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Template for comments and secretariat observations

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/IEC DIS 19583-27

Information technology — Concepts and usage of metadata —

Part 27:

Mapping between ISO/IEC 11179- 34 Metamodel for computable data registration and IEEE 2791 Standard for Bioinformatics Analyses Generated by High- Throughput Sequencing (HTS)

ICS: 07.080; 35.240.70

ISO/IEC JTC 1/SC 32

Secretariat: **ANSI**

Voting begins on:
2025-04-11

Voting terminates on:
2025-07-04

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Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Abbreviated terms	2
5 Mapping overview	2
5.1 General	2
5.2 Mapping mechanism	2
5.3 Data transformation	3
6 S2M Mapping and data transformation requirements	3
6.1 S2M Mapping requirements	3
6.2 Data transformation Requirements	9
6.2.1 Overview	9
6.2.2 Data transformation related to the IEEE 2791 object	10
6.2.3 Data transformation related to the spec_version	10
6.2.4 Data transformation related to the provenance_domain.review.status	10
6.2.5 Data transformation related to the provenance_domain.contributors	10
6.2.6 Data transformation related to the extension_domain	10
6.2.7 Data transformation related to the description_domain.xref	10
6.2.8 Data transformation related to the description_domain.pipeline_steps	11
6.2.9 Data transformation related to the parametric_domain.step	11
6.2.10 Data transformation related to the io_domain.input_subdomain, io_domain.output_subdomain, description_domain.pipeline_steps.input_list, and description_domain.pipeline_steps.output_list	11
6.2.11 Data transformation related to the error_domain	11
7 M2S Mapping and data transformation requirements	11
7.1 M2S Mapping requirements	11
7.2 Data transformation Requirements	16
7.2.1 Overview	16
7.2.2 MDR implementation requirements	16
7.2.3 Data transformation related to Computable_Data class	17
7.2.4 Data transformation related to the Supporting_Document	17
7.2.5 Data transformation related to the Computable_Data_Error	17
7.2.6 Data transformation related to the Input_Output_Data	18
7.2.7 Data transformation related to Contributor.contributor_contribution and Review.reviewer_contribution	18
Annex A (informative) Examples of transforming IEEE 2791 objects into ISO/IEC 11179-34 computable data	19
Annex B (informative) Example of producing an IEEE 2791 object from ISO/IEC 11179-34 computable data	41
Bibliography	49

Foreword

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

This document is part of ISO/IEC 19583.

A list of all parts in the ISO/IEC 19583 series can be found on the ISO and IEC websites.

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 and www.iec.ch/national-committees.

Introduction

ISO/IEC 11179-34 provides a specification of the extensions to the registry metamodel specified in ISO/IEC 11179-3:2023 to enable the registration of metadata about computable data. Registration of metadata about computable data are like a manifest describing all details related to input files, output files, and the pipeline used to process these files. The intent is to facilitate efficient communication and interoperability among different platforms, industries, scientists, and regulators and to improve reproducibility and replicability.

IEEE 2791-2020^[1] aims to improve communication of bioinformatics protocols and data to facilitate bioinformatics workflow related exchange and communication between regulatory agencies, pharmaceutical companies, bioinformatics platform providers and researchers.

Both the ISO/IEC 11179-34 and the IEEE 2791 aim to ensure data reproducibility, which enhances confidence in the decisions and conclusions drawn from such data. The consistency and quality of mapping between them will ensure metadata for computable data to be accurately translated and applied across different systems and applications.

Information technology — Concepts and usage of metadata —

Part 27:

Mapping between ISO/IEC 11179-34 Metamodel for computable data registration and IEEE 2791 Standard for Bioinformatics Analyses Generated by High-Throughput Sequencing (HTS)

1 Scope

This document provides a mapping between the ISO/IEC 11179-34 metamodel for computable data registration and the IEEE 2791 Standard for Bioinformatics Analyses Generated by High-Throughput Sequencing (HTS), to facilitate the production of IEEE 2791 objects from instances of ISO/IEC 11179-34 metamodel and the registration of IEEE 2791 objects as computable data within an MDR conforming to ISO/IEC 11179-34.

This document is applicable to those who are submitting data to organizations that require metadata submissions in IEEE 2791 compliant format, as well as those aiming to register IEEE 2791 objects into an MDR that conforms to ISO/IEC 11179-34.

