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SWITCH Deliverable Briefing Note

SWITCH Document: A database for a suite of informational and decision-making tools
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Audience This deliverable is targeted to persons interested in databases development, including the realisation of conceptual data models (CDM) and to the users of the database, which means especially the developers teams of information sharing and decision making modules (Theme 1) who will make direct use of the data to be stored in the planned database.
Purpose Create a database schema able to host and make available the various data required by the suite of different information sharing and decision making tools (developed in Theme 1).
Background Several modules are being developed (Theme 1) to provide information sharing and decision making tools to the Learning Alliances. These tools require the same general water-related data in plus of some specific requirements. Therefore, a common database will provide a useful asset to avoid redundant developments and enhance compatibility and data exchange between modules. However, the development process of such a database deserves a careful methodology if it is to be efficient and to meet users' needs. A methodology is therefore proposed in this deliverable, before detailing its subsequent application to the development of the common database. It necessitates in particular the elaboration of a conceptual data model, graphically showing the data architecture, and enabling to communicate it, submit it to users, in order to refine it, before the realisation of the actual database.
Potential Impact The common database will enable information sharing and decision making tools (Theme 1) to make use of data stored in a proper way. It will avoid redundant work, as several modules require the same data. It will also enhance compatibility and data exchange between the modules.
Recommendations The annex 3 -the data dictionary- provides a detailed reference of all the entities and attributes. Therefore, its consultation is only required for the readers wishing to dig into the details. Annex 1 was taken over from a previous deliverable, as it is an input for the present study. Annex 1 and Annex 2 -one of the major outputs of this deliverable- are both large diagrams. If required, print them at least in A3 format.

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Abstract

Several modules of the SWITCH project aim at providing Learning Alliances with information sharing and decision making tools. Most of these modules will make use of similar, water-related data. In order to (i) avoid redundant developments and (ii) enhance compatibility and data exchange between the modules, a common database appears to be an appropriate technology. However, the creation process of databases might be long and difficult, especially if it involves many different users with various needs. This paper therefore first proposes a methodological framework for the development process, and then describes the way this methodology is applied to the common database realisation process.

1 Introduction

Within the SWITCH project, several information sharing and decision-making tools are under development, such as a geographic information system (GIS), a knowledge management system, an indicator viewer, or a systemic view upon the water system. These tools make use of similar general water-related data, and of some specific data. Therefore, a common database would provide an efficient way of avoiding redundant development works for data storage. Moreover, it would enhance the compatibility and data exchange between modules. However, before reaching the production stage of a database, a possibly long process of preparation and development is necessary, especially in a case involving several different teams with different needs. And such a process can follow different paths.

For the development of the common database, a methodology was first established. It is described in the next section. Its application was then started, and led to the creation of a first version of the conceptual data model and the first deployment of this model into a database schema. This work is described in the section “Application”. Finally, a short synthesis and the next steps are provided in the conclusive section.

2 Methodology

The methodology that was used for the realisation of the common database for a suite of information-sharing and decision-making tools (SWITCH Theme 1) is described in this section. The different steps are represented in Figure 1 and detailed hereafter. They give rise to the production of different intermediary outputs (marked in bold and listed below).

- 1) Identify users: Users are defined as persons who will make use of the database: in general, this use will occur indirectly, through interfaces such as geographic information systems (GIS) which provide a way of displaying the data in a convenient manner. In order to capture the different users’ needs, the whole range of database users has to be identified, through interviews starting with the evident users, and possibly extending to successive circles of potential users. This process leads up to the creation of a **(i) users list** exhaustively including the users, either mentioned namely, or through category names covering groups of users with similar needs.
- 2) Define users’ requirements: On the basis of the users list, **(ii) users’ requirements** should be made explicit within a formal document. This document lists what the users expect to do with which data (e.g. consultation of specific information, edition, analysis) and through which interface (e.g. users’ forms, GIS, web displayer). This can be carried out through interviews with the users, or representatives of users groups. However, at this stage, users might still be unaware of the potential functionalities they can get, especially if they are not used to utilising database-related tools. This might lead to the impossibility to exhaustively uncover all the requirements, and to the possible refinement of the users’ requirements document in later steps of the process, once users realise the full potential of the tools.
- 3) Identify data: The analysis of the users’ requirements document allows extracting the information about what data is to be included into the database. Therefore, this step leads to the production of the next important intermediary document, the **(iii) data list**.
- 4) Select a CDM design methodology: There are several methodologies available for designing conceptual data models (CDM, see next point hereafter), including commercial and free

academic applications, supporting or not different concepts such as spatiality, time, or uncertainties, and possibly providing a semi-automatic mean of generating the database schema, for different database management systems (DBMS, such as Oracle, PostgreSQL or MSAccess) based on different concepts (e.g. relational database, object-oriented database). Therefore, depending upon the kind of data to be included and the users' requirements, including the target applications, the most appropriate tool for designing the CDM can be selected.

- 5) Design the CDM, submit and adapt CDM: The conceptual data model is a graphical representation of the data -using entities to show database tables and attributes- and of its relations (generalisation, composition, functional relation, etc.) -using different connectors. This important step enables globally designing the architecture of the database. This is achieved by specialists, through an effort of transposing the required data and users requirements into a possible **(iv) CDM**. Then, the CDM provides a useful document to communicate the vision upon the database. It serves as a basis for discussions with the previously identified users and for subsequent iterative refinements. This submission and refinement iterative process may also lead to discovering missing data of importance to users, and therefore, to subsequent refinement of the users' requirements document.
- 6) Deploy the database schema: Once the CDM has been validated by the users, it has to be translated into the database schema. Depending upon the tools used to design the CDM this may involve just few operations in a semi-automatic process, or a fully manual work. Sometimes, a logical and a physical data model are created, as intermediary steps between the concept and the database.
- 7) Feed DB with data: On the basis of the data list, the database can be fed with appropriate data. This step may imply much manual effort. Sometimes, data can be semi-automatically recovered from other databases or from spreadsheets.
- 8) Submit and adapt DB: The database schema being fed with data, the produced database can be submitted to users. At this pre-production stage, they might still discover lacks, or missing data, which may involve revising the schema, or the CDM, or they may even issue new requirements that they didn't express before. By the end of this iterative refinement process, the **(v) database** is ready for production.

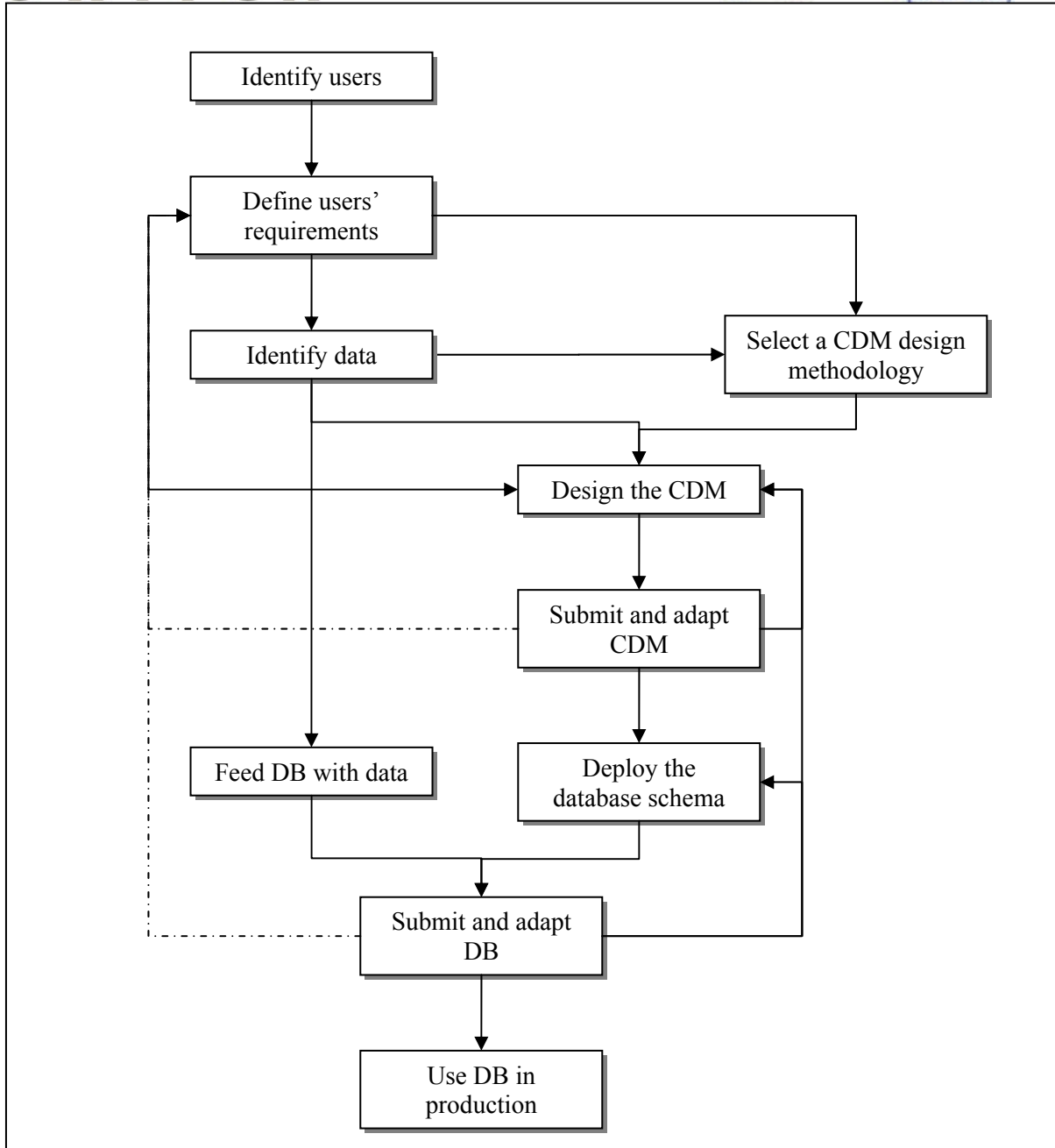


Figure 1: Database development steps

3 Application

There are several modules under development within the SWITCH Theme 1 to help sharing information and make decisions. Most of these modules require similar data, which makes the design of a common database especially adequate. Thus, the methodology detailed in the previous section is currently being applied to the development of this common database. The following points refer to those mentioned in the methodology:

- 1) Identify users: End-users are the stakeholders in the demo cities, which includes at least the Learning Alliance's members. However, these end-users will only indirectly make use of the database, through the different information sharing and decision making modules. These latter are in turn responsible of developing tools in accordance with their target users' (possibly overlapping subsets of the end-users) needs and are therefore relevant representatives of the end-users. Thus, the users list, provided in Table 1, is the inventory of the modules' development teams.

