



IoT METADATA SPECIFICATION

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CONTENTS

[Forward](#)

[About This Specification](#)

[Audience](#)

[How This Document Is Organized](#)

[Conventions Used In This Document](#)

[Types](#)

[Mandatory or Optional](#)

[Cardinality](#)

[What This Document Does Not Cover](#)

[Overview](#)

[Related Documents](#)

[Uses Of Metadata](#)

[Types Of Metadata](#)

[Source Of Metadata](#)

[Content vs. Metadata](#)

[Identification](#)

[Format of an identifier within the ID Service](#)

[Types](#)

[Custom lists](#)

[Metadata Definition](#)

[Internal Types](#)

[Create Info](#)

[Legal Information](#)

[Regulatory Information](#)

[Location Information](#)

[Sensor Information](#)

[Schema Information](#)

[Meta](#)

[Identifier](#)

[Dataset](#)

[Container](#)

[Delivery](#)

[Ownership](#)

[Category](#)

[Legal](#)
[Citation](#)
[Regulatory](#)
[Relation](#)
[Grading](#)
[Custom list](#)

[Domain Types](#)

[Dataset Type](#)
[Sensor Type](#)
[Format Type](#)
[Delivery Type](#)
[Owner Type](#)
[Container Type](#)
[Category Type](#)
[Schema Type](#)
[Legal Type](#)
[Regulatory Type](#)
[Relation Type](#)
[Grading Type](#)
[Location Type](#)
[Location Sub Type Fixed](#)
[Location Sub Type Moving](#)

[Metadata Elements](#)

[Sample Metadata](#)

[Appendix A - Glossary](#)

[Appendix B - Revisions](#)

FORWARD

This forward is not part of the IoT Metadata Specification; it is included for information only.

ABOUT THIS SPECIFICATION

This specification is the “*private draft*” version of the IoT Metadata Specification v.0.9.9 for review and discussion.

This at the moment is a working document managed by Terbine and subject to change. In the near future Terbine will declare this as a public version and changes will be versioned and either backward compatible or a detailed migration path will be outlined.

AUDIENCE

This document is intended for anyone who will interact with the Terbine system, whether buyer or seller. This will allow an overview of what metadata is collected and the structure used for discovery and indexing of content within Terbine. It is intended for broad use within and between systems of varying types, in addition to Terbine.

HOW THIS DOCUMENT IS ORGANIZED

This document is organized within these main sections.

- Metadata Definition - specific of the individual entities and their elements.
- Domain Types - standard reference types
- Metadata Elements - organization of the entities, their cardinality within the larger metadata structure.

CONVENTIONS USED IN THIS DOCUMENT

Entities will have a label, name, comment and list of elements (fields). Label is descriptive title for human consumption, name is a title for machine processing and a comment provides a long text explanation of the element.

TYPES

Types will be either concrete or referenced.

If a concrete type it will be one of the following.

- UUID
- TEXT
- CHAR
- NUMERIC
- DECIMAL
- CURRENCY
- ID – id to a domain type in numeric format such as 1 or 2.
- DATE
- DATETIME
- TIME
- FLAG - 1 is true and 0 as false
- BOOLEAN – true or false
- YESNO – yes or no

If referenced they will be of two variations

- **type** - this means the entire type as defined is included in the current definition. Example is **type:createupdate** where all fields defined as belonging to createUpdate type are included in this definition.
- **ref** - this means a reference to the unique identifier for that type is included in the current definition. Example is **ref:createupdate** where only the identifier that references an instance of an createUpdate information is included in this definition.
- **domain** – this refers to a domain type, these are listed under the section Domain Types. Example is **domain:sensorType** where one of the ID values defined for that type will be included here.

MANDATORY OR OPTIONAL

Elements can be defined as mandatory or optional. Mandatory fields are required to have a valid value as defined by the element type. Default is mandatory if not specified. See Cardinality for further information.

CARDINALITY

Elements can have a defined cardinality which is the number of elements. This also can be used to show a mandatory vs. optional relationship.

- Fixed - fixed occurrence. Default is 1 if not specified.
- 0 .. 1 - Item is optional, can have zero or 1 elements.
- 1 - Item has 1 element and is mandatory
- 0 .. N - an element can have 0 to N number of elements. Denotes optional elements.
- 1 .. N - an element can have 1 to N number of elements. Denotes mandatory attribute.

WHAT THIS DOCUMENT DOES NOT COVER

This document does not cover certain aspects of metadata in relation to the contributors organization.

OVERVIEW

This document is the official specification for the IoT Metadata Definition.

