Enabling seamless integration of Copernicus and in-situ data

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BUILDSPACE

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Motivation

- **BUILDSPACE** project aims to couple **terrestrial building data** with **aerial imaging** from drones equipped with thermal cameras and **location data** from satellite services to support informed decision-making toward energy-efficient buildings and climate-resilient cities
- **Diverse data types** from various sources, including **IoT devices, satellite imagery, and building information models** are needed to ensure comprehensive **insights** and enable **holistic analysis**
- **Collaboration among organizations is essential** for addressing complex urban challenges and maximizing the impact of initiatives like BUILDSPACE
- **Fast speeds** in managing files **enhance operational efficiency**, enabling stakeholders to access and exchange information without delays

Approach

- Deployment of Core Platform in a **Kubernetes cluster** for data **upload, download, and sharing**, with a backbone component being a **REST API**
- The REST API will be **consumed by the BUILDSPACE services** and a User Interface to facilitate data management
- Implementation of user authentication using **OpenID Connect (OIDC)**, ensuring **secure access** to the platform and **group authorization**, allowing users within the same organization to access shared data
- **Data stored** in an **S3-compatible file system** for efficient storage, split into blobs ensuring the platform's type-agnosticism
- **Meta data** of files stored in a **NoSQL database** to facilitate efficient data management and retrieval.
- Implementation of a **sharing functionality** that allows data owners to **specify sharing terms and conditions**
- **Implementation of folder logic** to assist in organizing, managing, and sharing data within the BUILDSPACE ecosystem
- **Integration of 3 Copernicus APIs** under a single endpoint to provide users with access to Copernicus data

Key Points and Summary Figure

- **Scalability**: Deployed on Kubernetes cluster, designed to handle large volumes of data and user requests.
- **Enhanced Security**: Utilizes secure authentication mechanisms and granular sharing controls to protect sensitive data.
- **Seamless Integration**: Integrates with Copernicus APIs and other external services, providing users with access to a wide range of data sources.
- **Flexibility**: Supports diverse data formats
- Collaboration: Facilitated among organizations through seamless data sharing and access controls.
- **Efficient Data Handling**: Implements efficient data storage and management techniques to ensure optimal performance and resource management
- **Accelerated Data Operations**: The split of data into blobs enables HTTP parallelization, allowing for the simultaneous retrieval of data segments
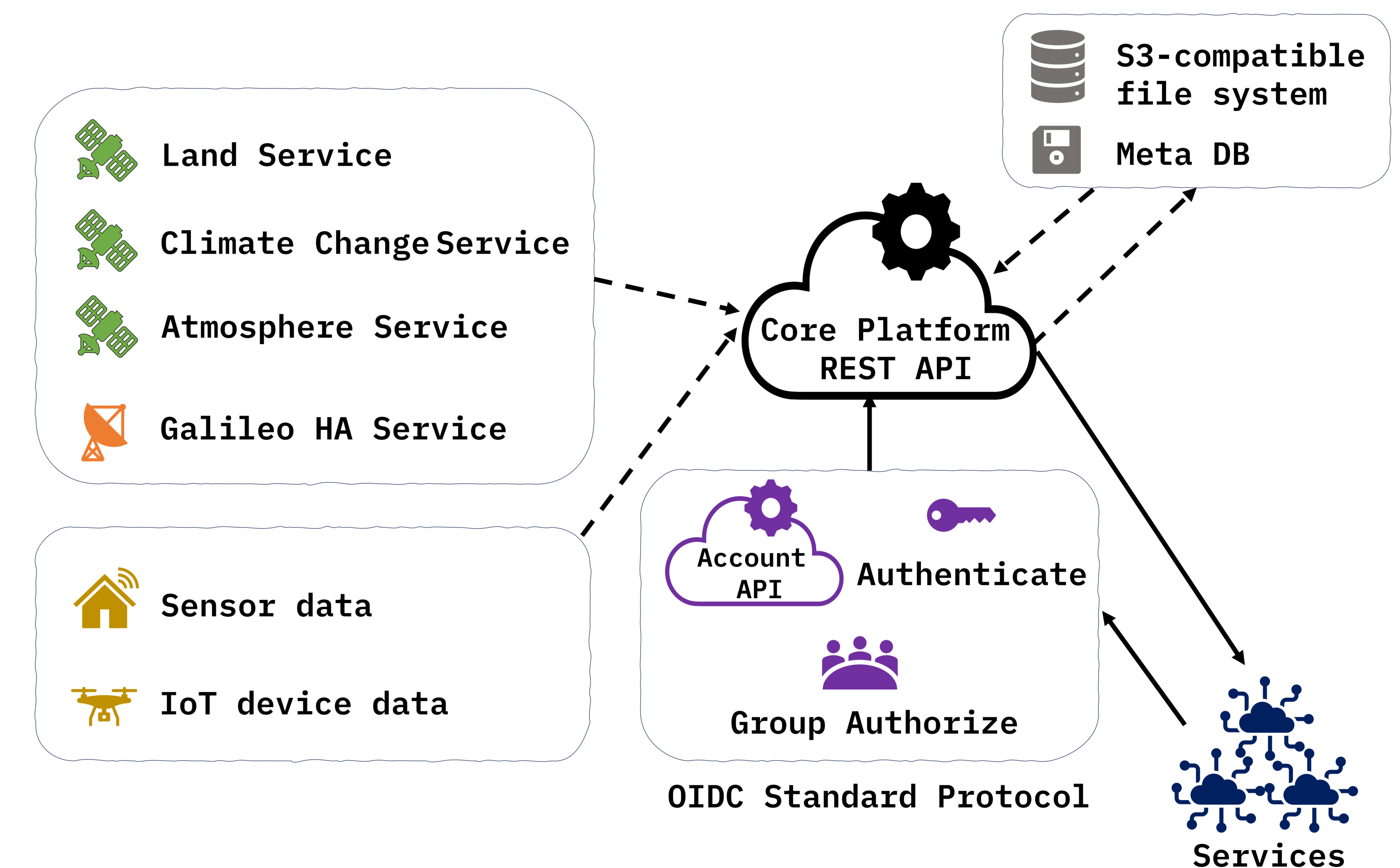

Fig. 1 High level architecture of the core platform

Conclusions & Future Work

- **Testing** of the core platform functionalities in the context of the **pilot cases** in the BUILDSPACE project
- **Frontend development** to provide a catalogue of data resources
- Further **fine-tune** the platform to **support more data sources & data operations**