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Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 20525

Tourism and related services — Semantics applied to tourism destinations

Tourisme et services connexes — Sémantique appliquée aux destinations touristiques

ICS: 03.200.01; 35.240.30

ISO/TC 228

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organisations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardisation.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by the Technical Committee ISO/TC 228, *Tourism and related services*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Tourist destinations are taking up the challenge of digital transition, a necessary condition for the sustainability and competitiveness of this strategic sector. Thanks to technology, destinations have the ability to influence tourists' behaviour to improve their experience, enhance their satisfaction and increase tourist expenditure. And one of the key elements that helps to achieve this goal is providing relevant and customised information to the tourist, before, during and after his stay at the destination.

The tourism activity is intensive both in the generation and in the use of data, and information plays an important role in the decision-making process for the tourist, the destination manager and the business sector. With this constant information flow between machines and people, there is a need to standardise a common language in the tourism field so that both can understand each other.

Machines, with their high processing capacity, allow complex processes operations and can offer information in real time both to the destination and the tourist. For the destination, this means the ability to anticipate and manage different scenarios, for example to adjust public services to the actual volume of people. For the tourists, the machines act as an interface of the destination and an agile facilitator of information, aligned with the tourist's preferences. Machines process information and lines of code with instructions.

Semantics endows an object with machine-interpretable meaning, with additional information that can be understood by a computer, facilitating communication between humans and machines and between machines. The machines need to acquire a sufficiently high level of comprehension to be able to interact with the tourist, who is connected through different channels (web, app, chatbot, etc.), delivering throughout the trip cycle, updated digital content in a flexible, adapted, precise and agile way. In short, the document seeks to provide machines with the context they need for human/machine and machine/machine interaction to be as efficient as possible.

The process of smart transformation of a tourist destination shares many aspects with that of smart cities and territories. However, destinations have to cater to a group not foreseen by the city, tourists and visitors, with specific needs for information (content) and services. Therefore, the implementation of this document by the whole tourism ecosystem of these destinations that aspire to become smart, focuses on laying the foundations of the semantics to be used in relation to how tourist information should be structured and transmitted in the different channels used by tourists and visitors and does not intend to define how it should be generated, stored or processed. Furthermore, it will allow sharing a common data structure that will ensure interoperability amongst tourism and city platforms managed by different stakeholders.

Tourism and related services — Semantics applied to tourism destinations

1 Scope

This document defines a semantic base that allows representing relevant information related to tourist destinations (resources and services within the destination, travel experiences, and the destination itself), ensuring the interoperability of local, territorial and country tourism IT platforms with third-party digital systems.

This document provides tourist destinations with semantic data structures that primarily benefit final users (i.e. tourists), as these structures allow destinations to provide access to relevant information in an intuitive and agile way and improve the interaction between tourists and the systems that manage, publish, carry transactions and accompany them. Furthermore, destination managers and data publishers, who will be in charge of applying this document, will also benefit from such implementation, thus being of interest to the whole tourism industry.

Ultimately, this document establishes the vocabulary, the hierarchy, and the minimum properties and relationships required for the definition of a reference semantic structure at international scale in favour of the interoperability of systems and the improvement of the accuracy of recommendations to tourists.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 639, *Code for individual languages and language groups*

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country code*

ISO 4217, *Codes for the representation of currencies*

ISO 8601-2, *Date and time — Representations for information interchange — Part 2: Extensions*

ISO/DIS 18513:2021, *Tourism services — Hotels and other types of tourism accommodation — Vocabulary*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 semantics

information that defines the meaning rather than the physical representation of data. Semantics potentially cover a very large *domain* (3.2), from the simple domain, such as the units of one data *entity* (3.5), to a more complex one, such as the *relationship* (3.4) between one data entity and another

[SOURCE: ISO 21961:2003, 017]

3.2

domain

subject field, sphere of knowledge or activity having its own specialized culture, social context, and linguistic characteristics

[SOURCE: ISO 17100:2015, 2.3.10]

3.3

ontology

logical structure of the terms used to describe a domain of knowledge, including both the definitions of the applicable terms and their *relationships* (3.4)

[SOURCE: ISO/IEC/IEEE 24641:2023, 3.1.23]

3.4

relationship

perceived association among objects, *entities* (3.5), among *attributes* (3.7)

Note 1 to entry: A relationship itself may be considered an object, entity, or property.

[SOURCE: ISO/IEC 20944-1:2013, 3.14.2.6]

3.5

entity

semantic/pragmatic unit referenced in discourse, including circumstances, and objects

Note 1 to entry: An entity is represented by a node in a content structure.