RELATED DOCUMENTS

- Terbine Marketplace V1 Requirements
- Terbine API Overview

USES OF METADATA

Metadata is collected, tracked and analyzed within Terbine for a variety of reasons. These include the following:

- Provide unique identity.
- Provide ownership information.
- Track data lifecycle information (provenance).
- Provide contributor information.
- Allow identifying group and organizational information.
- Provide source information, including geospatial identification.
- Track grading (quality) information.
- Track transferring of ownership (provenance)
- Store schema and type information.
- Allow identifying data with predefined and user supplied categories and applicable tags.
- Track data aggregation and filtering information.

The world of IoT or sensor-born data introduces many unique challenges within the realm of metadata. These include that the Machine to Machine (M2M) communication will rely on automatic update and discovery of metadata elements. Also, within IoT it is important to track these types of relationships within the data.

- **Container:** Another aspect of IoT is that often data is delivered within a larger ecosystem of related sensors used to track an entire environment. The value of the information often lies in the ability to identify and track this relationship. Metadata within Terbine allow storing and updating this relationship. Example of this are a group of sensors measuring various readings within a large HVAC system. Note the HVAC system could also be part of a larger monitoring system for an entire building.
- **Similarity:** Also, relationships that track similar data sources from disparate providers is required to allow cross referencing and identification of these links.

Example of this is temperature sensors of a specific type across all same HVAC systems in all buildings.

- **Inheritance:** Data can be aggregated, combined, reduced, mapped etc. to derive new datasets that are useful for a specific use case. Therefore the data that was used to create other datasets should be tracked.

TYPES OF METADATA

Metadata is generally divided into two overarching types.

- **Structural** - defining the organization or container for the data.
- **Descriptive** - defining the content or context of the data

The IoT Metadata Specification is designed to cover both of these types and allows a complete description of the form, structure, content and context of the data.

SOURCE OF METADATA

Metadata in Terbine is created from one of these sources.

- **User supplied** – metadata is entered through the Terbine API before or after ingestion of the associated data stream.
- **Data generated** – under certain conditions metadata may be machine generated from ingested or sample data.
- **Migrated** – metadata migrated from other source systems containing their own metadata. In this manner the attributes of the data can be transferred over and reflected within Terbine.

CONTENT VS. METADATA

There can be gray areas where the same information could be treated as content or metadata, depending on the workflow. In general, metadata should have value on its own without regard for the content. For example, if there is following record delivered to Terbine, this would be content.

2017-08-14T01:01:01, 23.1, TEMPERATURE

The value “TEMPERATURE” which describes a sensor reading value is considered content.

If within the description of the data a user would enter the following tags to describe that record.

SENSOR; DAILY; TEMPERATURE

The tag “TEMPERATURE” would be considered metadata.

Note also metadata can be delivered embedded in or part of the delivery and will be treated as such. This can be used to create a new metadata record or update an existing one. An example of this is as follows.

```
1 : DATE, READING, TYPE
2 : 2017-08-14T01:01:01, 23.1, TEMPERATURE
3 : 2017-08-14T01:03:11, 17.1, TEMPERATURE
```

Here the first line is considered metadata which is used to describe the data and all lines following (in this example lines 2 and 3) are actual content.

IDENTIFICATION

Critical to any metadata system is to be able to uniquely identify and allow human and machine to machine (M2M) identification and querying. TERBINE allows this using their ID registry.

The IDs allocated by this service will be assigned to each metadata configuration as well as for content and organization/users within TERBINE. This is an immutable identifier. It has a length of 36 and is a combination of numeric and alphanumeric characters.

Also part of the function of this service is to store other unique identifiers and types and associate these the main identifier. These various ids can be queried to find the main ID as well as add or update these within an organization's domain.

FORMAT OF AN IDENTIFIER WITHIN THE ID SERVICE

Name	Length	Type	Comment
Schema	1	Numeric	For now always 1, reserved for future use in case of introduction of other schemas.
Type	2	Numeric	Type of identifier (see table below for possible values).
Registrar	10	Numeric	Unique identifier for the owning or registering party.
Item	10	Numeric	Unique identifier for the item being identified.

Custom	13	Alpha	Client specific identifier they can use for their purpose. If not entered by client, TERBINE will auto allocate this field.
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TYPES

Id	Name
1	account
2	user
3	metadata
4	dataset
5	content
6	transaction

CUSTOM LISTS

This metadata specification is intended for tracking information about delivered data formats and structures that are cross-industry. These can be thought of as a flexible extension mechanism to the fixed portions of the specification.

To allow maintaining a catalogue of designators that is flexible, but still allow non-human guided M2M communication, is a significant challenge. To implement this the concept of custom lists have been introduced and are integrated into the metadata specification.

An organization can then maintain these named list by assigning a variable number of entries with an id value, name and optional description and then assign these to a metadata configuration. The values will be indexed and searchable along with all fixed portions of the specification.

Custom lists have two elements. The list definition and the entries for that list.