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/IEC 11179-3:2023, *Information technology — Metadata registries (MDR) — Part 3: Metamodel for registry common facilities*

ISO/IEC 11179-33:2023, *Information technology — Metadata registries (MDR) — Part 33: Metamodel for data set registration*

ISO/IEC 11179-34:2024, *Information technology — Metadata registries (MDR) — Part 34: Metamodel for computable data registration*

IEEE 2791-2020, *Standard for Bioinformatics Analyses Generated by High-Throughput Sequencing (HTS) to Facilitate Communication*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 11179-34 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/>

4 Abbreviated terms

JSON	JavaScript Object Notation
MDR	Metadata Registry
UML	Unified Modeling Language
URI	Uniform Resource Identifier
URL	Uniform Resource Locator

5 Mapping overview

5.1 General

ISO/IEC 11179-34 provides a specification for an extension to a metadata registry (MDR), as specified in ISO/IEC 11179-3, in which metadata that describe computable data can be registered. The specification in ISO/IEC 11179-34, together with the relevant clauses of the specification in ISO/IEC 11179-3, provides the ability to record metadata about computable data.

IEEE 2791 captures relevant information from a high-throughput sequencing workflow as an IEEE 2791 object in order to enable a user to understand and interpret the workflow efficiently and with high confidence. IEEE 2791 is a standard that was initially created with a goal of improving efficiency in regulatory review. Pursuant to this, workflow steps and prerequisites to execute workflow steps are recorded in detail in an IEEE 2791 object, information is recorded using key/value pairs in JSON, adhering to the IEEE 2791 JSON Schema.

NOTE 1 The IEEE 2791 schema is the formal definition of the IEEE 2791 specification against which instances of IEEE 2791 specification can be validated.

NOTE 2 An IEEE 2791 object is an instance of the IEEE 2791 specification and is a text file written in JSON data structure that shall consist of all domains required by the IEEE 2791 schema.

Although ISO/IEC 11179-34 and IEEE 2791 differ in their structure, style of representation, and intended areas of application, they converge in their shared goals. ISO/IEC 11179-34 has been developed with the consideration of being compatible with IEEE 2791, which provides a solid basis for semantic interoperability and facilitates the mapping between these two standards.

5.2 Mapping mechanism

This document defines two mapping mechanisms:

- S2M Mapping (Schema to Metamodel Mapping): Mapping from the IEEE 2791 JSON Schema to the ISO/IEC 11179-34 computable data registration metamodel;
- M2S Mapping (Metamodel to Schema Mapping): Mapping from the ISO/IEC 11179-34 computable data registration metamodel to the IEEE 2791 JSON Schema.

Both mechanisms enable interoperability by allowing the transformation of metadata and data representations between the two standards. The S2M Mapping enables the transformation of IEEE 2791 objects into computable data that can be registered in an MDR conforming to ISO/IEC 11179-34. Conversely, the M2S Mapping facilitates the conversion of metadata items registered in an MDR that conforms to ISO/IEC 11179-34 into IEEE 2791 objects. This bidirectional mapping ensures that metadata can be accurately translated and utilized across different systems and applications using either standard, thereby supporting efficient data exchange and consistency.

5.3 Data transformation

For the purpose of this document, data transformation refers to the process of converting and structuring data from its original format into the target format that adheres to the corresponding IEEE 2791 JSON Schema or ISO/IEC 11179-34 metamodel. This process utilizes either the S2M mapping mechanism or the M2S mapping mechanism.

Considering the heterogeneity between the ISO/IEC 11179-34 metamodel and the IEEE 2791 JSON Schema, not all mappings are one-to-one; they may also be zero-to-one, one-to-zero, one-to-many, many-to-one, or many-to-many. While data transformation is straightforward for one-to-one and many-to-one mappings, transformations related to other types of mappings require human involvement.

6 S2M Mapping and data transformation requirements

6.1 S2M Mapping requirements

The S2M Mapping is specified in [Table 1](#), which includes the following columns:

- IEEE 2791-2020 JSON Schema object;
- ISO/IEC 11179-34:2024 metamodel object;
- Note.