Table 1: Common database users list (adapted from Theme 1 PhD workshop's minutes, Nov. 2007)

Module	Short description
GIS	Visualisation of all spatial data and spatial indicators. Functionalities to include model implementation.
Indicator Viewer	Visualisation of non-spatial indicator results (charts, graphs, tables, single value results).
City water vision	An interactive tool to help stakeholders explore issues and scenarios, share knowledge and opinions.
City water	A total water cycle analysis tool, including water, water quality and energy balance outputs for alternative future strategies and to provide life cycle assessments of net present value costs and total energy consumption.
City drain	An event based conceptual hydrological model to address flooding and flood damage at the urban catchment scale.
City water risk	A tool to identify global change drivers and to develop frameworks to analyse the risks and to quantify the risks.
City water futures	An agent-based modelling system to evaluate stakeholder responses to alternative strategies for coping with different scenarios.
City water strategy	A performance assessment tool coupled with a solution explorer and optimiser to support the selection of adapted strategies for sustainable integrated urban water management.
City water system	A tool to explore a city water system to identify holistically all functional interactions between components, attributes and stakeholders of the system.
City water economics	A tool to explore the potential effects of economic drivers for change in water use based on outputs for LCA costings from City Water and financial modelling concepts.

- 2) Define users' requirements: As all the modules are still under development, the requirements were formulated as general functionalities through discussions with the developers and

consultation of their technical documents. The synthesis of the expressed functionalities along different conceptual axis is given in Table 2.

Table 2: Synthesis of the users' requirements along conceptual axis

Axis	Requirement
Time	Present state, past state and future states consultation and edition
Space	Geographical view
Scenarios / Strategies	Hypothetical and vision states objects consultation and edition
System	Groups and nested groups, hierarchical parent-children structure; interrelations-related data (influences, fluxes) consultation and edition
Data types	Water-related objects with geographical location, values and imprecision, descriptions, opinions, documents and multimedia documents
Data mining	Best management practices (BMPs) objects as sets of technical and non-technical options
Uncertainties background	Characteristics of the origin and overall background information behind any data stored in the database (e.g. values, water-related objects)

- 3) Identify data: Again, as all modules are still under development, no exhaustive data list could be finalised. The provisional inventoried data is summarised in Table 3 (with detail of the numeric information in Table 4). The lists were elaborated through discussions with the modules developers and through the analysis of the users' requirements and of the technical documentation relative to each module.

Table 3: Data lists summary

Data type	List
Water-related object	This includes all the objects represented in the water management system model (see Annex 1).
Numeric information	<p>The detailed list of the numeric information is provided in Table 4.</p> <p>(i) Numeric information may be produced through one or more (in parallel and/or series) of the following <i>generation methods</i>:</p> <ul style="list-style-type: none"> • Measures, statistic • Historical record • Calculation, simulation • Expert judgement <p>(ii) They may document different <i>levels</i> of a same value type: its mean, minimum (or lower bound), maximum (or upper interval bound), or a given return period.</p> <p>(iii) They may be <i>reference</i> values (legal, target or design values).</p> <p>(iv) They might characterise <i>imprecision</i> with interval values, probability distribution functions (pdf) or fuzziness.</p>
Descriptive information	Pictures, text documents (legislation, studies, descriptions, remarks, opinions) and possibly other multimedia documents describing water-related objects.
Uncertainties background	<p>Level of uncertainty, nature of uncertainty and knowledge-base qualification defining the uncertainties about the data.</p> <p>Pedigree, documenting the origin and processes of the data.</p>

Table 4: Numeric data list






Category	Name
Water quantity	Discharge (streams, supply and sanitation networks)
	Precipitation
	Resources volumes (aquifer, surface water, snow)
	Wastewater sludge
	Virtual water
	Connection rate to supply network
	Connection rate to sanitation network
	Use rate (industry, agriculture, domestic)
	Reuse rate
Water quality	DBO5
	DCO
	Suspended solids
	Phosphorous
	Nitrogen
	Escherichia Coli
	pH
	Salinity
	Temperature
	Water-related diseases
Energy	Bathing indicator
	Water framework directive indicator
	Consumption (supply, sanitation, industries, agriculture, domestic)
Economics	Production
	Income
	Maintenance expenditures
	Value (investment, current, usage, non-usage)
Data	Duration (age, design duration)
	Flux

4) Select a CDM design methodology:

Among several candidates, two conceptual data modelling methodologies were investigated in more details, as the most suitable, after a first screening process: (i) the MADS approach (Parent et al., 2006) and (ii) Perceptory (Bedard et al., 2004). Both approaches are developed by academic institutions and provide freely their design tools. They also both propose advanced, rich semantics to model the spatial and temporal aspects of the data. They finally both provide a suite of tools allowing to design and validate CDMs and subsequently translate them into database schemas. However, the tools provided by the MADS approach were found much less convenient and reliable than Perceptory's and the latter was therefore selected. Perceptory proposes a series of pictograms to efficiently represent the various spatial and temporal aspects of data. The basic pictograms are shown in Table 5. They can be further combined to provide more complex definitions, such as: objects whose shape are evolving in time, or objects that can be either located with a point or a polygon on a map. Using Perceptory requires the software Microsoft Visio, which provides extended

diagramming functionalities, including UML (unified modelling language, see for instance Rumbaugh et al. (2004) for a reference). The Perceptory plug-in extends the UML and provides tools for validating and exporting the schema towards Oracle database management system, as well as generating data dictionaries.

Table 5: Basic conceptual data modelling pictograms in Perceptory and their meanings (adapted from (Bedard, 2005))

Pictogram	Interpretation
	Spatial location: point
	Spatial location: polyline
	Spatial location: polygon
	Timestamp: instant
	Timestamp: duration

- 5) Design the CDM, submit and adapt CDM: Given the users' requirements, the data lists, and considering the fact that these latter may still evolve, the first version of the CDM was realised with an effort to keep it flexible and extendable. This document is shown in Annex 2. It is documented by the extensive data dictionary in Annex 3, which provides details about each entity and its attributes. The CDM was elaborated along the following principles:
 - Separate clearly the information (green package) from the water-related objects (blue package) and the uncertainties background (orange package), which may apply to objects from the two others packages,
 - Use UML and Perceptory (see previous point) to represent entities (rectangles) and their relations (plane links represent a functional relation; triangle-headed links represent generalisations, or a parent-child relation; diamond-headed links represent a composition relation),
 - Include meta-data information in most objects (Attributes "Author" and "Last modification"),
 - Model time and space with Perceptory pictograms (see previous point),
 - Possibly reference water-related objects into one or more scenarios or strategies (entity "Scenario or Strategy"),
 - Implement the interactions between system elements (entity "Interaction")
 - Implement a hierarchical structure to mirror the groups and nested groups organisation required for the systemic view (hierarchical, tree-like structure in the lower side of the blue package),
 - Implement the various required data types and their respective lists; create a generic structure to host the various numeric data inventoried in the data list and the list's possible future extension (entity "Value or Reference Value" and related entities).
 - Implement a way of distinguishing values from references, to enable benchmarking, comparisons with target values or Best Management Practices (entity "Reference Interpretation" and related entities),
 - Model the required uncertainties background with its various information requirements (orange package).

Regarding the submission and adaptation of this first version of the CDM, this is yet to take place, once the modules will reach a sufficiently mature state, implying an extensive knowledge of their needs, especially in terms of data.

- 6) Deploy the database schema: Although the previous step is not finalised, first successful deployments of the schema into an Oracle database management system were carried out, showing the appropriateness of the Perceptory (see point 4) tools for this operation.

