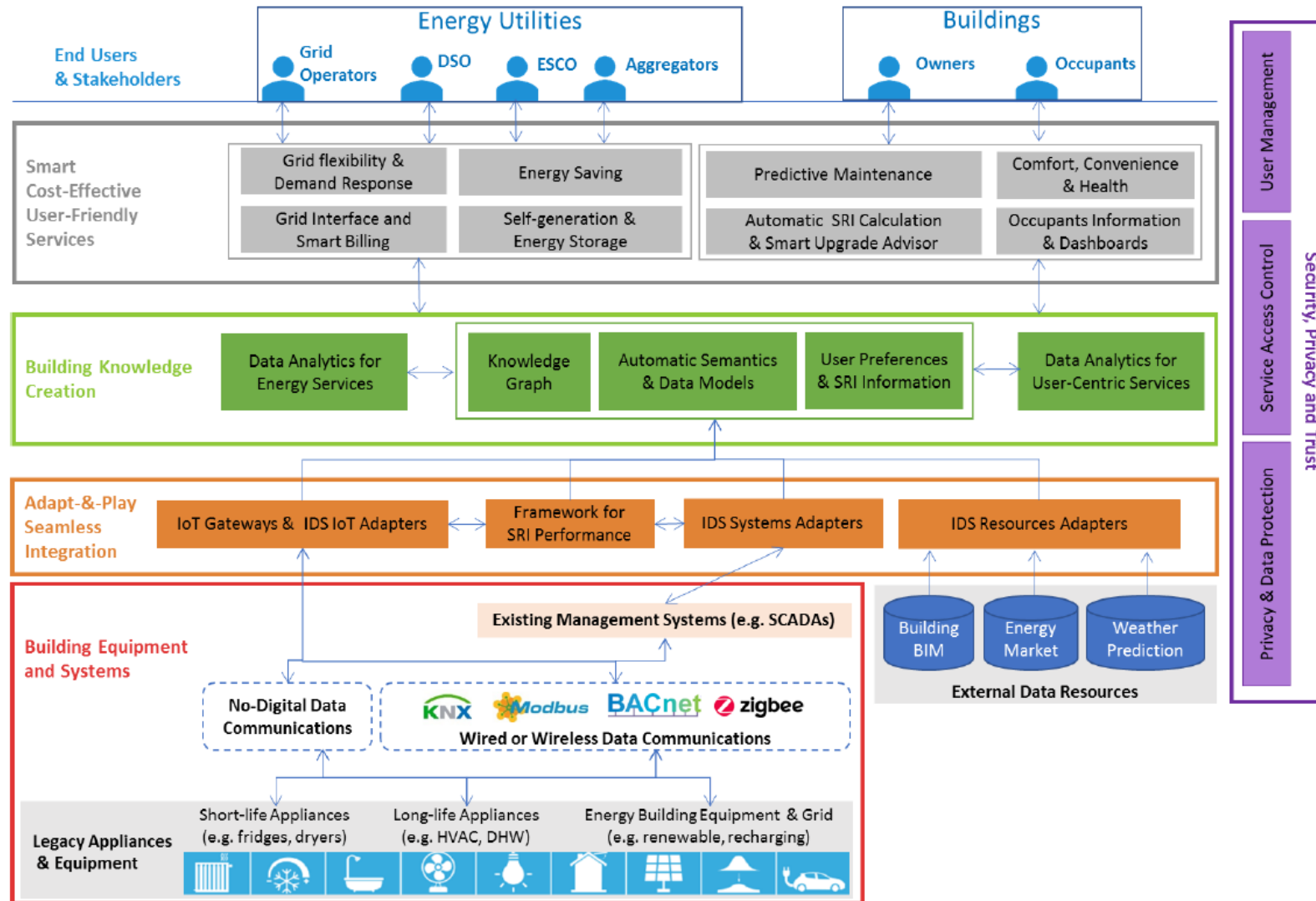


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