Table 1 — S2M Mapping

No.	IEEE 2791-2020 JSON Schema object	ISO/IEC 11179-34:2024 metamodel object	Note
1	object_id	Scoped_Identifier.identifier (ISO/IEC 11179-3:2023, 7.3.2)	
2	spec_version	Supporting_Document (ISO/IEC 11179-34:2024, 7.2.2.3)	
3	etag	Computable_Data.etag (ISO/IEC 11179-34:2024, 7.2.2.1)	
4	provenance_domain	metamodel objects in rows from 5 to 30	There is no single class or attribute in ISO/IEC 11179-34:2024 metamodel that covers the entire range of the provenance_domain. It is mapped to multiple classes and attributes.
5	provenance_domain.name	Designation.sign (ISO/IEC 11179-3:2023, 8.4.1)	
6	provenance_domain.version	Computable_Data.version (ISO/IEC 11179-34:2024, 7.2.2.1)	
7	provenance_domain.review	Review (ISO/IEC 11179-34:2024, 7.2.2.8)	
8	provenance_domain.review .date	Review.review_date (ISO/IEC 11179-34:2024, 7.2.2.8)	
9	provenance_domain.review .reviewer	metamodel objects in rows from 10 to 14	There is no single class or attribute in ISO/IEC 11179-34:2024 metamodel that covers the entire range of the provenance_domain.review .reviewer. It is mapped to multiple attributes of one or more classes.

Table 1 (continued)

No.	IEEE 2791-2020 JSON Schema object	ISO/IEC 11179-34:2024 metamodel object	Note
10	provenance_domain.review .reviewer.name	Review.reviewer_name (ISO/IEC 11179-34:2024, 7.2.2.8)	
11	provenance_domain.review .reviewer.contribution	Review.reviewer_contribution (ISO/IEC 11179-34:2024, 7.2.2.8)	Table 2 presents the mapping of values from the contribution property defined in IEEE 2791-2020 to the corresponding Contribution enumerated class as specified in ISO/IEC 11179-34.
12	provenance_domain.review .reviewer.affiliation	Review.reviewer_affiliation (ISO/IEC 11179-34:2024, 7.2.2.8)	
13	provenance_domain.review .reviewer.email	Review.reviewer_email (ISO/IEC 11179-34:2024, 7.2.2.8)	
14	provenance_domain.review .reviewer.orcid	Review.reviewer_orcid (ISO/IEC 11179-34:2024, 7.2.2.8)	
15	provenance_domain.review .reviewer.comment	Review.reviewer_comment (ISO/IEC 11179-34:2024, 7.2.2.8)	
16	provenance_domain.review .status	Review.review_status (ISO/IEC 11179-34:2024, 7.2.2.8)	Table 3 presents the mapping of values from the status property defined in IEEE 2791 to the corresponding Review_Status enumerated class as specified in ISO/IEC 11179-34.
17	provenance_domain.derived_from	Computable_Data.derived_from (ISO/IEC 11179-34:2024, 7.2.2.1)	
18	provenance_domain.obsolete_after	Computable_Data.obsolete_after_datetime (ISO/IEC 11179-34:2024, 7.2.2.1)	
19	provenance_domain.embargo	Computable_Data.embargo_period (ISO/IEC 11179-34:2024, 7.2.2.1)	
20	provenance_domain.embargo.start_time	Computable_Data.embargo_period.start_datetime (ISO/IEC 11179-34:2024, 7.2.2.1)	
21	provenance_domain.embargo.end_time	Computable_Data.embargo_period.end_datetime (ISO/IEC 11179-34:2024, 7.2.2.1)	
22	provenance_domain.created	Computable_Data.created_datetime (ISO/IEC 11179-34:2024, 7.2.2.1)	
23	provenance_domain.modified	Computable_Data.modified_datetime (ISO/IEC 11179-34:2024, 7.2.2.1)	
24	provenance_domain.contributors	Contributor (ISO/IEC 11179-34:2024, 7.2.2.5) Individual_Contributor (ISO/IEC 11179-34:2024, 7.2.2.6) Organization_Contributor (ISO/IEC 11179-34:2024, 7.2.2.7)	
25	provenance_domain.contributors.contributor.name	Designation.sign (ISO/IEC 11179-3:2023, 8.4.1)	
26	provenance_domain.contributors.contributor.affiliation	Individual_Contributor.contributor_affiliation (ISO/IEC 11179-34:2024, 7.2.2.6)	