Finally, points 7) Feed DB with data and 8) Submit and adapt DB will start once the CDM will be validated

4 Synthesis and conclusion

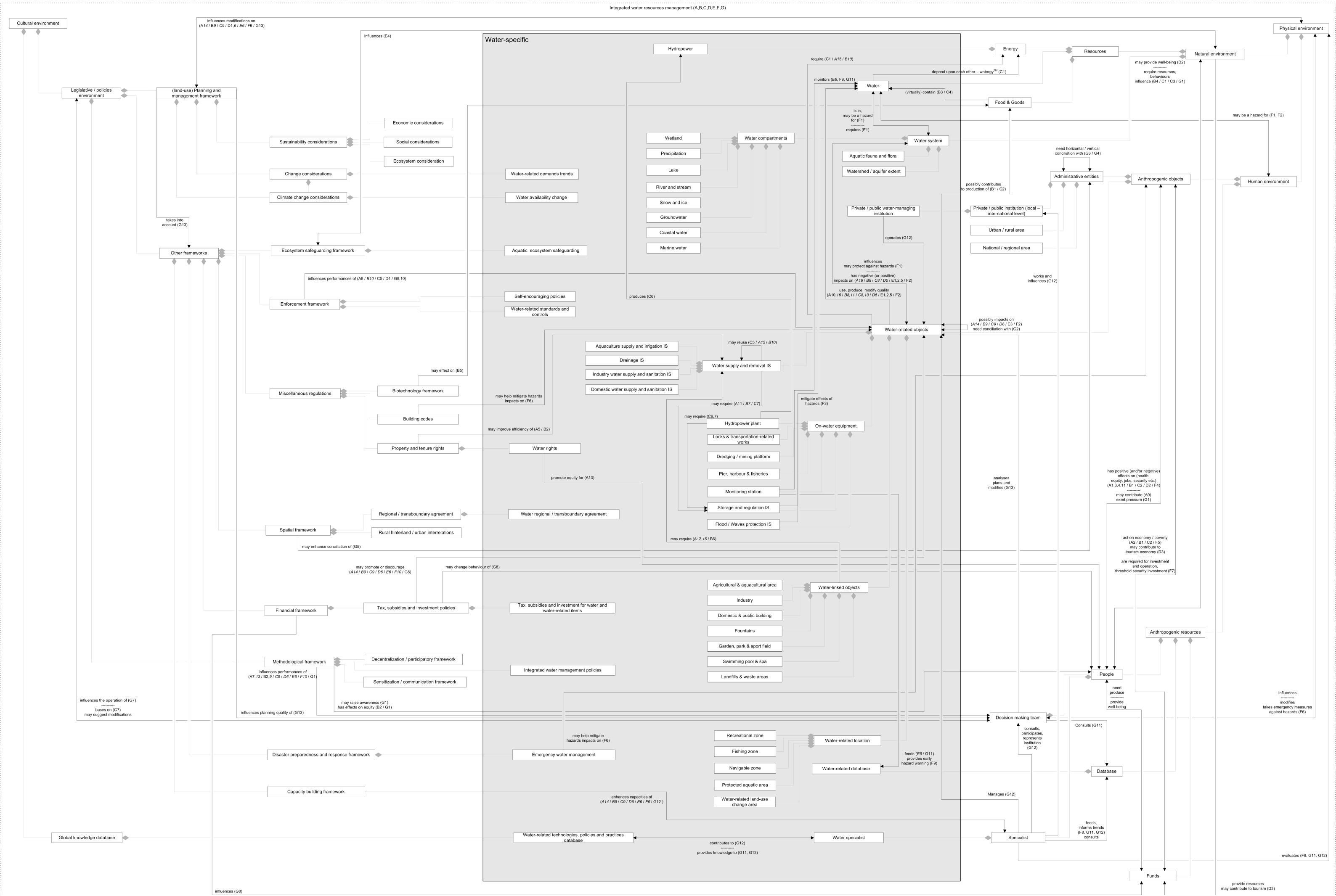
Several information-sharing and decision-making tools, developed as separate modules in the SWITCH project require similar information. Therefore, it is adequate to develop a common database for these modules. The development follows a general methodology based on the users' requirements, their feedbacks and subsequent refinements in an iterative process. This process includes the realisation of a conceptual data model (CDM), which allows graphically designing the database architecture and therefore communicating it, before creating the actual physical database. This way, users were first identified as the different modules developers (representing their respective end-users), their requirements, as well as the data involved were inferred from discussions and technical documents. A conceptual data modelling approach, called Perceptory, was then selected and applied to realise the first version of the CDM. Also, the translation of the latter into an Oracle database schema was successfully achieved.

The process of realising a database for a suite of information-sharing and decision-making tools is thus taking place properly. The next steps will involve the submission of the CDM -and then, of the actual database- to the users, its possible refinement and finally its validation. This will lead up to the production phase of the common database.

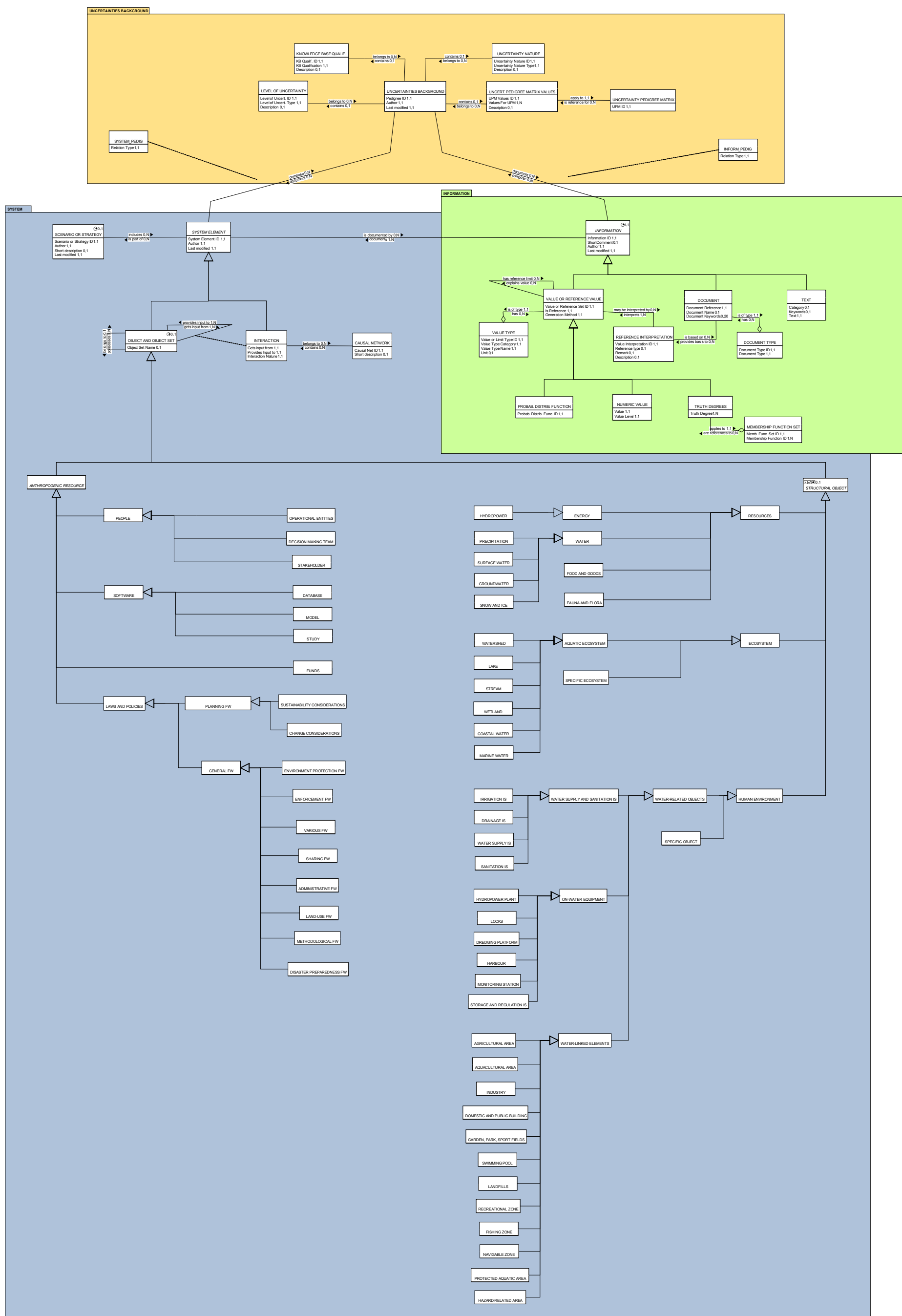
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Annex 1. Water management system model



Annex 2: Common Geodatabase Conceptual Data Model for a suite of informational and decision-making tools (SWITCH Theme 1)



<<ENUMERATION>>	<<ENUMERATION>> GENERATION METHOD DOMAIN	<<ENUMERATION>> THREESTEP APPRAISAL DOMAIN	<<ENUMERATION>> PEDIGREE RELATION TYPE	<<ENUMERATION>> TEXT CATEGORY	<<ENUMERATION>> UNCERTAINTY NATURE DOMAIN	<<ENUMERATION>> DOCUMENT TYPE DOMAIN	<<ENUMERATION>> VALUE CATEGORY DOMAIN	<<ENUMERATION>> REFERENCE TYPE DOMAIN
LEVEL OF UNCERTAIN DOMAIN	1 = Smallest or calculation 2 = Expert judgement 3 = Statistic or measure 4 = Historical record	1 = Small 2 = Medium 3 = Strong	1 = ObjectPartOfPedigree 2 = PedigreeQuotientOfObject	1 = Comment 2 = Opinion 3 = Assessment 4 = Problem 5 = Information 6 = Vision 7 = Scenario 8 = Variability-related	1 = Knowledge-related 2 = Variability-related	1 = Picture 2 = Document 3 = Movie	1 = Economic 2 = Social 3 = Environmental	1 = Legal 2 = Target 3 = Design

