Virtual Sensors Editor: A scalable tool to visually aggregate physical sensors with user-defined dataflow logic into virtual sensors. It supports real-time and historical display of sensor values for both physical and virtual sensors. It is cross-platform and customizable, and provides verifiable sensor data service composability.

**Physical Devices**
- Collect physical sensor data and react with the real world
- A bridge between virtual space and physical reality

**Sensor Data Service Platform (SDSP)**
- A Web 2.0 platform to provide sensor data as a service
- Allow users to discover reusable data and data analysis tools, and to integrate them into value-added workflows through REST service calls

**Action Device**
- Respond to virtual sensors with human sensible effects, e.g., a siren
- Drive NEST thermostat by virtual sensors. e.g., the temperature can be set remotely according to the logic of a virtual sensor

**Virtual Sensor Directory**
- Virtual sensor is provided as a service for other applications through a REST API
- Repository of reusable services

**Physical World**
- A Web 2.0 platform to provide sensor data as a service
- Allow users to discover reusable data and data analysis tools, and to integrate them into value-added workflows through REST service calls

**Virtual Sensor Cycle**
- A Web 2.0 platform to provide sensor data as a service
- Allow users to discover reusable data and data analysis tools, and to integrate them into value-added workflows through REST service calls

**Recursively composition**
- A Web 2.0 platform to provide sensor data as a service
- Allow users to discover reusable data and data analysis tools, and to integrate them into value-added workflows through REST service calls

**Case study**
NASA Sustainability Base Smart Building Monitoring and Management

**Composability**
To select and assemble physical or virtual sensors as components: \( vs = < f, i, \vec{a}, \vec{m} > \)

**Embedded workflow**
A computable partial function: \( f : X \rightarrow Y \) where \( (\vec{m}_n, \vec{a}_n) = f((\vec{m}_{n-1}, \vec{a}_{n-1})) \), \( n \geq 0 \)

**Workflow Composition**
Given two workflows \( f : A \rightarrow B \) and \( g : C \rightarrow D \). The composition \( h = f \circ g \) exists iff \( f(A) \subseteq C \) and \( h(x) = f(g(x)) = f(g(x)) \).