List Definition

organization	UUID	Mandatory	The owning organization, not provided if a global list.
name	TEXT	Mandatory	Name of this list
description	TEXT	Optional	Description of this list

List Entries

id	ALPHA	Mandatory	A unique identifier within this list for this list entry
name	ALPHA	Mandatory	Name of this list entry
description	ALPHA	Optional	Description for this list entry

Example

List Definition is:

32ee4079-e562-45c8-8a63-ab11c56af3b9	ODB-II Codes
--------------------------------------	--------------

List Entries are:

P0600	Serial Communication Link Malfunction
P0601	Internal Control Module Memory Check Sum Error
P0602	Control Module Programming Error
P0603	Internal Control Module Keep Alive Memory (KAM) Error
P0604	Internal Control Module Random Access Memory (RAM) Error
P0605	Internal Control Module Read Only Memory (ROM) Error (Module Identification Defined by SAE J1979)
P0606	ECM/PCM Processor Fault
P0607	Control Module Performance
P0608	Control Module VSS Output A Malfunction
P0609	Control Module VSS Output B Malfunction
P0610	Control Module VSS Output C Malfunction
P0611	Fuel Injector Control Module Performance
P0612	Fuel Injector Control Module Relay Control Circuit

The person defining the metadata configuration then designates that a custom list will be used with the specification and can assign any number of the entries under that list as being relevant to that metadata configuration.

METADATA DEFINITION

The following top level sections can be found in the Terbine Metadata Specification definition section.

- Internal Types – these are definitions for types that are used within definition of entities. Generally these have a child relationship to an owning entity (example address).
- Meta – this is information about the metadata record.
- Identifier
- Source
- Container - this section contains a reference to an owning entity.
- Delivery
- Ownership
- Category
- Legal
- Citation
- Schema
- Relation
- Grading
- Custom Lists
- Domain Types – these are definition of standard domain or reference data. These are predefined types that have an id, code and associated description.

Fields within top level definition include

- requireLegalReview - flag if entire metadata configuration requires legal review when created.

INTERNAL TYPES

These are defined types that only have an instance with another identifiable piece of content. These types have no identifier.

CREATE INFO

Label:	CreateUpdate
Name:	createupdate
Comment:	This is a standard type used to hold created date and update information. Generally updated internally in the system and used for display purposes.
Elements	

createdate	Mandatory	DATETIME	Timestamp of creation
createuser	Mandatory	ref:user	Reference to user responsible for creating entity
updatedate	Optional	DATETIME	Timestamp of last update
updateuser	Optional	ref:user	Reference to user responsible for updating entity

LEGAL INFORMATION

Label:	Legal Info		
Name:	legalInfo		
Comment:	This is a standard type used to hold information about rights, legal information or copyright information.		
Elements			
type	Mandatory	domain:legalType	Type of legal info
externalUrl	Optional	TEXT	An external URL with additional legal information.
comment	Optional	TEXT	Name of party or organization containing legal rights of content.

REGULATORY INFORMATION

Label:	Regulatory Info		
Name:	regulatoryInfo		
Comment:	This is a standard type used to hold information about regulatory information.		
Elements			
type	Mandatory	domain:regulatoryType	Type of regulatory info
comment	Optional	TEXT	Additional Information pertaining to the regulatory information.
startDate	Mandatory	DATETIME	If not provided defaults to current date/time
endDate	Optional	DATETIME	

LOCATION INFORMATION

Label:	Location Info		
Name:	locationInfo		
Comment:	This is a standard type used to hold information about location information.		
Elements			
type	Mandatory	domain:locationType	Type of location info
latitude	Optional	TEXT	
longitude	Optional	TEXT	
altitude	Optional	TEXT	
address	Optional	TEXT	Street address
stateterritory	Optional	TEXT	State or territory information
county	Optional	TEXT	County or province information
country	Optional	TEXT	Country code as defined in ISO 3166-2
postalcode	Optional	TEXT	Postal code
freeText	Optional	TEXT	When location type Other this field may be used. Also for additional text for Moving subtype options,
startDate	Optional	DATETIME	If not provided defaults to current date/time
endDate	Optional	DATETIME	

SENSOR INFORMATION

Label:	Sensor Info		
Name:	sensorInfo		
Comment:	This is a standard type used to hold information about sensor information.		
Elements			
type	Mandatory	domain:sensorType	Type of sensor info
make	Optional	TEXT	
model	Optional	TEXT	
comment	Optional	TEXT	

SCHEMA INFORMATION

Label:	Schema Info		
Name:	schemaInfo		
Comment:	This section contains information about schema of the content. This is highly dependent on the type.		
Elements			
format	Mandatory	type:formatType	Type of format of data when delivered
type	Mandatory	type:schemaType	Type of schema if schema is present in body element.
properties	Optional	TEXT	additional properties as needed, for instance if specific character separator.
body	Optional	TEXT	Schema information, dependent on type.
createupdate	Mandatory	type:createupdate	Create and update information for schema information record. This is the create and update date of this record holding schema information.