Table 1 (continued)

No.	IEEE 2791-2020 JSON Schema object	ISO/IEC 11179-34:2024 metamodel object	Note
27	provenance_domain.contributors.contributor.email	Individual_Contributor.contributor_email (ISO/IEC 11179-34:2024, 7.2.2.6)	
28	provenance_domain.contributors.contributor.contribution	Individual_Contributor.contributor_contribution (ISO/IEC 11179-34:2024, 7.2.2.5)	Table 2 presents the mapping of values from the contribution property defined in IEEE 2791-2020 to the corresponding Contribution enumerated class as specified in ISO/IEC 11179-34.
29	provenance_domain.contributors.contributor.orcid	Individual_Contributor.contributor_orcid (ISO/IEC 11179-34:2024, 7.2.2.6)	
30	provenance_domain.license	Computable_Data.licence (ISO/IEC 11179-34:2024, 7.2.2.1)	
31	usability_domain	Computable_Data.usability (ISO/IEC 11179-34:2024, 7.2.2.1)	
32	extension_domain	Supporting_Document (ISO/IEC 11179-34:2024, 7.2.2.3)	
33	description_domain	metamodel objects in rows from 34 to 64	There is no single class or attribute in ISO/IEC 11179-34:2024 metamodel that covers the entire range of the description_domain. It is mapped to multiple classes and attributes.
34	description_domain.keywords	Designation.sign (ISO/IEC 11179-3:2023, 8.4.1)	
35	description_domain.xref	Supporting_Document (ISO/IEC 11179-34:2024, 7.2.2.3)	
36	description_domain.xref.namespace	Supporting_Document (ISO/IEC 11179-34:2024, 7.2.2.3)	
37	description_domain.xref.name	Supporting_Document (ISO/IEC 11179-34:2024, 7.2.2.3)	
38	description_domain.xref.ids	Supporting_Document (ISO/IEC 11179-34:2024, 7.2.2.3)	
39	description_domain.xref.access_time	Supporting_Document (ISO/IEC 11179-34:2024, 7.2.2.3)	
40	description_domain.platform	Computation_Execution_Environment.platform (ISO/IEC 11179-34:2024, 7.2.2.11)	
41	description_domain.pipeline_steps	Computation_Step (ISO/IEC 11179-34:2024, 7.2.2.9)	
42	description_domain.pipeline_steps.step_number	Computation_Step.step_number (ISO/IEC 11179-34:2024, 7.2.2.9)	
43	description_domain.pipeline_steps.name	Designation.sign (ISO/IEC 11179-3:2023, 8.4.1)	
44	description_domain.pipeline_steps.description	Computation_Step.purpose (ISO/IEC 11179-34:2024, 7.2.2.9)	
45	description_domain.pipeline_steps.version	Computation_Step.version (ISO/IEC 11179-34:2024, 7.2.2.9)	
46	description_domain.pipeline_steps.prerequisite	Computation_Step_Prerequisite (ISO/IEC 11179-34:2024, 7.2.2.16)	

Table 1 (continued)