Schema information	
Project Name	SWITCH
Schema Name	Theme 1 Geodatabase
Organization	HYDRAM/EPFL
Individual	Colin Schenk, Bastien Rogier, Marc Soutter
File Name	E:\Colin\switch\Concepts\deliverable-4\Annex2_cdm.vsd
Version	0.1
Version Date	20.12.2007

**Annex 3 : Data dictionary
for the Common Geodatabase Conceptual Data Model
for a suite of informational and decision-making tools
(SWITCH Theme 1)**

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Class: Administrative FW

Stereotype name

Implementation name

AdministrativeFW



Abstract class

Semantics

Definition

This covers the framework (FW) regarding water-related administrative boards and other organisations managing water: centralisation or decentralisation, cooperation, communication or competition,. general organisation and staff management, capacity building.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

General FW

Class: Agricultural Area

Stereotype name

Implementation name

AgriculturalArea



Abstract class

Semantics

Definition

An area dedicated to agriculture.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-linked elements

Class: Anthropogenic Resource

Stereotype name

Implementation name

NonStructObject



Abstract class

Semantics

Definition

This covers anthropogenic resources: laws, funds, software, organisations, etc.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Object And Object Set

Class: Aquacultural Area

Stereotype name

Implementation name

AquaculturalArea



Abstract class

Semantics

Definition

An area dedicated to aquaculture.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-linked elements

Class: Aquatic Ecosystem

Stereotype name

Implementation name

AquaticEcosystem



Abstract class

Semantics

Definition

This groups wetlands, streams, lakes, coastal water and marine water.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Ecosystem

Class: Causal Network

Stereotype name

Implementation name

CausalNetwork



Abstract class

Semantics

Definition

This enables to track a series of one-after-the-other interactions which form a causal network.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Causal Net ID

Short description

List of associations

contains 0,N Interaction

List of supertype

Attribute definition : Causal Net ID 1,1

Implementation name

CausalNetID



Strong identifier

Semantics

Definition

The causal network unique identifier

Code

Derivation rules

Data type

Perceptory data type

unique identifier ID

Field size

0

Decimal places

0

Implementation data type

Number



Compose primary key



Required



will be index

Default value

Measurement units

Visibility

Details

Attribute definition : Short description 0,1

Implementation name

ShortDesc

☐ **Strong identifier**

Semantics

Definition A short description of the causal network
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Varchar2(size)
Field size 100

☐ **Compose primary key**
☐ **Required**
☐ **will be index**

Default value
Measurement units
Visibility
Details

Class: Change Considerations

Stereotype name

Implementation name

ChangeConsiderations



Abstract class

Semantics

Definition

This covers the framework for the integration of considerations of local and global changes (like populations trends, water availability and demand trends, or climate change).

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Planning FW

Class: Coastal Water

Stereotype name

Implementation name

CoastalWater



Abstract class

Semantics

Definition

Mangroves, estuaries, transitional waters, etc.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Aquatic Ecosystem

Class: Database

Stereotype name

Implementation name

Database



Abstract class

Semantics

Definition

Database containing useful data for water-related management.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Software

Class: Decision Making Team

Stereotype name

Implementation name

DMTeam



Abstract class

Semantics

Definition

The set of people involded in decision making.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

People

Class: Disaster Preparedness FW

Stereotype name

Implementation name

DisasterPreparednessFW



Abstract class

Semantics

Definition

This includes the legislative tools for water-related emergency cases.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

General FW

Class: Document

Stereotype name

Implementation name

Document

☐

Abstract class

Semantics

Definition

This is a document file (such as MSWord file or any other document-like format)

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Document Reference

Document Name

Document Keywords

List of associations

is of type 1,1 Document Type

is of type 1,1 Document Type

provides basis to 0,N Reference Interpretation

List of supertype

Information

Attribute definition : Document Reference 1,1

Implementation name

Document_Reference

☐

Strong identifier

Semantics

Definition

A pointer to the referenced file

Code

Derivation rules

Data type

Perceptory data type

others

Field size

0

Decimal places

0

Implementation data type

BLOB

☐

Compose primary key

☒

Required

☐

will be index

Default value

Measurement units

Visibility

Details

Attribute definition : Document Name 0,1

Implementation name DocName
☐ Strong identifier

Semantics

Definition A name describing the document
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Varchar2(size)
Field size 30

- ☐ Compose primary key
☐ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Attribute definition : Document Keywords 0,20

Implementation name DocKeywords
☐ Strong identifier

Semantics

Definition This provides the possibility of describing the document with up to 20 keywords
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type CLOB

- ☐ Compose primary key
☐ Required
☐ will be index

Default value
Measurement units
Visibility

Details

Class: Document Type

Stereotype name

Implementation name

Document_Type

☐

Abstract class

Semantics

Definition

This provides a reference to different document types. Each document must belong to one of them.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Document Type ID

Document Type

List of associations

has 0,N Document

has 0,N Document

List of supertype

Attribute definition : Document Type ID 1,1

Implementation name

DocumentTypeID

☒

Strong identifier

Semantics

Definition

The unique identifier for the document type.

Code

Derivation rules

Data type

Perceptory data type

unique identifier ID

Field size

0

Decimal places

0

Implementation data type

Number

☒

Compose primary key

☒

Required

☐

will be index

Default value

Measurement units

Visibility

Details

Attribute definition : Document Type 1,1

Implementation name InfoTypeDesc
☐ Strong identifier

Semantics

Definition The type of the document.
Code
Derivation rules

Data type

Perceptory data type
Field size 0
Decimal places 0

Implementation data type
Field size
Decimal places

☐ Compose primary key
☒ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Domain definition: Document Type Domain

Implementation name DocumentTypeDomain
Details
Domain types Enumeration

Code value 1
Name value Picture
Definition value

Code value 2
Name value Document
Definition value

Code value 3
Name value Movie
Definition value

Class: Domestic And Public Building

Stereotype name

Implementation name

DomPubBuilding



Abstract class

Semantics

Definition

Water consumers using water for private, daily life.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-linked elements

Class: Drainage IS

Stereotype name

Implementation name

DrainageIS



Abstract class

Semantics

Definition

Infrastructure (IS) used for drainage, like pipes, or set of pipes.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water Supply And Sanitation IS

Class: Dredging Platform

Stereotype name

Implementation name

DredgingPlatform



Abstract class

Semantics

Definition

Platform or other device used to dredge.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

On-Water Equipment

Class: Ecosystem

Stereotype name

Implementation name

Ecosystem



Abstract class

Semantics

Definition

The ecosystem includes aquatic ecosystems: habitats such as wetlands and rivers.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Structural Object

Class: Energy

Stereotype name

Implementation name

Energy



Abstract class

Semantics

Definition

The energy resource.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Resources

Class: Enforcement FW

Stereotype name

Implementation name

EnforcementFW



Abstract class

Semantics

Definition

This covers the methodologies used for enforcement of objectives and policies: standards, controls, fines, self-encouraging policies, taxes, investments, subsidies, import / export policies...

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

General FW

Class: Environment Protection FW

Stereotype name

Implementation name

EcosystemProtectionFW



Abstract class

Semantics

Definition

This covers the laws and policies protecting the environnement.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

General FW

Class: Fauna And Flora

Stereotype name

Implementation name

FaunaAndFlora



Abstract class

Semantics

Definition

The various fauna and flora resources.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Resources

Class: Fishing Zone

Stereotype name

Implementation name

FishingZone



Abstract class

Semantics

Definition

A zone used for sport or commercial fishing.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-linked elements

Class: Food And Goods

Stereotype name

Implementation name

FoodAndGoods



Abstract class

Semantics

Definition

Water is virtually contained in food and goods.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Resources

Class: Funds

Stereotype name

Implementation name

Funds



Abstract class

Semantics

Definition

The available monetary resource.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Anthropogenic Resource

Class: Garden, Park, Sport Fields

Stereotype name

Implementation name

GardenParkSportField



Abstract class

Semantics

Definition

Water is used for watering gardens, parks and sport fields.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-linked elements

Class: General FW

Stereotype name

Implementation name

GeneralFW



Abstract class

Semantics

Definition

This is just a group including the various frameworks (FW) except the planning and management framework, which may refer to it.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Laws And Policies

Class: Groundwater

Stereotype name

Implementation name

Groundwater



Abstract class

Semantics

Definition

The water resource included in groundwater.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water

Class: Harbour

Stereotype name

Implementation name

Harbour



Abstract class

Semantics

Definition

Harbour, used as a base for entertainment, transportation or fishing navigation activities.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

On-Water Equipment

Class: Hazard-Related Area

Stereotype name

Implementation name

HazardRelatedAre



Abstract class

Semantics

Definition

Area under water-related danger: flooding area, water scarcity zone, etc.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-linked elements

Class: Human Environment

Stereotype name

Implementation name

HumanEnvironment



Abstract class

Semantics

Definition

This covers water-related objects, such as infrastructures for sanitation, and activities locations.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Structural Object

Class: Hydropower

Stereotype name

Implementation name

Hydropower



Abstract class

Semantics

Definition

The energy produced through hydropower plants.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Energy

Class: Hydropower Plant

Stereotype name

Implementation name

HydropowerPlant



Abstract class

Semantics

Definition

Run-of-river, small or big, with or without dam equipment designed to produce energy through water use.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