3.6

instance

named value

[SOURCE: ISO 10303-11:2004, 3.3.10]

3.7

attribute

inherent property or characteristic of an *entity* (3.5) that can be distinguished quantitatively or qualitatively by human or automated means

Note 1 to entry: This document will call “property” what in this definition is an attribute in line with *schema.org* (3.17).

[SOURCE: ISO/IEC 25000:2014, 4.1]

3.8

multiplicity

when referring to *classes* (3.9), an indication of the range of allowable *instances* (3.6) of an object or an *attribute* (3.7)

[SOURCE: ISO/IEC 14776-261:2012, 3.1.116]

3.9

type

class

set of *entities* (3.5) that share the same characteristics

Note 1 to entry: The characteristics can be embodied by the use of properties, operations, methods, *relationships* (3.4), *semantics* (3.1), etc.

Note 2 to entry: This document uses “type” in line with *schema.org* (3.17).

3.10

subtype

subclass

type (3.9) that inherits *attributes* (3.7), operations, methods, *relationships* (3.4) and *semantics* (3.1) from another type, with some restrictions or extensions

Note 1 to entry: This document uses “subtype” in line with *schema.org* (3.17).

[SOURCE: ISO 28258:2013, 3.32]

3.11

type hierarchy

partial order over a set of types

[SOURCE: ISO 24610-2:2011, 3.2.6]

3.12

serialization

process of translating data structures or object states into a format that can be stored or transmitted and reconstructed later

[SOURCE: ISO/TS 23494-1:2023, 3.16]

3.13

JavaScript Object Notation (JSON)

open and text-based exchange format

Note 1 to entry: Data transmitted in JSON formats make it easy to read and write (for humans), parse and generate (for computers).

[SOURCE: ISO/TS 23029:2020, 3.3]

3.14

JSON-LD

lightweight format for serializing *linked data* (3.15), based on *JSON* (3.13), that inherits its human readability, and it is widely used to transmit data encoded with the *schema.org* (3.17) vocabulary

3.15

linked data

data related to other semantically defined data and which are identified and represented on the web

3.16

namespace

common URI prefix or stem used in identifiers for a set of related resources

[SOURCE: ISO 19150-2:2015, 4.1.26]

3.17

schema.org

global vocabulary managed by an open working group with the mission to create, maintain and promote structured data schemas on the Internet, especially for websites and emails

Note 1 to entry: It is supported by some of the major Internet search engines, which seek to unify the way they tag and enrich the information in web content in order to index and classify it more efficiently, thereby improving the experience of their users.

3.18

extensible markup language (XML)

schema that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable

[SOURCE: ISO 29404:2015, 3.28]

3.19**RDF**

framework for constructing logical languages that can work together in the Semantic Web. A way of using XML for data rather than just documents

[SOURCE: ISO 5127:2017, 3.1.13.23]

3.20**semantic web**

version of the internet following Web 2.0 which rather than simply connecting internet addresses and data in their formal form additionally does effect data linking through and in favour of their semantic content or meaning, thus providing enriched and enlarged information answering requests

[SOURCE: ISO 5127:2017, 3.1.9.06]

3.21**microdata**

format for encoding structured data within HTML code, embedded in websites and emails

3.22**OpenAPI 3**

standard defined in the framework of the OpenAPI Initiative open project whose goal is to create a neutral Standard for REST APIs that is open, independent of any programming language and portable, allowing an information consumer to easily understand and effectively interact with the remote system supplying it, with a minimal implementation logic effort

Note 1 to entry: OpenAPI documents are represented in *JSON* (3.13) or *YAML* formats and can be consulted in the following links: <https://www.openapis.org/> and <https://github.com/OAI/OpenAPI-Specification>

3.23**XSD**

World Wide Web Consortium (W3C) recommendation that specifies how to formally describe the elements in an *extensible markup language (XML)* (3.18) document

[SOURCE: ISO/TS 17451-2:2017, 3.6]

3.24**data manager**

person or entity who establishes plans for data quality improvement in an organization, grants data administrators the authority to trace and correct data over the information systems or organization, and maintains data consistency in individual information systems through the organization-wide data architecture

[SOURCE: ISO 8000-2:2022, 3.14.5]

3.25**Application Programming Interface (API)**

collection of invocation methods and associated parameters used by one piece of software to request actions from another piece of software

[SOURCE: ISO/IEC 18012-1:2004, 3.1.1]

3.26**REST API (Application Programming Interface – REpresentational State Transfer)**

program invocation convention for using Web systems from outside, developed in accordance with the architectural style called REST

Note 1 to entry: Resource operations are designated by HTTP sources. Results are sent back in *XML* (3.18), *JSON* (3.13) and other formats.