No.	IEEE 2791-2020 JSON Schema object	ISO/IEC 11179-34:2024 metamodel object	Note
47	description_domain.pipeline_steps.prerequisite.name	Designation.sign (ISO/IEC 11179-3:2023, 8.4.1)	
48	description_domain.pipeline_steps.prerequisite.uri	metamodel objects in rows from 49 to 52	There is no single class or attribute in ISO/IEC 11179-34:2024 metamodel that covers the entire range of the description_domain.pipeline_steps.prerequisite.uri. It is mapped to multiple attributes of one or more classes.
49	description_domain.pipeline_steps.prerequisite.uri.filename	Computation_Step_Prerequisite.filename (ISO/IEC 11179-34:2024, 7.2.2.16)	
50	description_domain.pipeline_steps.prerequisite.uri.uri	Computation_Step_Prerequisite.uri (ISO/IEC 11179-34:2024, 7.2.2.16)	
51	description_domain.pipeline_steps.prerequisite.uri.access_time	Computation_Step_Prerequisite.access_datetime (ISO/IEC 11179-34:2024, 7.2.2.16)	
52	description_domain.pipeline_steps.prerequisite.uri.sha1_checksum	Computation_Step_Prerequisite.sha1_checksum (ISO/IEC 11179-34:2024, 7.2.2.16)	
53	description_domain.pipeline_steps.input_list	Input_Output_Data (ISO/IEC 11179-34:2024, 7.2.2.10)	
54	description_domain.pipeline_steps.input_list.uri	metamodel objects in rows from 55 to 58	There is no single class or attribute in ISO/IEC 11179-34:2024 metamodel that covers the entire range of the description_domain.pipeline_steps.input_list.uri. It is mapped to multiple attributes of one or more classes.
55	description_domain.pipeline_steps.input_list.uri.filename	Designation.sign (ISO/IEC 11179-3:2023, 8.4.1)	
56	description_domain.pipeline_steps.input_list.uri.uri	Input_Output_Data.uri (ISO/IEC 11179-34:2024, 7.2.2.10)	
57	description_domain.pipeline_steps.input_list.uri.access_time	Input_Output_Data.access_datetime (ISO/IEC 11179-34:2024, 7.2.2.10)	
58	description_domain.pipeline_steps.input_list.uri.sha1_checksum	Input_Output_Data.sha1_checksum (ISO/IEC 11179-34:2024, 7.2.2.10)	
59	description_domain.pipeline_steps.output_list	Input_Output_Data (ISO/IEC 11179-34:2024, 7.2.2.10)	
60	description_domain.pipeline_steps.output_list.uri	metamodel objects in rows from 61 to 64	There is no single class or attribute in ISO/IEC 11179-34:2024 metamodel that covers the entire range of the description_domain.pipeline_steps.output_list.uri. It is mapped to multiple attributes of one or more classes.
61	description_domain.pipeline_steps.output_list.uri.filename	Designation.sign (ISO/IEC 11179-3:2023, 8.4.1)	
62	description_domain.pipeline_steps.output_list.uri.uri	Input_Output_Data.uri (ISO/IEC 11179-34:2024, 7.2.2.10)	

Table 1 (continued)

No.	IEEE 2791-2020 JSON Schema object	ISO/IEC 11179-34:2024 metamodel object	Note
63	description_domain.pipeline_steps.output_list.uri.access_time	Input_Output_Data.access_datetime (ISO/IEC 11179-34:2024, 7.2.2.10)	
64	description_domain.pipeline_steps.output_list.uri.sha1_checksum	Input_Output_Data.sha1_checksum (ISO/IEC 11179-34:2024, 7.2.2.10)	
65	execution_domain	Computation_Execution_Environment (ISO/IEC 11179-34:2024, 7.2.2.11)	
66	execution_domain.script	Execution_Script (ISO/IEC 11179-34:2024, 7.2.2.12)	
67	execution_domain.script.uri	metamodel objects in rows from 68 to 71	There is no single class or attribute in ISO/IEC 11179-34:2024 metamodel that covers the entire range of the execution_domain.script.uri. It is mapped to multiple attributes of one or more classes.
68	execution_domain.script.uri.filename	Execution_Script.filename (ISO/IEC 11179-34:2024, 7.2.2.12)	
69	execution_domain.script.uri.uri	Execution_Script.uri (ISO/IEC 11179-34:2024, 7.2.2.12)	
70	execution_domain.script.uri.access_time	Execution_Script.access_datetime (ISO/IEC 11179-34:2024, 7.2.2.12)	
71	execution_domain.script.uri.sha1_checksum	Execution_Script.sha1_checksum (ISO/IEC 11179-34:2024, 7.2.2.12)	
72	execution_domain.script_driver	Computation_Execution_Environment.script_driver (ISO/IEC 11179-34:2024, 7.2.2.11)	
73	execution_domain.software_prerequisites	Software_Prerequisite (ISO/IEC 11179-34:2024, 7.2.2.13)	
74	execution_domain.software_prerequisites.name	Designation.sign (ISO/IEC 11179-3:2023, 8.4.1)	
75	execution_domain.software_prerequisites.version	Software_Prerequisite.version (ISO/IEC 11179-34:2024, 7.2.2.13)	
76	execution_domain.software_prerequisites.uri	metamodel objects in rows from 77 to 80	There is no single class or attribute in ISO/IEC 11179-34:2024 metamodel that covers the entire range of the execution_domain.software_prerequisites.uri. It is mapped to multiple attributes of one or more classes.
77	execution_domain.software_prerequisites.uri.filename	Software_Prerequisite.filename (ISO/IEC 11179-34:2024, 7.2.2.13)	
78	execution_domain.software_prerequisites.uri.uri	Software_Prerequisite.uri (ISO/IEC 11179-34:2024, 7.2.2.13)	
79	execution_domain.software_prerequisites.uri.access_time	Software_Prerequisite.access_datetime (ISO/IEC 11179-34:2024, 7.2.2.13)	
80	execution_domain.software_prerequisites.uri.sha1_checksum	Software_Prerequisite.sha1_checksum (ISO/IEC 11179-34:2024, 7.2.2.13)	

