TITLE: Connected Systems Standards Working Group Charter

Author Name (s): Christopher Tucker, Mike Botts, Alex Robin, Scott Simmons

DATE: October 3, 2022

To: OGC members & interested parties

A re-charter of an OGC Standards Working Group (SWG) is being performed. The OGC members listed below have proposed the OGC Connected Systems SWG as a re-charter of the SensorML SWG.  The SWG proposal provided in this document meets the requirements of the OGC Technical Committee (TC) Policies and Procedures.

The SWG name, statement of purpose, scope, list of deliverables, audience, and language specified in the proposal will constitute the SWG's official charter. Technical discussions may occur no sooner than the SWG's first meeting.

This SWG will operate under the OGC IPR Policy. The eligibility requirements for becoming a participant in the SWG at the first meeting (see details below) are that:

* You must be an employee of an OGC member organization or an individual
member of OGC;
* The OGC member must have signed the OGC Membership agreement;
* You must notify the SWG chair of your intent to participate to the first meeting. Members may do so by logging onto the OGC Portal and navigating to the Observer page and clicking on the link for the SWG they wish to join and;
* You must attend meetings of the SWG. The first meeting of this SWG is at the time and date fixed below. Attendance may be by teleconference.

Of course, participants also may join the SWG at any time. The OGC and the SWG welcomes all interested parties.

Non-OGC members who wish to participate may contact us about joining the OGC. In addition, the public may access some of the resources maintained for each SWG: the SWG public description, the SWG Charter, Change Requests, and public comments, which will be linked from the SWG’s page.

Please feel free to forward this announcement to any other appropriate lists. The OGC is an open standards organization; we encourage your feedback.

# Purpose of the Connected Systems Standards Working Group

The Connected Systems SWG will focus on modernization of the SensorML and related Sensor Web Enablement (SWE) Standards, as an extension of the OGC API - Features specification, with an inclusive eye toward all manner of connected systems. This work will include the maintenance and update of SensorML, including development of additional encodings (e.g., JSON), adapting modern, RESTful approaches to SWE Standards (for discovery, tasking, observation access, processing, and portrayal), and integration of these updated Standards with OGC APIs.

# Business Value Proposition

The existing suite of OGC Sensor Web Standards have addressed important sectors of the geospatial marketplace for more than two decades. However, trends in Information Technology (IT) toward simple APIs and microservices will benefit from more agile standards for all manner of Connected Systems.

# Scope of Work

Historically, the OGC's Sensor Web Enablement initiative has developed a generic framework for delivering sensor data, dealing with remote-sensing, moving platforms, and in-situ monitoring and sensing. Parts of the OGC Sensor Web Enablement initiative (e.g., SensorML, SWE Common Data, etc.) focus on the interaction of sensors and actuators in the production of raw observation data. This related OGC Observations & Measurements efforts have been focusing on more ‘user centric’ use cases, targeting a higher-level semantic role for observations and observed properties related to monitoring the state of real-world features.

The Connected Systems API is intended to act as a bridge between static data (geographic and other domain features) and dynamic data (observations of these feature properties, and commands/actuations that change these feature properties). To this end, in addition to providing its own mechanism for retrieving static and dynamic data, the API will allow linking to other APIs from the OGC ecosystem, whenever it makes sense: Features, 3D GeoVolumes/3D Tiles, Coverages, EDR, Processes, SensorThings.

One entry point to the API will be the observing systems themselves (c.f. System, Sensor, Actuator, Platform, Sampler, Process objects based on SOSA/SSN model). These systems are the ones that observe and act on features of interest. A hierarchical description of these systems and their subcomponents is in scope. SensorML is intended to be the main system description format, with GeoJSON used for summary representations. O&M and SWE Common are intended to be used to describe observations and observation collections.

The second entry point will be the features of interest (i.e., the features being observed or acted upon, e.g., a building, a moving vehicle, the ocean, etc...). Simple representation of both proxy and domain/ultimate features of interest will be hosted by the API, with optional links pointing to the original feature repository containing the full description (e.g., a short summary of the observed building would be kept by the API and the full 3D data would be referenced on an external Features of GeoVolumes API for instance).

The Connected System SWG will collect all outstanding Change Request Proposals (CRPs) to legacy Sensor Web Enablement specifications, evaluate each of the proposals, and make edits to the standard based on CRPs (as issues in GitHub) and related decisions of the SWG membership. This will be done within the larger context of the OGC API strategic guidance from which all OGC SWGs are working, in harmonization with the OGC API-Features specification, and other related standards developments. The SWG, will ask the membership for any additional change requests that have not been previously submitted, including inputs from complementary/related SWGs. The final deliverable will be a revision of the candidate standard for consideration by the membership for adoption. Then, the SWG will focus on the review and alignment of the updated SWE specifications (in the form of a new draft Connected Systems APO) with other OGC and 3rd party standards and initiatives.

**SensorML update**

The Connected Systems SWG will undertake an update of the SensorML specification, including the needs of the Observations & Measurements (O&M) community and harmonization with the OGC API - Features, with a particular focus on a JSON encoding.

**SWE Common update**

The Connected Systems SWG will revise and curate definitions of data models commonly used by various connected systems, and ensure their codification within the OGC Definitions Server and other community resources. Further the Connected Systems SWG will formalize JSON best practices within SWE Common.

**SWE Services update**

The Connected Systems SWG will undertake an update of the OGC SWE services baseline, in accordance with OGC API strategic guidance for the evolution to RESTful services, without losing any backward compatibility with the underlying data models that support discovery, tasking, observation access, processing, and portrayal within the existing OGC SWE services.