[SOURCE: ISO 19847:2018, 3.27]

3.27**interoperability**

ability of two or more systems or applications to exchange information and to use the information that has been exchanged

[SOURCE: IEEE Standard Computer Dictionary]

3.28**competency questions**

natural language questions that define the scope and rationale of an ontology

4 Purpose and motivation**4.1 Purpose**

Tourist destinations seek to anticipate tourist aspirations and evolve towards a holistic approach to the destination. They integrate vertical systems, providing transversality in the analysis of information and placing the tourist at the centre of the action, being not only the beneficiary but also contributing themselves to many services with data and information. The tourist's perception of the destination is global, made up of a multitude of micro-experiences resulting from their interaction with different service providers, for which the tourist does not know whether they are public or private. This vision can only be realized to its full potential if the different technologies used by destinations to respond to the demands of the connected tourist and their own management incorporate a common semantic core.

The value that destinations offer their tourists is concentrated in flows of information organized and stored in the content management system (CMS) and distributed through all channels: web portal, applications (apps), social media campaigns, tourist offices, etc. Semantics optimizes the delivery of useful and relevant information for the tourist, as it allows the segmentation of this information - namely, hierarchized according to their motivations and preferences- in the shortest possible time by means of an agile and predictive search.

Thereby, the purpose of this semantics document is to define standardized schemas, in order to model the tourism information that constitutes a destination. This document focuses solely and exclusively on how information should be structured and transmitted, and does not seek to define how it should be generated, stored or processed.

Semantics aims to endow content with machine-interpretable meaning, enabling them to infer interrelationships among them automatically according to the usage scenarios of that information. This document contains:

- A vocabulary (see [Annex C](#)) that captures the accurate definition of the meaning of the concepts used by tourists, destinations and industry. The vocabulary ensures the homogeneous processing of information and enables interoperability between target and city platforms, as well as data analysis.
- A set of semantic objects (hierarchy of types, properties connecting them, and potential concrete values for some of the properties) to model tourism information.
- Examples of usage of this document to facilitate the development effort of target platforms, mentioned as a guidance.

4.2 Motivation

Tourism is one of the pioneering sectors in technological adoption, responding to the needs of a global industry and a tourist who uses technologies ubiquitously and intensively. Every day, technological developments in fields such as Artificial Intelligence, the Internet of Things (IoT), 5G, robotics, blockchain, among others, are being incorporated into tourism.

Tourism activity is intensive in both the generation and use of data, where information plays an important role in decision-making by the visitor, the destination manager and the business sector. Considering that the competitive evolution of tourism has a fundamental pillar in its digital transformation, and that the introduction of intelligence in tourism processes will allow its movement to the next level in terms of data

use and management, it is paradoxical how little development has been achieved in the field of tourism semantics, although there is a certain consensus on the vocabulary.

Semantics endow an object with machine-interpretable meaning, with additional information that can be understood by a computer. This is the core of the evolution of Web 3.0 or Semantic Web, without which the fast adoption of new technologies such as Artificial Intelligence or Machine Learning would not be feasible.

In this context, next-generation artificial intelligence (“AI”) will add to systems the ability to reason with “common sense”. This means that the AI of the future will be semantically interpreted.

For the tourism sector, this is very relevant, since the aim is for the machines themselves to acquire a sufficiently high level of understanding, allowing them to interact with the connected tourist on the channels and with the tools they choose (web, apps, totems, chatbots, etc.) throughout the entire travel cycle, delivering updated digital content in a flexible, adapted, accurate and agile manner. Ultimately, the aim is to provide machines with the context they need to make human-machine and machine-machine interaction as efficient as possible.

For instance, in a scenario where a tourist who just concluded a museum visit seeks to explore local dining options that accommodate pets, and through the utilization of a destination app grounded in semantics, tailored recommendations can be delivered thanks to the machine’s understanding of the user’s preferences and the contextual information available such as the proximity to the recently visited museum. This effective human-machine interaction provides up-to-date, flexible and accurate suggestions, exemplifying the potential of semantics enhancing the travel cycle.

The key to achieving this goal lies in the need for machines to understand natural language. In other words, they understand orders, even if they are full of ambiguities and colloquial structures. This document collects the vocabulary used by tourists, the words they use in their searches, arranged in a specific hierarchy for tourist destinations.