On-Water Equipment

Class: Industry

Stereotype name

Implementation name

Industry



Abstract class

Semantics

Definition

Infrastructures with water consumption and wastewater production significantly different from domestic usage.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-linked elements

Class: Inform_Pedig

Stereotype name

Implementation name

Inform_Pedig

☐

Abstract class

Semantics

Definition

This relational class allows to specify the kind of relation existing between the two objects:

- Information being part of a pedigree

or

- Pedigree providing info on the uncertainties to an information

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Relation Type

List of associations

List of supertype

Attribute definition : Relation Type 1,1

Implementation name

RelationType

☐

Strong identifier

Semantics

Definition

See class definition

Code

Derivation rules

Data type

Perceptory data type

Field size

0

Decimal places

0

Implementation data type

Field size

Decimal places

☐

Compose primary key

☐

Required

☐

will be index

Default value

Measurement units

Visibility

Details

Domain definition: Pedigree Relation Type

Implementation name	PedigreeRelationType
Details	
Domain types	Enumeration
Code value	1
Name value	ObjectPartOfPedigree
Definition value	
Code value	2
Name value	PedigreeDocumentingObject
Definition value	

Class: Information

Stereotype name

Implementation name

Information



Abstract class

Semantics

Definition

This covers any kind of information that may document the system. It is separated between documentation and indicators.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Information ID

ShortComment

Author

Last modified

List of associations

documents 1,N System Element
is documented by 0,1 Uncertainties background
compose 0,N Uncertainties background

List of supertype

Temporal definition : x 1,1

Acquisition rules

Derivation rules

Details

Temporal reference system

Zone

Units

Resolution

Origin

Temporal coverage

since

for

Attribute definition : Information ID 1,1

Implementation name

InformationID



Strong identifier

Semantics

Definition

Unique identifier for any information documenting the system

Code

Derivation rules

Data type

Perceptory data type unique identifier ID
Field size 0
Decimal places 0

Implementation data type Number

- ☒ Compose primary key
☒ Required
☐ will be index

Default value

Measurement units

Visibility

Details

Attribute definition : ShortComment 0,1

Implementation name ShortComment
☐ Strong identifier

Semantics

Definition A few comment sentences.
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Varchar2(size)
Field size 50

- ☐ Compose primary key
☐ Required
☐ will be index

Default value

Measurement units

Visibility

Details

Attribute definition : Author 1,1

Implementation name Author
☐ Strong identifier

Semantics

Definition The author of the data
Code

Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Varchar2(size)
Field size 30

- ☐ Compose primary key
- ☐ Required
- ☐ will be index

Default value

Measurement units

Visibility

Details

Attribute definition : Last modified 1,1

Implementation name LastModified
☐ Strong identifier

Semantics

Definition The last modification date
Code
Derivation rules

Data type

Perceptory data type date
Field size 0
Decimal places 0

Implementation data type Date (internal format)

- ☐ Compose primary key
- ☐ Required
- ☐ will be index

Default value

Measurement units

Visibility

Details

Class: Interaction

Stereotype name

Implementation name

Interaction

☐

Abstract class

Semantics

Definition

This covers interactions between objects or object sets. This might be uniquely descriptive. It might be also documented by values, as for water fluxes. It is not spatial, as it doesn't intend to provide such level of detail as in canalisations for instance. Instead, it is schematic. Regarding temporality, this aspect is included in the values possibly linked to interactions.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Gets input from
Provides Input to
Interaction Nature

List of associations

belongs to 0,N Causal Network

List of supertype

System Element

Attribute definition : Gets input from 1,1

Implementation name

InputFrom

☐

Strong identifier

Semantics

Definition

Reference to the interaction source object

Code

Derivation rules

Data type

Perceptory data type

unique identifier ID

Field size

0

Decimal places

0

Implementation data type

Number

☐

Compose primary key

☒

Required

☐

will be index

Default value

Measurement units

Visibility
Details

Attribute definition : Provides Input to 1,1

Implementation name InputTo
☐ Strong identifier

Semantics

Definition Reference to the interaction target object
Code
Derivation rules

Data type

Perceptory data type unique identifier ID
Field size 0
Decimal places 0

Implementation data type Number

☐ Compose primary key
☒ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Attribute definition : Interaction Nature 1,1

Implementation name InteractionNature
☐ Strong identifier

Semantics

Definition A short definition of the nature of the interaction.
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Nvarchar2(size)
Field size 10

☐ Compose primary key
☒ Required
☐ will be index

Default value

Measurement units
Visibility
Details

Class: Irrigation IS

Stereotype name

Implementation name

IrrigationIS



Abstract class

Semantics

Definition

Infrastructure (IS) used in irrigation, like pipes, sprinklers, pumps, etc.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water Supply And Sanitation IS

Class: Knowledge Base Qualif.

Stereotype name

Implementation name

KBQualif

☐

Abstract class

Semantics

Definition

An uppraisal of the knowledge base backing the information.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

KB Qualif. ID

KB Qualification

Description

List of associations

belongs to 0,N Uncertainties background

List of supertype

Attribute definition : KB Qualif. ID 1,1

Implementation name

KBQualifID

☒

Strong identifier

Semantics

Definition

A unique identifier of the knowledge base qualification.

Code

Derivation rules

Data type

Perceptory data type

unique identifier ID

Field size

0

Decimal places

0

Implementation data type

Number

☒

Compose primary key

☒

Required

☐

will be index

Default value

Measurement units

Visibility

Details

Attribute definition : KB Qualification 1,1

Implementation name

KBQualif

☐ Strong identifier

Semantics

Definition The actual qualification of the knowledge base backing the information.
Code
Derivation rules

Data type

Perceptory data type
Field size 0
Decimal places 0

Implementation data type
Field size
Decimal places

☐ Compose primary key
☒ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Domain definition: ThreeStep Appraisal Domain

Implementation name ThreeStepAppraisalDomain
Details
Domain types Enumeration

Code value 1
Name value Small
Definition value

Code value 2
Name value Medium
Definition value

Code value 3
Name value Strong
Definition value

Attribute definition : Description 0,1

Implementation name Description
☐ Strong identifier

Semantics

Definition A brief description explaining the qualification.
Code

Derivation rules

Data type

Perceptory data type	character
Field size	0
Decimal places	0
Implementation data type	Varchar2(size)
Field size	100

- ☐ Compose primary key
- ☐ Required
- ☐ will be index

Default value

Measurement units

Visibility

Details

Class: Lake

Stereotype name

Implementation name

Lake



Abstract class

Semantics

Definition

Lakes, ponds, still water.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Aquatic Ecosystem

Class: Land-Use FW

Stereotype name

Implementation name

LandUseFW



Abstract class

Semantics

Definition

This includes regulations regarding land-use, such as the definition of hazard-prone zones, deforestation, building, etc.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

General FW

Class: Landfills

Stereotype name

Implementation name

Landfills



Abstract class

Semantics

Definition

A special case of potential direct contamination of surface water or groundwater.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-linked elements

Class: Laws And Policies

Stereotype name

Implementation name

LawsPolicies



Abstract class

Semantics

Definition

This covers laws, policies, standards: reference documents.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Anthropogenic Resource

Class: Level Of Uncertainty

Stereotype name

Implementation name

LevelOfUncertainty



Abstract class

Semantics

Definition

This provides a broad classification regarding the level of uncertainty (statistic, scenario, ignorance).

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Level of Uncert. ID

Level of Uncert. Type

Description

List of associations

belongs to 0,N Uncertainties background

List of supertype

Attribute definition : Level of Uncert. ID 1,1

Implementation name

LevelOfUncertID



Strong identifier

Semantics

Definition

A unique identifier for the level of uncertainty.

Code

Derivation rules

Data type

Perceptory data type

unique identifier ID

Field size

0

Decimal places

0

Implementation data type

Number



Compose primary key



Required



will be index

Default value

Measurement units

Visibility

Details

Attribute definition : Level of Uncert. Type 1,1

Implementation name LevelOfUncertType
☐ Strong identifier

Semantics

Definition The actual classification into statistic, scenario or ignorance.
Code
Derivation rules

Data type

Perceptory data type
Field size 0
Decimal places 0

Implementation data type
Field size
Decimal places

☐ Compose primary key
☒ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Domain definition: Level of Uncert. Domain

Implementation name LevelOfUncertDomain
Details
Domain types Enumeration

Code value 1
Name value Statistic
Definition value

Code value 2
Name value Scenario
Definition value

Code value 3
Name value Ignorance
Definition value

Attribute definition : Description 0,1

Implementation name Description
☐ Strong identifier

Semantics

Definition A brief description regarding the level of uncertainty.
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Varchar(size)
Field size 100

- ☐ **Compose primary key**
- ☐ **Required**
- ☐ **will be index**

Default value
Measurement units
Visibility
Details

Class: Locks

Stereotype name

Implementation name

Locks



Abstract class

Semantics

Definition

Locks infrastructures.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

On-Water Equipment

Class: Marine Water

Stereotype name

Implementation name

MarineWater



Abstract class

Semantics

Definition

See, ocean, zones away from the coast, etc.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Aquatic Ecosystem

Class: Membership Function Set

Stereotype name

Implementation name

MembFuncSet

☐

Abstract class

Semantics

Definition

This is a set of membership function defining a fuzzy space, using several complementary membership functions

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Memb. Func. Set ID

Membership Function ID

List of associations

are references to 0,N Truth Degrees

List of supertype

Attribute definition : Memb. Func. Set ID 1,1

Implementation name

MembFuncSetID

☒

Strong identifier

Semantics

Definition

A unique identifier for the membership function set.