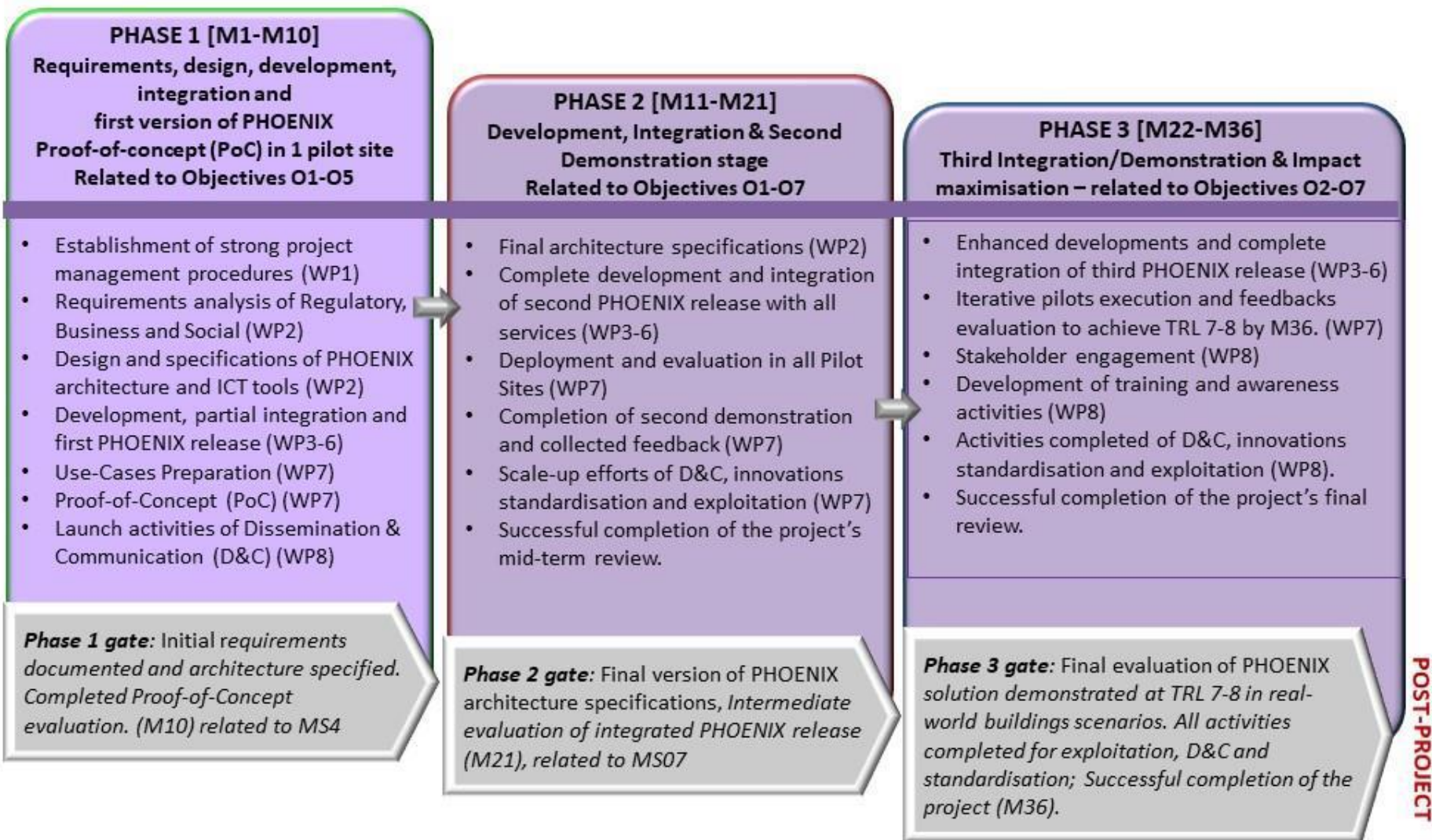
Project ICT Architecture, the skeleton of the project