By providing a systematic arrangement of the relevant vocabulary of the tourism domain, the hierarchy establishes a set of rules and conditions that guide machines in understanding diverse linguistic inputs. This structured framework offers a common sense dimension to artificial minds, furnishing them with the contextual awareness and the network of relationships needed for efficient interaction.

In this sense, the use of linked data, a method of structured data publishing that allows machines to combine information in very complex ways, enriching content with more context, more nuance and improved comprehension, is nuclear.

Furthermore, establishing common semantics for tourism activity will allow better digital strategies to be deployed in three main technological areas:

- Building of the digital tourism layer: make it possible to create a common framework for all the players involved in the generation of content, where all the destination’s tourism resources are interrelated in a unified and standardized way. This information shall be published following defined data structures so that it can be understood by all devices that make up the target ecosystem.
- Artificial Intelligence: the implementation of common semantics for all elements of the tourist destination improves reliability and extends the capabilities of virtual assistants, chatbots and robots. “Training” machines to interpret and return results to the searches posed by users is one of the most fundamental, and most costly, aspects of developing these technologies. The purpose of this document is not to work on Deep Learning techniques or advanced neural networks, but rather, regardless of the technology used by the destination, enable the creation of standardized content that allows machines to be more efficient in exchanging and interpreting resources, offering better responses and, hence, a better tourist experience.
- Tourism intelligence: the advanced analytics of Machine Learning systems enables statistical analysis of pattern recognition to make data-driven predictions. With the enormous amount of information sources available today, Big Data is an essential field to be able to analyse data more efficiently in order to make decisions when managing destinations, as well as when shaping tourism experiences and ultimately helping tourism companies to be more competitive. Semantics allows, among other things, dashboards

and indicators with more efficient forecasting systems including real-time simulations. In addition, it promotes interoperability, which will allow for extended data scenarios for more accurate analysis.

In short, semantics opens up a number of very beneficial scenarios for the tourism sector because enabling technologies will allow for new tourism services and improve the existing ones. However, where the benefits of semantics will be quickly perceived will be in the reduction of technological development costs, in its integration with destination platforms and in the exchange of information among the different players that make up the tourism ecosystem.

5 Premises and constraints

5.1 General

Under the aforementioned scope, this document considers critical aspects such as the definition of a language in which to express the relevant terminology of the tourism domain. Due to its international character, and, therefore, the vast language possibilities involved, an agreement on a common language that allows the collaborative development of this document shall be made.

To this end, English is the language used for all semantic terms. Nonetheless, the document foresees the usage of multilingual labels and comments, which can incorporate translations of the terms and definitions used in this document.

Regarding the representation of said terminology at machine level, JSON format can be used as the *de facto* Standard for structured data transmission on the Internet, as it is considered the most widespread serialization system in the world. Thus, being exclusively used by some of the most renowned APIs. However, other representation possibilities with linked data capabilities are RDF/XML, Microdata or JSON-LD, the latter extending JSON itself. Likewise, such representation ensures the findability of data through Uniform Resource Identifiers (URIs).

In addition, the usage of existing guidelines from vocabularies standardization initiatives such as schema.org is recommended whenever possible in favour of interoperability.

Besides, this document takes a deep and thoughtful look at tourist destinations. However, the task is complex because every tourist destination is unique, but the document needs to be applied internationally. This uniqueness makes it harder to define common terms in tourism, especially those that reflect the specific features of different destinations. As a result, the approach focuses on a broad, high-level perspective to ensure the terms can apply universally across all types of tourist destinations worldwide.

To illustrate the aforementioned complexity, consider the culinary landscape of France and Japan. In France, the term "Brasserie" is locally renowned and represents a specific type of restaurant known for their atmosphere and classic French dishes. While in the Japanese equally diverse culinary landscape, the equivalent of a "Brasserie" is not a widespread concept. Instead, various unique dining establishments cater to the diverse preferences of locals and visitors alike. For example, "Izakayas", "Ryotei".

This example underscores the need for a nuanced and globally adaptable approach to terminology within the tourism domain. A high-level conceptual approach allows transcending the specificities of individual destinations, acknowledging and respecting the diverse realities faced by each.

Furthermore, the tourist destination is not the only vital component of the global tourism system with a dynamic nature. The tourist, understood as the main character of the tourism domain, has an even more radical complexity when compared with other elements of this system. This subject cannot be understood semantically, since its characterization possibilities in an international scenario are nearly infinite. Thus, although the tourist will be considered as a relevant domain term, it will not participate nor be affected by the semantic relationships established in this document. Instead, each user of this document should first characterize their tourist objectives and then articulate the rest of the proposed entities and properties around them.