Table 1 (continued)

No.	IEEE 2791-2020 JSON Schema object	ISO/IEC 11179-34:2024 metamodel object	Note
81	execution_domain.external_data_endpoints	External_Data_Endpoint (ISO/IEC 11179-34:2024, 7.2.2.15)	
82	execution_domain.external_data_endpoints.name	Designation.sign (ISO/IEC 11179-3:2023, 8.4.1)	
83	execution_domain.external_data_endpoints.url	External_Data_Endpoint.url (ISO/IEC 11179-34:2024, 7.2.2.15)	
84	execution_domain.environment_variables	Environment_Variable (ISO/IEC 11179-34:2024, 7.2.2.14)	
85	parametric_domain	Computation_Step_Parameter (ISO/IEC 11179-34:2024, 7.2.2.17)	
86	parametric_domain.step	Computation_Step.step_number (ISO/IEC 11179-34:2024, 7.2.2.9)	
87	parametric_domain.param	Computation_Step_Parameter.parameter (ISO/IEC 11179-34:2024, 7.2.2.17)	
88	parametric_domain.value	Computation_Step_Parameter.value (ISO/IEC 11179-34:2024, 7.2.2.17)	
89	io_domain	Input_Output_Data (ISO/IEC 11179-34:2024, 7.2.2.10)	
90	io_domain.input_subdomain	Input_Output_Data (ISO/IEC 11179-34:2024, 7.2.2.10)	
91	io_domain.input_subdomain.uri	metamodel objects in rows from 92 to 95	There is no single class or attribute in ISO/IEC 11179-34:2024 metamodel that covers the entire range of the io_domain.input_subdomain.uri. It is mapped to multiple attributes of one or more classes.
92	io_domain.input_subdomain.uri.filename	Designation.sign (ISO/IEC 11179-3:2023, 8.4.1)	
93	io_domain.input_subdomain.uri.uri	Input_Output_Data.uri (ISO/IEC 11179-34:2024, 7.2.2.10)	
94	io_domain.input_subdomain.uri.access_time	Input_Output_Data.access_datetime (ISO/IEC 11179-34:2024, 7.2.2.10)	
95	io_domain.input_subdomain.uri.sha1_checksum	Input_Output_Data.sha1_checksum (ISO/IEC 11179-34:2024, 7.2.2.10)	
96	io_domain.output_subdomain	Input_Output_Data (ISO/IEC 11179-34:2024, 7.2.2.10)	
97	io_domain.output_subdomain.media_type	Data_Set_Distribution.media_type (ISO/IEC 11179-33:2023, 7.2.2.5)	
98	io_domain.output_subdomain.uri	metamodel objects in rows from 99 to 102	There is no single class or attribute in ISO/IEC 11179-34:2024 metamodel that covers the entire range of the io_domain.output_subdomain.uri. It is mapped to multiple attributes of one or more classes.
99	io_domain.output_subdomain.uri.filename	Designation.sign (ISO/IEC 11179-3:2023, 8.4.1)	
100	io_domain.output_subdomain.uri.uri	Input_Output_Data.uri (ISO/IEC 11179-34:2024, 7.2.2.10)	

Table 1 (continued)