- Note schema may have versions, but this concept is not reflected in the metadata specification but is the function of the Terbine Application.

META

Label:	Meta		
Name:	meta		
Comment:	This contains information about the metadata. This is considered metamodel information.		
Elements			
name	Optional	TEXT	Name for Metadata. Also known as search name.
imageUrl	Optional	TEXT	An optional image to be used for this metadata configuration for display purposes.
description	Optional	TEXT	Description of the metadata in long

			form. Allowable 2500 characters.
version	Mandatory	TEXT	Version of Metadata
createupdate	Mandatory	type:createupdate	Create and update information for organization

IDENTIFIER

Label:	Identifier		
Name:	identifier		
Comment:	This section contains information that is used as an unambiguous reference to the information, title and description.		
Elements			
id	Supplied	UUID	UUID identifier, internal only
gid	Supplied	ALPHA(36)	This is the id provided from the Identification Service. Used for machine to machine identification and public identification of entities within TURBINE.
extId	Optional	TEXT	External Identifier, link to external metadata identifier
urn	Optional	TEXT	
uri	Optional	TEXT	
createupdate	Mandatory	type:createupdate	Create and update information for organization

DATASET

Label:	Dataset		
Name:	dataset		
Comment:	This section contains information that is used to describe the dataset of the associated content the metadata is describing.		
Elements			
id	Mandatory	UUID	Global unique identifier
extId	Optional	TEXT	External identifier for this source.
type	Mandatory	domain:datasetType	ID that references the type of source (see DatasetType domain data)
sensorInfo	Optional	type:sensorInfo	Information on sensor is the source of

			the content if applicable and available.
schemaInfo	Mandatory	type:schemaInfo	Information on schema for this dataset
comment	Optional	TEXT	
createupdate	Mandatory	type:createupdate	Create and update information for datasetinformation. This is create and update information on the dataset data record.

CONTAINER

Label:	Container		
Name:	container		
Comment:	This section contains information relevant to the data container. This is the parent entity, not that this container may have links to another container through the parentId. This information will be stored on time and reused across metadata instances		
Elements			
id	Mandatory	UUID	Global unique identifier
type	Mandatory	domain:containerType	ID that references the type of container (see Container Type domain data)
parentId	Optional	UUID	Reference to a parent container.
extId	Mandatory	TEXT	This is an identifier used externally for the item.
locationType	Mandatory	domain:locationType	This is the type of location info.
locationSubType	Optional	domain:locationSubType	This is the type of sub location, dependant on location type
location	Mandatory	type:locationInfo	This is the location of the container, section is mandatory even if location information is unknown. See locationType.
name	Optional	TEXT	
description	Optional	TEXT	

DELIVERY

Label:	Delivery		
Name:	delivery		
Comment:	This section contains information about the delivery method for the data.		
Elements			
id	Mandatory	UUID	Global unique identifier
type	Mandatory	ID	ID that references the type of delivery (see Delivery Type domain data)
size	Optional	NUMERIC	Size of data
hash	Optional	TEXT	Hash of the data
deliveryDate	Mandatory	DATETIME	Date delivered

OWNERSHIP

Label:	Owner		
Name:	owner		
Comment:	This section contains information about the ownership for the content.		
Elements			
id	Mandatory	UUID	Global unique identifier
type	Mandatory	ID	ID that references the type of owner (see Owner Type domain data)
startDate	Mandatory	DATETIME	If not provided defaults to current date/time
endDate	Optional	DATETIME	
comment	Optional	TEXT	Comment about this ownership record
createupdate	Mandatory	type:createupdate	Create and update information for ownership information. This is not the ownership date, but the create and update date for the record about ownership.

CATEGORY

Label:	Category		
Name:	category		

Comment:	This section contains information about category and associated tags for the content		
Elements			
type	Mandatory	domain:category Type	1..N category types. Terbine defined category type.
tag	Optional	TEXT	0..N tags. User defined tag for this content.

