This project designs and implements an SOA-powered infrastructure to support software defined Internet of Things as a service. A cloud-based prototyping system has been established as a proof of concept to support smart community.

The concept of a Software Defined Thing applies the actor theory to model IoT networks centered around autonomic units to provide scalable and context-aware sensor data and services.

A web portal allows users to create and manage abstract sensors that may encompass a hierarchy of physical devices. Data visualization tools are developed, allowing users to select sensor readings and visualize the data in a preferred manner.

The back-end of the sensor data service platform is Java-based on top of the Play framework. It contains the core logic of platform back-end and communicates with SAP’s in-memory database, HANA. The platform favors IoT data accumulation, discovery, federation, and management.

The programmable interfaces are provided for developers to add, remove, modify and query IoT data, which may be dynamically generated from persistent sensor data. RESTful APIs are provided to interact with HANA database.

SDT tool enables users to build customizable/personalizable IoTs which may involve multiple physical IoTs in the real world. Users can then combine these virtual sensors to create their own virtual sensors, providing a flexible scheme that can adapt to many different users’ needs.

Our platform provides sensor data as a service, to allow users to discover reusable data and data analysis tools, and to integrate them into value-added workflows. Our work contributes to an open community to support small research groups and individuals to contribute and share data sources and data services.