No.	IEEE 2791-2020 JSON Schema object	ISO/IEC 11179-34:2024 metamodel object	Note
101	io_domain.output_subdomain.uri.access_time	Input_Output_Data.access_datetime (ISO/IEC 11179-34:2024, 7.2.2.10)	
102	io_domain.output_subdomain.uri.sha1_checksum	Input_Output_Data.sha1_checksum (ISO/IEC 11179-34:2024, 7.2.2.10)	
103	error_domain	Computable_Data_Error (ISO/IEC 11179-34:2024, 7.2.2.4)	
104	error_domain.empirical_error	Computable_Data_Error (ISO/IEC 11179-34:2024, 7.2.2.4)	
105	error_domain.algorithmic_error	Computable_Data_Error (ISO/IEC 11179-34:2024, 7.2.2.4)	

Table 2 — contribution property mapping

Value in contribution property	Value in Contribution enumerated class
"authoredBy"	"authoredBy"
"contributedBy"	"contributedBy"
"createdAt"	"createdAt"
"createdBy"	"createdBy"
"createdWith"	"createdWith"
"curatedBy"	"curatedBy"
"derivedFrom"	"derivedFrom"
"importedBy"	"importedBy"
"importedFrom"	"importedFrom"
"providedBy"	"providedBy"
"retrievedBy"	"retrievedBy"
"retrievedFrom"	"retrievedFrom"
"sourceAccessedBy"	"sourceAccessedBy"
N/A	"sourceAccessedAt"

Table 3 — Values in the Review_Status enumerated class

Value in status property	Value in Review_Status enumerated class
"unreviewed"	"proposed"
	"scheduled"
"in-review"	"in-review"
"approved"	"approved"
"suspended"	"suspended"
"rejected"	"rejected"

6.2 Data transformation Requirements

6.2.1 Overview

[Subclause 6.2](#) addresses the data transformation requirements for specific IEEE 2791-2020 JSON Schema objects that necessitate human involvement.

Two examples illustrating the transformation from IEEE 2791 objects into computable data using the S2M Mapping mechanism are provided in [Annex A](#).

6.2.2 Data transformation related to the IEEE 2791 object

An IEEE 2791 object is a complete JSON file that contains all JSON data. Therefore, each IEEE 2791 object should be transformed into an instance of the `Computable_Data` class, along with several instances of associated classes.

6.2.3 Data transformation related to the spec_version

The `spec_version` in the IEEE 2791-2020 JSON Schema is a string that describes the version of the IEEE 2791 specification used to define the JSON document, with its format being a URI. The value of `spec_version` should be transformed into an instance of the `Supporting_Document` class with the following attributes:

- `document_role`: indicates that the document is a schema document used to define the IEEE 2791 object;
- `supporting_document_identifier`: specifies the URI of the IEEE 2791 specification.

6.2.4 Data transformation related to the provenance_domain.review.status

The permissible value “unreviewed” for `provenance_domain.review.status` is mapped to two values in the `Contribution` enumerated class: “proposed” and “scheduled”. Human judgment is required to determine which value should be selected.

6.2.5 Data transformation related to the provenance_domain.contributors

The `provenance_domain.contributors` can be mapped to 3 classes:

- For individual contributors, the instance of `provenance_domain.contributors` should be transformed into an instance of `Individual_Contributor`;
- For organization contributors, the instance of `provenance_domain.contributors` should be transformed into an instance of `Organization_Contributor`;
- For other types of contributors, the instance of `provenance_domain.contributors` should be transformed into an instance of `Contributor`.

6.2.6 Data transformation related to the extension_domain

The `extension_domain` in the IEEE 2791-2020 JSON Schema is an optional domain that contains user-defined fields. It provides the JSON Schema for the extension, with its format being a URI. Each value of the `extension_domain` should be transformed into an instance of the `Supporting_Document` class with the following attributes:

- `document_role`: indicates that the document is a schema document used to specify user-defined fields;
- `supporting_document.identifier`: specifies the URI of the extension schema.

6.2.7 Data transformation related to the description_domain.xref

The `description_domain.xref` in the IEEE 2791-2020 JSON Schema provides a list of database or ontology IDs that are cross-referenced in the IEEE 2791 object. Each instance of `description_domain.xref` should be transformed into an instance of the `Supporting_Document` class with the following attributes:

- `document_role`: indicates that the document is an external reference used to provide a list of database or ontology IDs that are cross-referenced;
- `supporting_document.provider`: specifies the namespace of the database or ontology represented by the value of `description_domain.xref.namespace`;
- `supporting_document.title`: specifies the name of the database or ontology represented by the value of `description_domain.xref.name`;