LEGAL

Label:	Legal		
Name:	legal		
Comment:	This section contains information about legal and copyright information related to the content.		
Elements			
id	Mandatory	UUID	Unique identifier for this rights information.
legalInfo	Mandatory	type:legalInfo	Legal information internal type.
createUpdate	Mandatory	type:createupdate	

CITATION

Label:	Citation		
Name:	citation		
Comment:	This section contains information about required citation for any dataset within this metadata configuration.		
Elements			
id	Mandatory	UUID	Unique identifier for this citation information.
citation	Mandatory	type:text	Actual citation text.
createUpdate	Mandatory	type:createupdate	

REGULATORY

Label:	Regulatory		
Name:	regulatory		
Comment:	This section contains		

			information about regulatory information.
Elements			
id	Mandatory	UUID	Unique identifier for this rights information.
regulatoryInfo	Mandatory	type:regulatoryInfo	Regulatory information internal type.
createUpdate	Mandatory	type:createupdate	

RELATION

Label:	Relation		
Name:	relation		
Comment:			This section contains information about related content.
Elements			
id Mandator UUID Identifier for this relationship.			
refid Mandator UUID identifier for related content that links to the id in the “identifier” section.			
type Mandator type:relationType			
comment Optional TEXT Comment about related information			
createupdate Mandator type:createupdate Create and update information for relation information record. This is the create and update date of this record holding relation information.			

GRADING

Label:	Grading		
Name:	grading		
Comment:			This section contains information about grading information for content.
Elements			
id Mandator UUID id of grading info.			
type Mandator type:gradingType Type of grading system used.			

grade	Mandatory y	INTEGER	The highest level will consist of data generated by sensors that are calibrated and maintained by humans whose job it is to do so. Turbine will use a four-level scale, with each level being an order of magnitude more ‘certain’ than the one below it.
comment	Optional	TEXT	Comment about grading.
createupdate	Mandatory y	type:createupdate	Create and update information for grading information record. This is the create and update date of this record holding grading information.

CUSTOM LIST

Label:	Custom List		
Name:	customList		
Comment:	This section contains information about custom lists that have been assigned to a configuration.		
Elements			
id	Mandatory	UUID	0 or more id of custom lists that have been linked to this configuration..
entries	1..n	Entries of ID/Name pairs	Under each list the list entries that have been assigned to this configuration.

DOMAIN TYPES

Note that the values provided is not an exhaustive list and in most cases is meant to show an example of the type of domain data.

DATASET TYPE

Label:	Dataset Type
Name:	datasetType
Domain	3
Type Id:	
Comment:	This is a designator for type of dataset.

Values:

ID	CODE	DESCRIPTION
30	Sensor	Sensor sourced dataset
31	External	External generic sourced dataset
32	Platform	Dataset is from a data platform
33	Other	Dataset is from human data entry

SENSOR TYPE

Label:	Sensor Type
Name:	sensorType
Domain	4
Type Id:	
Comment:	This is a designator for sensor type.

Values:

ID	CODE	DESCRIPTION
40	Sound	Acoustic, sound, vibration
41	Location	Location based sensor
42	Chemical	Chemical
43	Electricity	Electric current, electric potential, magnetic, radio
44	Flow	Flow, fluid velocity
45	Gases	Gas based readings
46	Acceleration	Acceleration
47	Direction	Directional sensor readings
48	Infrared	Infrared Readings
49	Pressure	Pressure
400	Velocity	Force, density, level
402	Friction	Friction Measurements
403	Radar	Radar sensor
404	Counters	
405	Motion	
406	Air Quality	

407	Altitude	
408	Beacon	
409	Humidity	
410	Lidar	
411	Moisture	
412	Particles	
413	Patterns	
414	Slippage	
415	Temperature	
416	UV	
417	Weight	

FORMAT TYPE

Label:	Format Type
Name:	formatType
Domain	5
Type Id:	
Comment:	This is a designator for format type.

Values:

ID	CODE	DESCRIPTION
500	CSV	Comma Separated
501	TAB	Tab Separated
502	JSON	JSON Format
503	XML	XML Format
504	Positional	Format of a record is defined by start and end position
505	Character	Non comma separated records such as semicolon
506	XLS	XLS Format
507	DOC	DOC/DOCX Format
508	PDF	PDF Format
509	ZIP	Zip
510	TAR	Tar

511	TARGZ	Tar Zipped
512	Unknown	Unknown Format
513	KMZ	Keyhole Markup Language Zipped
514	KML	Keyhole Markup Language

DELIVERY TYPE

Label:	Delivery Type
Name:	deliveryType
Domain	2
Type Id:	
Comment:	This is a designator for delivery type.

Values:

ID	CODE	DESCRIPTION
21	API	Data was delivered via Terbine Ingestion API
22	Upload	Data was delivered via batch upload.
23	MQTT	Data was delivered via Terbine MQTT Transport.
24	Other	Other method/unknown

OWNER TYPE

Label:	Owner Type
Name:	ownerType
Domain	6
Type Id:	
Comment:	This is a designator for owner type.

Values:

This is a designator for owner type.

ID	CODE	DESCRIPTION
60	Organization	Owner is a public or private organization
61	Individual	Owner is an individual
62	Government	Government owned data
63	Non Profit	Owner is a non profit business
64	Education	Owner is an educational institution

CARRIER TYPE

Label:	Carrier Type
Name:	carrierType
Domain	7
Type Id:	
Comment:	This is a designator for carrier type.