Project in a nutshell

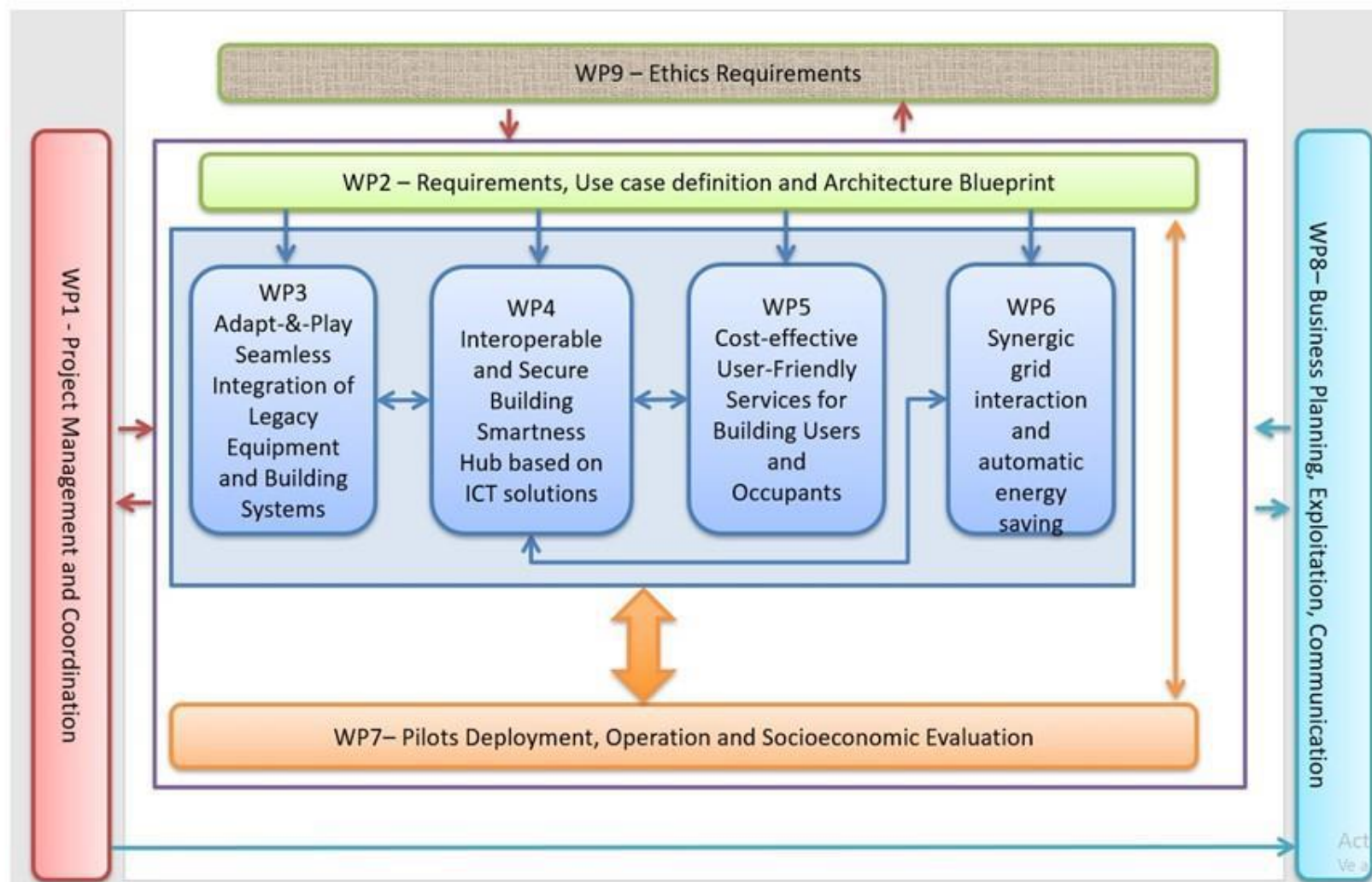


How we are going to do it

Project in a nutshell



Work Breakdown Structure of the project



Summary

- The **end user/customer in the loop** to take into account needs → behavior analysis and integration in the energy consumption predictions
- The platforms need to link through each other through **interoperable and modular interfaces** → Interoperability like NGSI-LD in Smart Platform
- Important the capability of **prediction/forecast, data analytics and behavioral patterns** discovery → Big Data
- **Authorised Data access:** personal data remains under the control of their respective owners and is available to community or to third parties on demand → User centric data management and privacy preserving
- **Trusted** source of data and ML mechanism for monitoring and pruning abnormal data. DTL could be interesting but not necessary the best option always



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