Code

Derivation rules

Data type

Perceptory data type

unique identifier ID

Field size

0

Decimal places

0

Implementation data type

Number

☒

Compose primary key

☒

Required

☐

will be index

Default value

Measurement units

Visibility

Details

Attribute definition : Membership Function ID 1,N

Implementation name

MembFunctionID

☐ **Strong identifier**

Semantics

Definition A reference to the membership functions used in the membership function set.

Code

Derivation rules

Data type

Perceptory data type unique identifier ID

Field size 0

Decimal places 0

Implementation data type Number

☐ **Compose primary key**

☒ **Required**

☐ **will be index**

Default value

Measurement units

Visibility

Details

Class: Methodological FW

Stereotype name

Implementation name

MethodologicalFW



Abstract class

Semantics

Definition

This covers the policies and general conditions regarding methodologies applied in water-related management and planning such as participatory framework, sensitization and communication framework, integrated water management.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

General FW

Class: Model

Stereotype name

Implementation name

Model



Abstract class

Semantics

Definition

Model useful for water-related management.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Software

Class: Monitoring Station

Stereotype name

Implementation name

MonitoringStation



Abstract class

Semantics

Definition

A location at which a heavy or lightweight equipment enables measuring permanent or occasional water-related data.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

On-Water Equipment

Class: Navigable Zone

Stereotype name

Implementation name

NavigableZone



Abstract class

Semantics

Definition

A zone used for commercial (transportation) or entertainment navigation.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-linked elements

Class: Numeric Value

Stereotype name

Implementation name

NumericValue

☐

Abstract class

Semantics

Definition

This is for simple numeric values

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Value

Value Level

List of associations

List of supertype

Value or Reference Value

Attribute definition : Value 1,1

Implementation name

Value

☐

Strong identifier

Semantics

Definition

The actual numeric value

Code

Derivation rules

Data type

Perceptory data type

number

Field size

0

Decimal places

0

Implementation data type

Float(38)

☐

Compose primary key

☒

Required

☐

will be index

Default value

Measurement units

Visibility

Details

Attribute definition : Value Level 1,1

Implementation name

ValueLevel

☐

Strong identifier

Semantics

Definition This defines the level of the numeric value: a mean, a minimum (or lower bound), a maximum (or upper bound), or a return-period

Code

Derivation rules

Data type

Perceptory data type character

Field size 0

Decimal places 0

Implementation data type Varchar2(size)

Field size 20

- ☐ **Compose primary key**
- ☐ **Required**
- ☐ **will be index**

Default value

Measurement units

Visibility

Details

Class: Object And Object Set

Stereotype name

Implementation name

ObjAndObjSet

☐ **Abstract class**

Semantics

Definition

This is an object being part of group (unless it is the uppermost object in the hierarchy) and a group of objects itself (unless it is the lowermost in the hierarchy).

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Object Set Name

List of associations

provides input to 1,N Object And Object Set
gets input from 1,N Object And Object Set
belongs to 0,1 Object And Object Set
possesses 0,N Object And Object Set

List of supertype

System Element

Temporal definition : x 0,1

Acquisition rules

Derivation rules

Details

Temporal reference system

Zone

Units

Resolution

Origin

Temporal coverage

since

for

Attribute definition : Object Set Name 0,1

Implementation name

ObjSetName

☐ **Strong identifier**

Semantics

Definition

The name of the group of objects: ex: "City's reservoirs" or "IWRM-related policies"

Code

Derivation rules

Data type

Perceptory data type	character
Field size	0
Decimal places	0
Implementation data type	Varchar2(size)
Field size	30

- ☐ Compose primary key
- ☐ Required
- ☐ will be index

Default value

Measurement units

Visibility

Details

Class: On-Water Equipment

Stereotype name

Implementation name

OnWatEquip



Abstract class

Semantics

Definition

This groups all infrastructures exerting a direct, on-line influence on water.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-related Objects

Class: Operational Entities

Stereotype name

Implementation name

OperationalEntities



Abstract class

Semantics

Definition

This groups the different operational boards in charge of water-related management: private / public, local / regional / national / international, rural / urban.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

People

Class: People

Stereotype name

Implementation name

People



Abstract class

Semantics

Definition

This groups the population, including the different water stakeholders.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Anthropogenic Resource

Class: Planning FW

Stereotype name

Implementation name

PlanningFW



Abstract class

Semantics

Definition

This covers planning-related legislative or policy elements, such as sustainability and change (e.g. climate or population change) considerations

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Laws And Policies

Class: Precipitation

Stereotype name

Implementation name

Precipitation



Abstract class

Semantics

Definition

The water resource due to precipitation.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water

Class: Probab. Distrib. Function

Stereotype name
Implementation name DistributionFunction
☐ Abstract class

Semantics

Definition This allows the storage of probability distribution functions (pdf).
Aliases
Code
Visibility
Derivation rules

Associated Elements

List of operations
List of attributes Probab. Distrib. Func. ID

List of associations
List of supertype Value or Reference Value

Attribute definition : Probab. Distrib. Func. ID 1,1

Implementation name ProbabDistribFuncID
☐ Strong identifier

Semantics

Definition A reference to the actual pdf
Code
Derivation rules

Data type

Perceptory data type unique identifier ID
Field size 0
Decimal places 0

Implementation data type Number

☒ Compose primary key
☒ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Class: Protected Aquatic Area

Stereotype name

Implementation name

ProtectedAquaticArea



Abstract class

Semantics

Definition

A zone in which special policies apply to protect water or aquatic ecosystems, like protection areas for groundwater, or regional conservation area.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-linked elements

Class: Recreational Zone

Stereotype name

Implementation name

RecreationalZone



Abstract class

Semantics

Definition

A zone used for recreation, with a link to water, like a beach, or a waterfall, or hiking paths in a wetland.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-linked elements

Class: Reference Interpretation

Stereotype name

Implementation name

LimitInterpret



Abstract class

Semantics

Definition

This allows to provide an interpretation to a value or limit value (class interval bounds, water quality limit values, etc.)

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Value Interpretation ID

Reference type

Remark

Description

List of associations

interprets 1,N Value or Reference Value
is based on 0,N Document

List of supertype

Attribute definition : Value Interpretation ID 1,1

Implementation name

ValueInterpretationID



Strong identifier

Semantics

Definition

The unique identifier for the value interpretation.

Code

Derivation rules

Data type

Perceptory data type

unique identifier ID

Field size

0

Decimal places

0

Implementation data type

Number



Compose primary key



Required



will be index

Default value

Measurement units

Visibility

Details

Attribute definition : Reference type 0,1

Implementation name RefType
☐ Strong identifier

Semantics

Definition The type of the reference value: legal, target, or design value
Code
Derivation rules

Data type

Perceptory data type
Field size 0
Decimal places 0

Implementation data type
Field size
Decimal places

☐ Compose primary key
☐ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Domain definition: Reference Type Domain

Implementation name RefTypeDomain
Details
Domain types Enumeration

Code value 1
Name value Legal
Definition value

Code value 2
Name value Target
Definition value

Code value 3
Name value Design
Definition value

Attribute definition : Remark 0,1

Implementation name Remark
☐ Strong identifier

Semantics

Definition Possible remark about the reference interpretation
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Varchar2(size)
Field size 30

- ☐ Compose primary key
☒ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Attribute definition : Description 0,1

Implementation name Description
☐ Strong identifier

Semantics

Definition A brief description of the interpretation.
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Varchar2(size)
Field size 100

- ☐ Compose primary key
☐ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Class: Resources

Stereotype name

Implementation name

Resources



Abstract class

Semantics

Definition

This groups water and energy resources, as well as food and goods and fauna / flora.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Structural Object

Class: Sanitation IS

Stereotype name

Implementation name

SanitationIS



Abstract class

Semantics

Definition

Infrastructure (IS) used in water sanitation, like pipes, pumps, wastewater treatment plants.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water Supply And Sanitation IS

Class: Scenario or Strategy

Stereotype name

Implementation name

ScenarioOrStrategy



Abstract class

Semantics

Definition

This defines a scenario or a strategy, which are both virtual (not real) states.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Scenario or Strategy ID

Author

Short description

Last modified

List of associations

includes 0,N System Element

List of supertype

Temporal definition : x 0,1

Acquisition rules

Derivation rules

Details

Temporal reference system

Zone

Units

Resolution

Origin

Temporal coverage

since

for

Attribute definition : Scenario or Strategy ID 1,1

Implementation name

ScenarioOrStrategyID



Strong identifier

Semantics

Definition

The unique identifier of the scenario or strategy

Code

Derivation rules

Data type

Perceptory data type unique identifier ID
Field size 0
Decimal places 0

Implementation data type Number

- ☒ **Compose primary key**
☐ **Required**
☐ **will be index**

Default value

Measurement units

Visibility

Details

Attribute definition : Author 1,1

Implementation name Author
☐ **Strong identifier**

Semantics

Definition The author of the scenario or the strategy
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Varchar2(size)
Field size 30

- ☐ **Compose primary key**
☐ **Required**
☐ **will be index**

Default value

Measurement units

Visibility

Details

Attribute definition : Short description 0,1

Implementation name ShortDescription
☐ **Strong identifier**

Semantics

Definition A short description of the scenario of the strategy
Code
Derivation rules

Data type

Perceptory data type	character
Field size	0
Decimal places	0
Implementation data type	Varchar2(size)
Field size	100