Values:

This is a designator for carrier type.

ID	CODE	DESCRIPTION
70	System	Container is part of a larger system.
71	Subsystem	Container is a subsystem of a larger system.

CATEGORY TYPE

Label:	Category Type
Name:	categoryType
Domain	1
Type Id:	
Comment:	This is a designator for category type.

Values:

ID	CODE	DESCRIPTION
1000	AGRICULTURE	Agriculture Category
1001	GOVERNMENT	Government Category
1002	MINING	Mining, Quarrying, and Oil & Gas Extraction
1003	UTILITIES	Utilities Category
1004	CONSTRUCTION	
1005	MANUFACTURING	
1006	WHOLESALE TRADE	

1007	RETAIL TRADE	
1008	TRANSPORTATION	
1009	INFORMATION	
1010	FINANCE AND INSURANCE	
1011	REAL ESTATE	
1012	PROFESSIONAL SERVICES	
1013	MANAGEMENT	
1014	ADMIN SUPPORT	
1015	EDUCATIONAL	
1016	HEALTH CARE	
1017	ARTS	
1018	ACCOMODATION	
1019	OTHER SERVICES	
1020	Public Administration	
1021	ENVIRONMENT AND WEATHER	
1022	Data Supplier	

SCHEMA TYPE

Label:	Schema Type
Name:	schemaType
Domain	8
Type Id:	
Comment:	This is a designator for schema type.

Values:

ID	CODE	DESCRIPTION
80	JSON	JSON Schema definition
81	AVRO	Avro Schema
82	XSD	XML Schema Definition
83	None	
84	Unknown	

LEGAL TYPE

Label:	Legal Type
Name:	legalType
Domain	10
Type Id:	
Comment:	This is a designator for legal type. This is a designator for a party or organization that had or has legal rights for the content.

Values:

ID	CODE	DESCRIPTION
100	Patented	Content is under a patent.
101	Government	Government controlled data.
102	Copyright	Copyrighted content.
103	Proprietary	Proprietary controlled data, public or private data.
104	Open Source	Open source licensed data.
105	None	No Legal Type

REGULATORY TYPE

Label:	RegulatoryType
Name:	regulatoryType
Domain	14
Type Id:	
Comment:	This is a designator for regulatory type.

Values:

ID	CODE	DESCRIPTION
140	GDPR	Content is covered by General Data Protection Regulation.
141	Privacy Shield	Content is covered by Privacy Shield.
142	ITAR	Content is covered by International Traffic in Arms Regulation
143	UK-DPA	United Kingdom Data Processing Act

RELATION TYPE

Label:	Relation Type
Name:	relationType
Domain	11
Type Id	
Comment:	This is a designator for relation type.

Values:

ID	CODE	DESCRIPTION
110	Individual	Data from same individual source

111	Organization	Data from same organization
112	Type	Different source but same type of data

GRADING TYPE

Label:	Grading Type
Name:	gradingType
Domain	12
Type Id:	
Comment:	This is a designator for grading type.

Values:

ID	CODE	DESCRIPTION
120	Bronze	Bronze Level Grading
121	Silver	Silver Level Grading
122	Gold	Gold Level Grading
123	Platinum	Platinum Level Grading

LOCATION TYPE

Label:	Location Type
Name:	locationType
Domain	13
Type Id:	
Comment:	This is a designator for location type.

Values:

ID	CODE	DESCRIPTION
130	Fixed	Fixed location
131	Moving	Moving or mobile location
132	Other	Other or unknown

LOCATION SUB TYPE FIXED

Label:	Location Subtype (Fixed)
Name:	locationSubType Fixed
Domain	101
Type Id:	
Comment:	This is a designator for fixed location sub type.

Values:

ID	CODE	DESCRIPTION
10001	Address	Address, street, city, state, postal etc.

10002	GPS Coordinate	GPS Coordinate, including altitude.
10003	LAT/LON	Latitude / Longitude

LOCATION SUB-TYPE MOVING

Label:	Location Subtype (Moving)
Name:	locationSubType Moving
Domain	102
Type Id:	
Comment:	This is a designator for moving location sub type.