Finally, it is crucial that destination managers update frequently the content they distribute in the digital channels of their destination. This is because effective recommendations for tourists come along with the availability of relevant and up-to-date information.

5.2 Competency questions

The term Competency Questions is defined in the Terms and Definitions [clause \(3.28\)](#).

The following list proposes indicative, non-exhaustive competency questions chosen to represent the core tourism types in [clause 6](#).

- a) Accommodation establishments offered by a tourism destination, classified by type.
- b) Bed and breakfasts that are contained in a natural heritage site.
- c) Tariffs offered by a campsite of a tourism destination with a price filter.
- d) Rural accommodations next to a particular natural heritage site of a tourist destination.
- e) Hotels near a convention centre.
- f) Services offered by a tourist guide.
- g) Fine arts museums of a tourist destination.
- h) Local businesses, classified by type of business.
- i) Free art events in a tourist destination.
- j) Events suitable for families.
- k) Food establishments classified according to the type of cuisine they offer.
- l) Restaurants near a beach.
- m) Trips and circuits recommended by a tourist destination.
- n) Touristic entities of a destination by typology.
- o) Tourist guides in a specific tourist destination.
- p) Trails in a tourist destination.

5.3 Namespaces

Data is defined using a set of types and properties that encode tourism objects or elements. This document defines a series of types and properties that are not always found in schema.org. It does this to better meet the various requirements of tourist destinations, in particular defining the most relevant objects: points of interest, services, destinations, trips, offers, events, etc.

Since this document goes beyond the capabilities of schema.org, in order to easily differentiate between ISO and Schema.org types and properties, we introduce the notion of namespaces (see definition in [clause 3](#)) in them, which will constitute the basis of this data exchange document.

The main namespaces used in this document will be:

- **iso**
ISO namespace to define specific properties and classes.
- **xsd**
<https://www.w3.org/TR/xmlschema-2/>
- **rdf**
<https://www.w3.org/TR/rdf11-schema/>

— **schema**¹⁾

<https://schema.org>

This document is based on the schema.org standard as per 26.0 release, see <https://schema.org/docs/releases.html>

Users can extend this document by providing their own namespaces (see [Annex A](#)).

Types and properties will be prefixed with one of these namespaces (e.g. “iso”), in order to indicate to which one of them they belong. Several examples will be provided throughout the document to show how this mechanism works.

Types, properties and enumeration members will be defined in sections below.

6 Types and properties

NOTE 1 See [clause 5.3](#) Namespaces for an introduction of how this data exchange standard works.

The vocabulary is structured as a list of types, similarly to schema.org.²⁾

The types defined in this document are defined from the point of view of the tourist’s consumption itinerary, addressing their information needs, with the aim of covering the full range of tourism behaviour in destinations: accommodation establishments, restaurants, leisure, events, experiences, packages, travel arrangements and information on the destination itself.

They work in the following manner:

- Types can have subtypes, e.g. iso:AccommodationEstablishment → iso:Hotel.
- A subtype can have multiple supertypes.
- Subtypes inherit the properties of their parent types, e.g. iso:Hotel can be described with all the properties of iso:AccommodationEstablishment.
- Supertypes inherit the instances of subtypes, e.g. any instance of iso:Hotel would be an iso:AccommodationEstablishment.

For convenience, in order to separate “core” tourism types (e.g. iso:Hotel) and “helper” types (e.g. iso:OpeningHoursSpecification), types and their subtypes are divided in these two groups.

[Table 1](#) contains the core tourism types and their subtypes (which can be core and helper). These core tourist types will be (editor comment: could be worded as *shall be* in final version) required at the root of every JSON-LD document or similar representation.

[Table 2](#) contains helper types, which will be used to define property values.

As a reminder, each type belongs to namespaces, in this document: iso (used by default), xsd, rdf, and schema (schema.org). Using this mechanism, it is possible to extend schema types to ISO as required.

If required, new types and namespaces will be added to subsequent editions of this document.

[Table 3](#) contains the data types used to encode data (mainly based on the XSD recommendation from the W3C).

[Tables 4](#) to [25](#) contain the properties that can be used to encode tourism objects.

1) Schema.org is the de facto standard vocabulary of structured data over the internet. The goal of this ISO standard is to provide a full vocabulary on its own and map it whenever possible to schema.org.

2) In schema.org, types are hierarchical and organised in the form of an oriented graph, the *Thing* type being the root of them all.