- ☐ Compose primary key
- ☐ Required
- ☐ will be index

Default value

Measurement units

Visibility

Details

Attribute definition : Last modified 1,1

Implementation name	LastModified
<input type="checkbox"/> Strong identifier	

Semantics

Definition	The last modification date
Code	
Derivation rules	

Data type

Perceptory data type	date
Field size	0
Decimal places	0
Implementation data type	Date (internal format)

- ☐ Compose primary key
- ☐ Required
- ☐ will be index

Default value

Measurement units

Visibility

Details

Class: Sharing FW

Stereotype name

Implementation name

SharingFW



Abstract class

Semantics

Definition

This group includes laws, policies and agreements for sharing water such as: regional or transboundary agreement or rural hinterland - city relations.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

General FW

Class: Snow and Ice

Stereotype name

Implementation name

SnowAndIce



Abstract class

Semantics

Definition

The water resource included in snow and ice.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water

Class: Software

Stereotype name

Implementation name

Software



Abstract class

Semantics

Definition

This groups any useful piece of software, including databases and models and other contribution, such as studies.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Anthropogenic Resource

Class: Specific Ecosystem

Stereotype name

Implementation name

SpecificEcosystem



Abstract class

Semantics

Definition

This includes any sepcifically located ecosystem, as part of the general ecosystem, excepting aquatic ecosystems

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Ecosystem

Class: Specific Object

Stereotype name

Implementation name

SpecificObject



Abstract class

Semantics

Definition

This includes any object, infrastructure, that is no water-related object.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Human Environment

Class: Stakeholder

Stereotype name

Implementation name

Stakeholder



Abstract class

Semantics

Definition

Stakeholder involved in a water-related field.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

People

Class: Storage And Regulation IS

Stereotype name

Implementation name

StorageAndRegulationIS



Abstract class

Semantics

Definition

Infrastructure used to store or regulate water, like dams, retention basins, dykes.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

On-Water Equipment

Class: Stream

Stereotype name

Implementation name

Stream



Abstract class

Semantics

Definition

Rivers, smaller streams, etc.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Aquatic Ecosystem

Class: Structural Object

Stereotype name

Implementation name

StructuralObject



Abstract class

Semantics

Definition

This covers ecosystems, resources and human environment elements such as infrastructures or activities locations.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Object And Object Set

Spatial definition : qwe 0,1

Acquisition rules

Derivation rules

Details

Minimal dimensions

Area

Width

Length

Height

Class: Study

Stereotype name

Implementation name

Study



Abstract class

Semantics

Definition

A study concerning water-related objects

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Software

Class: Surface water

Stereotype name

Implementation name

SurfaceWater



Abstract class

Semantics

Definition

The water resource included in surface water.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water

Class: Sustainability Considerations

Stereotype name

Implementation name

SustConsiderations



Abstract class

Semantics

Definition

This covers the framework for integrating sustainability, hopefully including economy, social and environment considerations.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Planning FW

Class: Swimming Pool

Stereotype name

Implementation name

SwimmingPool



Abstract class

Semantics

Definition

Water consumption in swimming pools, and spas.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-linked elements

Class: System Element

Stereotype name

Implementation name

System_Element



Abstract class

Semantics

Definition

This covers all system elements: objects and interactions between objects

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

System Element ID

Author

Last modified

List of associations

is documented by 0,N Information
compose 0,N Uncertainties background
is part of 0,N Scenario or Strategy

List of supertype

Attribute definition : System Element ID 1,1

Implementation name

SystemElementID



Strong identifier

Semantics

Definition

The unique identifier of the system element

Code

Derivation rules

Data type

Perceptory data type

unique identifier ID

Field size

0

Decimal places

0

Implementation data type

Number



Compose primary key



Required



will be index

Default value

Measurement units

Visibility

Details

Attribute definition : Author 1,1

Implementation name Author
☐ Strong identifier

Semantics

Definition The person who entered the data
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Varchar2(size)
Field size 30

- ☐ Compose primary key
☐ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Attribute definition : Last modified 1,1

Implementation name LastModified
☐ Strong identifier

Semantics

Definition The last modification date
Code
Derivation rules

Data type

Perceptory data type date
Field size 0
Decimal places 0

Implementation data type Date (internal format)

- ☐ Compose primary key
☐ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Class: System_Pedig

Stereotype name

Implementation name

System_Pedig

☐

Abstract class

Semantics

Definition

This relational class allows to specify the kind of relation existing between the two objects:

- Information being part of a pedigree

or

- Pedigree providing info on the uncertainties to an information

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Relation Type

List of associations

List of supertype

Attribute definition : Relation Type 1,1

Implementation name

RelationType

☐

Strong identifier

Semantics

Definition

See class definition

Code

Derivation rules

Data type

Perceptory data type

Field size

0

Decimal places

0

Implementation data type

Field size

Decimal places

☐

Compose primary key

☐

Required

☐

will be index

Default value

Measurement units

Visibility

Details

Domain definition: Pedigree Relation Type

Implementation name	PedigreeRelationType
Details	
Domain types	Enumeration
Code value	1
Name value	ObjectPartOfPedigree
Definition value	
Code value	2
Name value	PedigreeDocumentingObject
Definition value	

Class: Text

Stereotype name

Implementation name

Text

☐

Abstract class

Semantics

Definition

This is a text information.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Category

Keywords

Text

List of associations

List of supertype

Information

Attribute definition : Category 0,1

Implementation name

Category

☐

Strong identifier

Semantics

Definition

A general classification of the text: comment, evaluation, problem, opinion, etc.

Code

Derivation rules

Data type

Perceptory data type

Field size

0

Decimal places

0

Implementation data type

Field size

Decimal places

☐

Compose primary key

☐

Required

☐

will be index

Default value

Measurement units

Visibility

Details

Domain definition: Text Category

Implementation name	TextCategory
Details	
Domain types	Enumeration
Code value	1
Name value	Comment
Definition value	
Code value	2
Name value	Opinion
Definition value	
Code value	3
Name value	Assessment
Definition value	
Code value	4
Name value	Problem
Definition value	
Code value	5
Name value	Strategy
Definition value	
Code value	6
Name value	Vision
Definition value	
Code value	7
Name value	Scenario
Definition value	
Code value	8
Name value	Information
Definition value	

Attribute definition : Keywords 0,1

Implementation name	Keywords
<input type="checkbox"/> Strong identifier	

Semantics

Definition	Keywords summarizing the text information.
Code	
Derivation rules	

Data type

Perceptory data type	character
Field size	0
Decimal places	0

Implementation data type Nvarchar2(size)
Field size 50

- ☐ **Compose primary key**
☐ **Required**
☐ **will be index**

Default value
Measurement units
Visibility
Details

Attribute definition : Text 1,1

Implementation name Text
☐ **Strong identifier**

Semantics

Definition The actual text body.
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Nvarchar2(size)
Field size 200

- ☐ **Compose primary key**
☒ **Required**
☐ **will be index**

Default value
Measurement units
Visibility
Details

Class: Truth Degrees

Stereotype name

Implementation name

TruthDegrees

☐

Abstract class

Semantics

Definition

This allows to store truth degrees relative to membership functions (referenced by "value interpretation").

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Truth Degree

List of associations

applies to 1,1 Membership Function Set

List of supertype

Value or Reference Value

Attribute definition : Truth Degree 1,N

Implementation name

TruthDegree

☐

Strong identifier

Semantics

Definition

This stores the actual truth degrees, as many as necessary.

Code

Derivation rules

Data type

Perceptory data type

number

Field size

0

Decimal places

0

Implementation data type

Float(38)

☐

Compose primary key

☒

Required

☐

will be index

Default value

Measurement units

Visibility

Details

Class: Uncert. Pedigree Matrix Values

Stereotype name

Implementation name

UPMValues



Abstract class

Semantics

Definition

This contains values referring to an uncertainty pedigree matrix (UPM).

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

UPM Values ID

Values For UPM

Description

List of associations

apply to 1,1 Uncertainty Pedigree Matrix
belongs to 0,N Uncertainties background

List of supertype

Attribute definition : UPM Values ID 1,1

Implementation name

UPMValuesID



Strong identifier

Semantics

Definition

The unique identifier for the UPM values.

Code

Derivation rules

Data type

Perceptory data type

unique identifier ID

Field size

0

Decimal places

0

Implementation data type

Number



Compose primary key



Required



will be index

Default value

Measurement units

Visibility

Details

Attribute definition : Values For UPM 1,N

Implementation name ValuesForUPM
☐ Strong identifier

Semantics

Definition This is the actual values vector.
Code
Derivation rules

Data type

Perceptory data type integer
Field size 0
Decimal places 0

Implementation data type Number (p)
Field size 30

☐ Compose primary key
☒ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Attribute definition : Description 0,1

Implementation name Description
☐ Strong identifier

Semantics

Definition A brief description regarding the values for the UPM.
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Varchar2(size)
Field size 100

☐ Compose primary key
☐ Required
☐ will be index

Default value
Measurement units
Visibility

Details

Class: Uncertainties background

Stereotype name
Implementation name UncertBackground
☐ **Abstract class**

Semantics

Definition This is a set of information about the way the information or the object was produced, and more generally, about the uncertainties background behind the data.