Values:

ID	CODE	DESCRIPTION
10004	Device GPS	Location, via GPS on sensor
10005	System Level	Geo produced by system level tracking
10006	Algorithm Generated	Geo generated via algorithm

METADATA ELEMENTS

Section Name	Occurrence **	Description
Meta	1	Summary information about the metadata.
Identifier	1	Identifying information about the metadata.
Dataset	1	Dataset information about the metadata.
Grading	1	Grading information for this metadata configuration.
Container	1..N	Container information related to larger systems of which the deliver is part of. These can link to other containers providing a hierarchy.
Delivery	1..N	Delivery information about the metadata. At least one record of delivery. Since data can be appended to, there may be more than one delivery.
Ownership	1..N	Ownership information about the metadata. Content may have multiple owners or a chain of ownership that needs to be tracked.
Category	1	This possibly contains reference to multiple categories and multiple tags within the single Category section.
Legal	0..N	Optional information pertaining to legal information.
Relation	0..N	Optional related data information.
Custom List	0..N	Optional information about custom lists linked to this

		metadata configuration. When a list is linked there will be 0..N entries from that list assigned to this metadata configuration.
--	--	--

** For an explanation of the Occurrence column see the section in the Preface titled **Cardinality**.

SAMPLE METADATA

Below is a complete example metadata instance.

```
{
  "id": "c325fe24-5351-407b-9544-17730920f34b",
  "identifier": [
    {
      "id": "c325fe24-5351-407b-9544-17730920f34b",
      "tid": "000000000111111122222222aaabbccc",
      "extId": "ID_EXT_ID",
      "urn": "urn:sensorDate",
      "uri": "www.sensordata.com/schemaInfo",
      "createUpdateInfo": [
        {
          "createUser": "SYSTEM_USER",
          "createDate": "2015-11-18T06:18:23Z",
          "updateUser": null,
          "updateDate": null
        }
      ],
      "meta": [
        {
          "name": "Test Metadata",
          "description": "Test Metadata Description",
          "version": "1.0",
          "imageUrl": "http://somehost.com/image/someimage.jpg",
          "createUpdateInfo": [
            {
              "createUser": "SYSTEM_USER",
              "createDate": "2015-11-18T06:18:23Z",
              "updateUser": null,
              "updateDate": null
            }
          ],
          "dataset": [
            {
              "id": "6a6a80f8-a9b5-473a-b1ac-863f093ed345",
              "extId": "SRC_EXT_ID",
              "type": 30,
              "sensorInfo": [
                {
                  "type": 44,
                  "make": "make 123",
                  "model": "model 123",
                  "comment": "Specific sensor comment"
                }
              ],
              "schemaInfo": [
                {
                  "id": "71b821af-fe2e-442a-b07d-d8fdf8ee02d5",
                  "format": 6,
                  "type": 81,
                  "property": ";",
                  "body": null
                }
              ]
            }
          ]
        }
      ]
    }
  ]
}
```

```

    "createUpdateInfo": {
        "createUser": "SYSTEM_USER",
        "createDate": "2015-11-18T06:18:23Z",
        "updateUser": null,
        "updateDate": null
    }
},
"comment": "Comment on sample dataset information",
"createUpdateInfo": {
    "createUser": "SYSTEM_USER",
    "createDate": "2015-11-18T06:18:23Z",
    "updateUser": null,
    "updateDate": null
}
},
"containers": [
{
    "id": "f6c8f665-0f58-4ad1-93ed-82b1c04fa7d4",
    "type": 130,
    "parentId": null,
    "extId": "CONT_EXT_ID",
    "name": "Container name",
    "description": "Container long description",
    "locationType": 130,
    "locationSubType": 10001,
    "location": {
        "address": "",
        "city": "",
        "state": "",
        "county": "",
        "country": "",
        "postalCode": "",
        "freeText": ""
    }
},
"createUpdateInfo": {
    "createUser": "SYSTEM_USER",
    "createDate": "2015-11-18T06:18:23Z",
    "updateUser": null,
    "updateDate": null
}
],
"deliveries": [
{
    "id": "8da51760-a07b-47c7-a8c1-b15c46cb2c14",
    "type": 22,
    "size": 32032223232,
    "hash": null,
    "deliveryDate": "2015-11-18T06:18:23Z"
}
],
"owners": [
{
    "id": "87d77111-e11d-4823-9fab-575a4a21c150",
    "type": 60,
    "comment": "Ownership comment",
    "startDate": "2015-11-18T06:18:23Z",
    "endDate": null,
    "createUpdateInfo": {
        "createUser": "SYSTEM_USER",
        "createDate": "2015-11-18T06:18:23Z",
        "updateUser": null,
        "updateDate": null
    }
}
]
}