**Connected Systems update**

The Connected Systems SWG will gather use cases of the APIs used with all manner of connected systems, including sensors (e.g., space-based, airborne, mobile, in situ and terrestrial remote – of all phenomenologies), control systems, devices, robots, and various platforms, whether manned, remotely piloted, or autonomous – in order to assure that the Connected Systems API is capable of supporting them.

## Statement of relationship of planned work to the current OGC standards baseline

The Connected Systems SWG will develop Standards that augment and replace the existing Sensor Web Enablement Standards published by OGC, including the following:

* SWE Common Data Model;
* SWE Service Model;
* Sensor Model Language (SensorML);
* Sensor Observation Service; and
* Sensor Planning Service.

Further, newer OGC Standards will be highly relevant to this SWG, and some level of alignment and harmonization with the OGC API suite of Standards will be sought, particularly with the Feature API.

Where necessary, the SWG may consider reference to foundational standards such as Observations & Measurements; Observations and Sampling; Semantic Sensor Network (SSN) Ontology; and Sensor, Observation, Sample and Actuator (SOSA) ontology.

## What is Out of Scope?

While the Connected Systems SWG may consider complementarities with the SensorThings API, it has no role in adjudicating SensorThings API CRPs, however the Connected Systems SWG would entertain change requests submitted by members of the SensorThings API SWG just as it would entertain change requests from all OGC members.

## Specific Contribution of Existing Work as a Starting Point

The Connected Systems SWG will begin with the consideration of the draft Connected Systems API specification, which is based on SensorML, O&M and SSN as complementary information models, and suggested updates amendments to related complementary specifications.

## Is this a persistent SWG?

X Yes No

## When can SWG be inactivated?

The Connected Systems SWG can be inactivated when the Standards managed by the SWG require no further update nor maintenance.

# Description of Deliverables

The deliverables for this SWG activity will include a new Connected Systems API, and complementary standards, definitions, information models, and best practices, that augment and replace the existing Sensor Web Enablement Standards published by OGC.

These will be made available for consideration at the December 2022 Members Meeting, with a goal of approving them by the June 2023 Members Meeting.

## Initial Deliverables

The initial standard(s) to be developed by the SWG include:

* An approved Connected Systems API 1.0.
* A JSON encoding for SensorML 2.0
* A curated collection of definitions of information models commonly used by various connected systems.
* JSON best practices within SWE Common.

## Additional SWG Tasks

To be completed as the SWG continues its operation.

# IPR Policy for this SWG

X RAND-Royalty Free. RAND for fee

# Anticipated Participants

Those involved in the design, development, implementation, or use of elements listed above in "Scope of the Work".  This includes search manufacturers, service providers, prospective users of various connected systems including sensors, devices, control systems, robots, and manned, remotely piloted, and autonomous platforms.

This is not meant as a limiting statement but instead is intended to provide guidance to interested potential participants as to whether they wish to participate in this SWG.

# Domain Working Group Endorsement

The Connected Systems SWG will work closely with the Autonomy, Sensors, Things, Robots, and Observations (ASTRO) DWG, the Aviation DWG, the Marine DWG, Citizen Science DWG, Defense and Intelligence (D&I) DWG, Emergency Disaster Management DWG, Energy and Utilities DWG, Geoscience DWG, Hydrology DWG, Meteorology and Oceanography DWG, Smart Cities DWG, Temporal DWG, Uninhabited Systems (UxS) DWG, and other related DWGs.

We will also maintain a relationship with the O&M SWG, since O&M is used as a core encoding within the draft Connected Systems API.

# Other Informative Remarks about this SWG

a. Similar or Applicable Standards Work (OGC and Elsewhere)
The following standards and projects may be relevant to the SWG's planned work, although none currently provide the functionality anticipated by this committee's deliverables:

OGC SensorThings API

OGC and Khronos Group glTF and 3DTiles

IETF HTTP and WebSockets

OASIS Message Queuing Telemetry Transport (MQTT)

W3C and OGC Semantic Sensor Network (SSN) Ontology

W3C Sensors, Observations, Samples and Actuations (SOSA)

Eclipse Ditto

Robot Operating System

MavLink

The SWG intends to seek and, if possible, maintain liaison with each of the organizations maintaining the above works.

b. Details of the First Meeting
The first meeting of the SWG will be held within four weeks of the approval of the SWG charter. Meeting details will be forwarded to the SWG email list and the Technical Committee.

c. Projected On-going Meeting Schedule
The work of the SWG will be carried out primarily by email and conference calls, possibly every two weeks, with face-to-face meetings perhaps at each of the OGC TC meetings.

d. Supporters of the Proposal (Charter Members)

The following people support this proposal and are committed to the Charter and projected meeting schedule. These members are known as SWG Founding or Charter members. The charter members agree to the SoW and IPR terms as defined in this charter. The charter members have voting rights beginning the day the SWG is officially formed. Charter Members are shown on the public SWG page. Extend the table as necessary.

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| --- | --- |
| Name | Organization |
| Tien-Yin (Jimmy) Chou | Feng Chia University, GIS Research Center |
| Patrick Cozzi | Cesium |
| Glenn Laughlin | Pelagis Data Solutions |
|  |  |

e. Convener(s)

Name of individual(s) who started the SWG process. Could be the lead for an RFC submission, an OGC staff person, or an individual who believes it is time for a revision to an adopted standard.

Christopher Tucker, GeoRobotix

Mike Botts, Botts Innovative Research

Alex Robin, GeoRobotix