Aliases
Code
Visibility
Derivation rules

Associated Elements

List of operations
List of attributes Pedigree ID
 Author
 Last modified

List of associations documents 1,N Information
 contains 0,1 Uncertainty Nature
 contains 0,1 Knowledge Base Qualif.
 contains 0,1 Uncert. Pedigree Matrix Values
 document 0,N System Element
 document 0,N Information
 contains 0,1 Level Of Uncertainty

List of supertype

Attribute definition : Pedigree ID 1,1

Implementation name PedigreeID
☒ **Strong identifier**

Semantics

Definition A unique identifier for the pedigree.
Code
Derivation rules

Data type

Perceptory data type unique identifier ID
Field size 0
Decimal places 0

Implementation data type Number

☒ **Compose primary key**
☒ **Required**
☐ **will be index**

Default value
Measurement units
Visibility
Details

Attribute definition : Author 1,1

Implementation name Author
☐ Strong identifier

Semantics

Definition The person who entered the data
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Varchar2(size)
Field size 30

- ☐ Compose primary key
☐ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Attribute definition : Last modified 1,1

Implementation name LastModified
☐ Strong identifier

Semantics

Definition The last modification date
Code
Derivation rules

Data type

Perceptory data type date
Field size 0
Decimal places 0

Implementation data type Date (internal format)

- ☐ Compose primary key
☐ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Class: Uncertainty Nature

Stereotype name

Implementation name

UncertaintyNature

☐

Abstract class

Semantics

Definition

This allows describing the nature of uncertainty: knowlege-related or variability-related.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Uncertainty Nature ID

Uncertainty Nature Type

Description

List of associations

belongs to 0,N Uncertainties background

List of supertype

Attribute definition : Uncertainty Nature ID 1,1

Implementation name

UncertaintyNatureID

☐

Strong identifier

Semantics

Definition

The unique identifier of the uncertainty nature.

Code

Derivation rules

Data type

Perceptory data type

unique identifier ID

Field size

0

Decimal places

0

Implementation data type

Number

☒

Compose primary key

☒

Required

☐

will be index

Default value

Measurement units

Visibility

Details

Attribute definition : Uncertainty Nature Type 1,1

Implementation name UncertaintyNatureType
☐ Strong identifier

Semantics

Definition This value of uncertainty nature knowlege-related or variability-related.
Code
Derivation rules

Data type

Perceptory data type
Field size 0
Decimal places 0

Implementation data type
Field size
Decimal places

☐ Compose primary key
☒ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Domain definition: Uncertainty Nature Domain

Implementation name UncertaintyNatureDomain
Details
Domain types Enumeration

Code value 1
Name value Knowledge-related
Definition value

Code value 2
Name value Variability-related
Definition value

Attribute definition : Description 0,1

Implementation name Description
☐ Strong identifier

Semantics

Definition A brief description regarding the uncertainty nature.
Code
Derivation rules

Data type

Perceptory data type	character
Field size	0
Decimal places	0

Implementation data type	Varchar2(size)
Field size	100

- ☐ Compose primary key
- ☐ Required
- ☐ will be index

Default value

Measurement units

Visibility

Details

Class: Uncertainty Pedigree Matrix

Stereotype name

Implementation name

UPM

☐

Abstract class

Semantics

Definition

A matrix used as reference to describe the uncertainty pedigree.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

UPM ID

List of associations

is reference for 0,N Uncert. Pedigree Matrix Values

List of supertype

Attribute definition : UPM ID 1,1

Implementation name

UPMID

☒

Strong identifier

Semantics

Definition

The unique identifier for the uncertainty pedigree matrix.

Code

Derivation rules

Data type

Perceptory data type

unique identifier ID

Field size

0

Decimal places

0

Implementation data type

Number

☒

Compose primary key

☒

Required

☐

will be index

Default value

Measurement units

Visibility

Details

Class: Value or Reference Value

Stereotype name

Implementation name

ValOrRef

☐

Abstract class

Semantics

Definition

This covers both values or limit values.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Value or Reference Set ID

Is Reference

Generation Method

List of associations

is of type 1,1 Value Type

may be interpreted by 0,N Reference Interpretation

has reference limit 0,N Value or Reference Value

explains value 0,N Value or Reference Value

List of supertype

Information

Attribute definition : Value or Reference Set ID 1,1

Implementation name

ValueRefSetID

☐

Strong identifier

Semantics

Definition

This is not a primary key. It is a reference code to group different values into a set of complementary values, for example if an interval complements a numeric value. Regarding limits, it allows to group them into a logical set (like for "class I" to "class V").

Code

Derivation rules

Data type

Perceptory data type

number

Field size

0

Decimal places

0

Implementation data type

Number

☐

Compose primary key

☒

Required

☐

will be index

Default value

Measurement units
Visibility
Details

Attribute definition : Is Reference 1,1

Implementation name IsRef
☐ Strong identifier

Semantics

Definition This defines if the value is a measure-like value or a reference limit.
Code
Derivation rules

Data type

Perceptory data type boolean
Field size 0
Decimal places 0

Implementation data type Number(1)

☐ Compose primary key
☒ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Attribute definition : Generation Method 1,1

Implementation name GenerationMethod
☐ Strong identifier

Semantics

Definition This stores the way the information was generated (simulation, expertise, measure / statistic, historic).
Code
Derivation rules

Data type

Perceptory data type
Field size 0
Decimal places 0

Implementation data type
Field size
Decimal places

☐ Compose primary key
☐ Required

☐ will be index

Default value

Measurement units

Visibility

Details

Domain definition: Generation Method Domain

Implementation name	GenMethodDomain
Details	
Domain types	Enumeration
Code value	1
Name value	Simulation or calculation
Definition value	
Code value	2
Name value	Expert judgement
Definition value	
Code value	3
Name value	Statistic or measure
Definition value	
Code value	4
Name value	Historical record
Definition value	

Class: Value Type

Stereotype name

Implementation name

ValueType

☐

Abstract class

Semantics

Definition

This provides a reference information on the type of a value or limit value (e.g. water quality indicator).

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

Value or Limit Type ID

Value Type Category

Value Type Name

Unit

List of associations

has 0,N Value or Reference Value

List of supertype

Attribute definition : Value or Limit Type ID 1,1

Implementation name

ValueLimitTypeID

☐

Strong identifier

Semantics

Definition

The unique identifier for the value or limit type.

Code

Derivation rules

Data type

Perceptory data type

unique identifier ID

Field size

0

Decimal places

0

Implementation data type

Number

☒

Compose primary key

☒

Required

☐

will be index

Default value

Measurement units

Visibility

Details

Attribute definition : Value Type Category 1,1

Implementation name ValueCategory
☐ Strong identifier

Semantics

Definition This classifies values into broad categories: environmental, economic, social.
Code
Derivation rules

Data type

Perceptory data type
Field size 0
Decimal places 0

Implementation data type
Field size
Decimal places

☐ Compose primary key
☒ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Domain definition: Value Category Domain

Implementation name ValueCategoryDomain
Details
Domain types Enumeration

Code value 1
Name value Economic
Definition value

Code value 2
Name value Social
Definition value

Code value 3
Name value Environmental
Definition value

Attribute definition : Value Type Name 1,1

Implementation name ValueTypeName
☐ Strong identifier

Semantics

Definition
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Varchar2(size)
Field size 30

- ☐ Compose primary key
☒ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Attribute definition : Unit 0,1

Implementation name Unit
☐ Strong identifier

Semantics

Definition The unit the value type is associated with
Code
Derivation rules

Data type

Perceptory data type character
Field size 0
Decimal places 0

Implementation data type Varchar2(size)
Field size 20

- ☐ Compose primary key
☐ Required
☐ will be index

Default value
Measurement units
Visibility
Details

Class: Various FW

Stereotype name

Implementation name

VariousFW



Abstract class

Semantics

Definition

This group includes various laws and policies that may have influences on water-related issues, such as biotechnology (e.g. some possibly authorised "improved" crops may require less water), building codes (they may influence resiliency in case of water-related disaster) and property and tenure rights, with the special case of water rights (e.g. in certain locations, women don't have access to property and to water).

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

General FW

Class: Water

Stereotype name

Implementation name

Water



Abstract class

Semantics

Definition

The water resource, including compartments such as groundwater and precipitation.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Resources

Class: Water Supply And Sanitation IS

Stereotype name

Implementation name

WatSupSanIS



Abstract class

Semantics

Definition

This groups all infrastructures (IS) involved in wate supply and sanitation, including drainage and irrigation.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-related Objects

Class: Water Supply IS

Stereotype name

Implementation name

WaterSupplyIS



Abstract class

Semantics

Definition

Infrastructure (IS) used to supply water, like pipes, pumps, treatment equipment.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water Supply And Sanitation IS

Class: Water-linked elements

Stereotype name

Implementation name

WatLinkedElem



Abstract class

Semantics

Definition

this groups all elements that are linked (influencing or influenced by) to water, such as fountains, water consumers, navigable zone, landfills, etc.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Water-related Objects

Class: Water-related Objects

Stereotype name

Implementation name

WaterRelatedObj



Abstract class

Semantics

Definition

This is a group of many different objects, including sanitation infrastructure, fountains, fishing zones, etc.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Human Environment

Class: Watershed

Stereotype name

Implementation name

Watershed



Abstract class

Semantics

Definition

The watershed is a hydrologically connected aquatic ecosystem.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Aquatic Ecosystem

Class: Wetland

Stereotype name

Implementation name

Wetland



Abstract class

Semantics

Definition

Swamps, shallow waters, marshes, etc.

Aliases

Code

Visibility

Derivation rules

Associated Elements

List of operations

List of attributes

List of associations

List of supertype

Aquatic Ecosystem