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OGC TEMPORAL ABSTRACT SPECIFICATION

STANDARD

APPROVED

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PREFACE

Table 1

Open Geospatial Consortium
Submission Date: 2023-05-09
Approval Date: <yyyy-mm-dd>
Internal reference number of this OGC® document: 23-999r0
Category: OGC® Standards Working Group Charter
Authors: Charles Heazel (Heazeltech LLC)

Table 2

Temporal Abstract Specification

Table 3

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To: OGC members & interested parties

A new OGC Standards Working Group is being formed. The OGC members listed below have proposed the OGC Temporal Abstract Specification 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.



SECURITY CONSIDERATIONS

No security considerations have been made for this document.



1

NORMATIVE REFERENCES

There are no normative references in this document.



2

PURPOSE OF THE STANDARDS WORKING GROUP

PURPOSE OF THE STANDARDS WORKING GROUP

The current OGC Standards treat time as an after-thought. After all, buildings don't move and continents move very slowly. However, the adoption of Moving Features Standards by the geospatial community brings time to the forefront. The location of a Moving Feature is a unique event in space and time. Time is now part of the Feature Geometry. Temporal precision and accuracies of 1 millisecond and below are common. This SWG will revisit the existing ISO and OGC Standards with the intention of making time an integral part of Feature Geometry.

Once Features begin to move there is little to keep them Earth-bound. As a result, geospatial is moving off-planet. Investigations into the use of existing geospatial technologies on the Moon, Mars, and even interplanetary space were begun in Testbed 18 and will continue in Testbed 19. For this work to succeed, our concepts of space and time cannot be limited to terrestrial applications. Calendars for Lunar residents should not be based on Terrestrial astronomical phenomenon. Measurements of time must accomodate the vast distances and velocities encountered in interplanetary space. And all of this must cleanly integrate into a 4D spatial-temporal geometry.

This work will leverage the ISO TC211 Harmonized UML Model. The Harmonized model is a single conceptual model encompassing most of the ISO TC211 suite of standards. It provides a rigorous, accessible, and navigatable representation of those standards. The Temporal Abstract Specification will be based on an extension to this model. Thereby assuring that the Temporal Abstract Specification is complete, correct, and coherent.



3

BUSINESS VALUE PROPOSITION

Existing standards treat location and time as separate properties defined by different reference systems. This makes representations of Moving Features as trajectories in space and time difficult. Techniques must be developed to assure that the spatial and temporal properties are properly correlated. Furthermore, the use of different spatial and temporal reference systems restrict the analytics available. What is the distance between two events in spacetime? Integration of space and time into a single geometry greatly simplifies these tasks.

Expanding the scope of this geometry to non-Terrestrial applications broadens the market for many geospatial disciplines. Facilities planning, construction, maintenance, and disposition should not require different tools depending on where the facility will be located. Facilities management tools that work on the Earth should also work for Lunar and Martian facilities.

Moving Features that are not planet-bound face additional issues. Due to the distances and velocities involved, Special and General Relativity begin to have a noticeable effect. The mathematics for addressing relativistic effects are based on Minkowski spacetime. A 4D spatial-temporal reference system. Accommodation of Minkowski spacetime and similar 4D Coordinate Reference Systems is essential if OGC Standards are going to support this domain.



4

SCOPE OF WORK

This Standards Working Group will develop an Abstract Specification for Temporal data. It will seek to integrate coordinate reference systems (ISO 19111) and temporal reference systems (ISO 19108) in a single conceptual model. In the process it will also expand our concept of temporal data to better accommodate moving features and non-terrestrial environments.

This work is expected to inform further work on the W3C Temporal Ontology and updates to ISO 19108.

4.1. Statement of relationship of planned work to the current OGC Standards baseline

The Temporal Abstract Specification will integrate date and time into the foundational ISO and OGC standards related to Feature Geometry. Specifically:

- ISO 19107 – 4D spacetime geometries and how they impact existing 3D implementations
- ISO 19108 – Proposed changes and updates to the current version of ISO 19108 to accommodate new temporal requirements
- ISO 19111 – Modifications may be needed to fully integrate spatial and temporal reference systems into ISO 19111 conformant reference systems for spacetime.
- ISO 19141 – Enhance to take advantage of 4D spacetime geometries.
- W3C Time Ontology in OWL – A semantic representation of temporal concepts.

4.2. What is out of scope?

As an Abstract Specification this Standard will not address encodings or specific representations of temporal concepts.

4.3. Specific existing work used as starting point

OGC Testbed 18 explored the question of “Can we use existing geospatial standards and technology for non-Terrestrial applications?”

Some Observations:

1. Many temporal reference systems are not coordinate reference systems
2. There is no temporal equivalent to the Compound Reference System
3. DateTime should be represented as a compound reference system consisting of a TM_Calendar and TM_Clock reference system.
4. TM_Calendar should be a type of TM_OrdinalReferenceSystem.
5. TM_Clock should not be defined in terms of a “day”. Many clocks count elapsed time since an epoch. Date and time are not considered.
6. TM_Clock should be a type of TM_CoordinateSystem
7. TM_Calendar can be defined as a Compound Reference System composed of days, months, and years. This would allow to define meaningful calendars for the Moon, Mars, and other non-Terrestrial environments.
8. Is there an ordinal equivalent to TM_Clock. Sunrise, noon, sunset, and midnight?
9. Can a calendar be defined in terms of planting season, Saints days, or other arbitrary events?

4.4. Is this a persistent SWG

☐ YES

☒ NO

4.5. When can the SWG be inactivated

The Temporal Abstract Specification SWG is not a persistent SWG. It may be deactivated once the deliverables have been delivered and accepted by the OGC membership as OGC Standards.

This charter may be extended beyond that point if coordination with efforts such as those described in section 8.2 are still under way.



5

DESCRIPTION OF DELIVERABLES

DESCRIPTION OF DELIVERABLES

There shall be two deliverables:

- an OGC Temporal Abstract Specification how much of a description do we need here?
- an OGC Temporal Abstract Specification Ontology how much of a description do we need here?
- an optional OGC Temporal Abstract Specification Users Guide how much of a description do we need here?

5.1. Initial deliverables

5.2. Additional SWG tasks



6

IPR POLICY FOR THIS SWG

☒ RAND-Royalty Free

☐ RAND for fee



7

ANTICIPATED AUDIENCE / PARTICIPANTS



ANTICIPATED AUDIENCE / PARTICIPANTS



8

DOMAIN WORKING GROUP ENDORSEMENT

The Temporal Abstract Specification SWG was created by and endorsed by the Temporal Domain Working Group.



9

OTHER INFORMATIVE INFORMATION ABOUT THE WORK OF THIS SWG

OTHER INFORMATIVE INFORMATION ABOUT THE WORK OF THIS SWG

9.1. Collaboration

The Temporal Abstract Specification SWG will perform its work in public in a GitHub repository operated by OGC and managed by the Temporal Abstract Specification SWG chairs.

9.2. 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:

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

9.3. Details of first meeting

The first meeting of the SWG will be held by telephone conference call at 10AM EDT on 1 October 2007. Call-in information will be provided to the SWG's e-mail list and on the portal calendar in advance of the meeting.

9.4. 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.

9.5. Supporters of this Charter

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.

Table 4

Name	Organization
Charles Heazel	Heazeltech LLC

9.6. Conveners

Charles Heazel