```

```

        "updateDate": null
    }
},
],
"categories": [
{
    "name": "Utilities",
    "id": 1003
},
{
    "name": "Information",
    "id": 1008
}
],
"tags": [
{
    "name": "Voltage",
    "id": 0
},
{
    "name": "Sensor Data",
    "id": 0
}
],
"legal": [
{
    "id": "ca91ab15-2c1b-4fd5-98c0-137fa74ac97e",
    "type": 102,
    "externalUrl": "http://somehost.com/legal/legalinfo.html",
    "comment": "Legal Information for COPYRIGHT",
    "startDate": "2015-11-18T06:18:23Z",
    "endDate": null,
    "createUpdateInfo": {
        "createUser": "SYSTEM_USER",
        "createDate": "2015-11-18T06:18:23Z",
        "updateUser": null,
        "updateDate": null
    }
},
{
    "id": "e46d1eb4-74e0-42cc-abe9-1966529759a8",
    "type": 101,
    "comment": "Legal Information for GOVERNMENT",
    "startDate": "2015-11-18T06:18:23Z",
    "endDate": null,
    "createUpdateInfo": {
        "createUser": "SYSTEM_USER",
        "createDate": "2015-11-18T06:18:23Z",
        "updateUser": null,
        "updateDate": null
    }
}
],
"regulatory": [
{
    "id": "7ff9924a-580c-435e-96d4-d3c2c321a84e",
    "type": 141,
    "comment": "Regulatory Information for SAFEHARBOR",
    "startDate": "2015-11-18T06:18:23Z",
    "endDate": null,
    "createUpdateInfo": {
        "createUser": "SYSTEM_USER",

```

```

        "createDate": "2015-11-18T06:18:23Z",
        "updateUser": null,
        "updateDate": null
    },
],
"relations": [
{
    "id": "d386807f-500f-4e5b-925e-7d572d4a6e0f",
    "type": 112,
    "referenceId": "90c2a940-f949-427a-830e-e864aa7622f1",
    "comment": "Relationship Sample",
    "createUpdateInfo": {
        "createUser": "SYSTEM_USER",
        "createDate": "2015-11-18T06:18:23Z",
        "updateUser": null,
        "updateDate": null
    }
},
],
"gradings": [
{
    "id": "631e32e7-8552-4124-9da0-3c2cd7290a1c",
    "type": 120,
    "grade": "Gold",
    "comment": "Sample grading information",
    "createUpdateInfo": {
        "createUser": "SYSTEM_USER",
        "createDate": "2015-11-18T06:18:23Z",
        "updateUser": null,
        "updateDate": null
    }
},
],
"customLists": [
{
    "id": "32ee4079-e562-45c8-8a63-ab11c56af3b9",
    "name": "ODB-II Codes",
    "entries": [
{
        "listId": "32ee4079-e562-45c8-8a63-ab11c56af3b9",
        "id": "P0611",
        "name": "Fuel Injector Control Module Performance",
    },
{
        "listId": "32ee4079-e562-45c8-8a63-ab11c56af3b9",
        "id": "P0612",
        "name": "Fuel Injector Control Module Relay Control Circuit",
    }
],
"userCreated": "aab864c1-74fc-44c1-b0d3-531828717729",
"dateCreated": "2017-07-20T14:27:58Z"
}
]
}

```

APPENDIX A - GLOSSARY

Attribute - named characteristic of an Entity.

Category -

Channel – Unique delivery within an organization. An organization can have many channels and each channel has a metadata instance related to it.

Company - *See organization.*

CSV -

Dictionary - list of terms and possibly their occurrence.

Entity - person, place, or thing about which data is stored.

Extract - subset of data that is pulled a main data set.

Group -

Instance - an actual concrete example of

Join - combining data based on a common attributes or defined set of attributes.

JSON -

Lifecycle -

Metadata - detailed description of the instance data, format, content, source, and modification history. Within Terbine this is used to track all information about content delivered to the Terbine Ingestion API , Persisted within Terbine and displayed within the Terbine Marketplace.

MIME - Internet Media Types

Namespace - The use of namespaces avoids conflict between properties in different schemas that have the same name but different meanings. For example, two metadata entities might have an Owner property: in one, it might mean the person who owns a resource; in another context, the application used to create the resource.

Organization -

Owner – current parent of the data generally a group or organization.

Schema -

Subtype -

Tag -

Type -

URI -

URN -

UUID -

XML -

APPENDIX B - REVISIONS

Version	Date	Name	Description
Draft	2015/10/02	Brian Enochson	For Review
Draft	2015/10/20	Brian Enochson	Added Regulatory Section
Draft	2016/01/30	Brian Enochson	Updated with recent additions for Meta and Legal sections.
Draft	2016/03/01	Brian Enochson	Updated Reference Domain Information.
Draft	2016/03/30	Brian Enochson	General Updates
Draft	2016/10/22	Brian Enochson	Citation and Legal Enhancement
Draft	2017/02/01	Brian Enochson	Multiple identifier updated
Draft	2017/07/23	Brian Enochson	TERBINE identifier, refactor spec and add industry specific information. Remove content attributes from metadata. Remove events.
Draft	2017/08/22	Brian Enochson	Minor modifications around id and provenance tracking
Draft	2017/09/17	Brian Enochson	Changes for domain values, identifier and schema changes.