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Common information sharing environment service and Data Model (CDM); Data Model; Release 1

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Foreword

This Group Specification (GS) has been produced by ETSI Industry Specification Group (ISG) european Common information sharing environment service and Data Model (CDM).

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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Introduction

In October 2009 the European Commission adopted the Communication COM/2009/538 [i.4].

This Communication introduced the first general guiding principles of the Common Information Sharing Environment (CISE) and initiated the CISE development process (Figure 1).

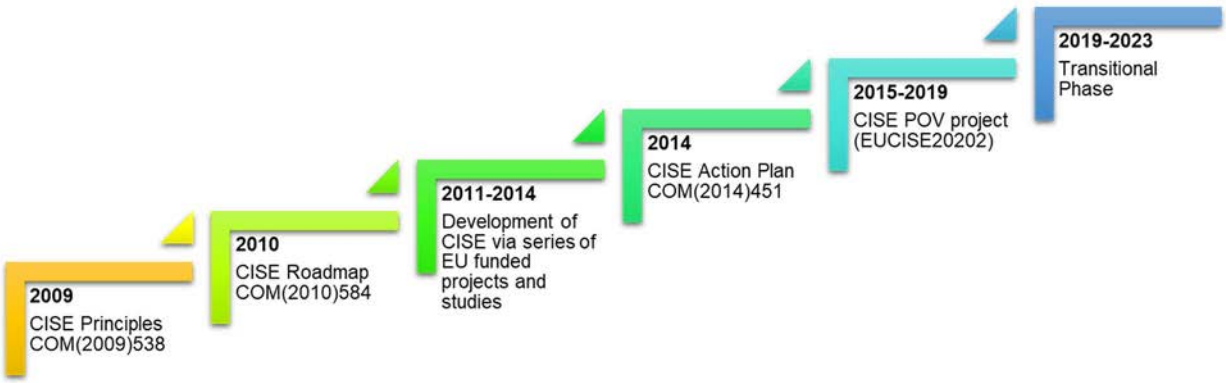

Figure 1: CISE development process

The Communication stated among other things, that the aim of the integrated maritime surveillance is to generate a situational awareness of activities at sea, impacting on the denominated seven maritime sectors: Maritime Safety and Security, Border Control, Maritime Pollution and Marine Environment Protection, Fisheries Control, Customs, General Law Enforcement and Defence, as well as the economic interests of the EU, so as to facilitate sound decision making.

Hybrid and complementary cross-sectoral and cross-border information exchange requires a common "data language" within the common network architecture as well as a common set of IT- services to handle the data transfer.

The technical standardization proposal for CISE implementation was therefore initiated by EUCISE 2020 project and directed towards a standardization process within the framework of a professional European standardization environment in order to elaborate universal and sustainable technical specifications for the implementation and development of CISE, as well as offering a technical solution for other, similar information exchange regimes.

ISG CDM was established in 2019 to carry out the technical standardization of CISE.

The requirements in the present document respect the operational and technical requirements defined during the CISE development process (Figure 1) and the general principles of CISE as originally defined in [i.4], [i.5] and later elaborated in the most recent version of the CISE Architecture [i.6] as follows:

- CISE connects public authorities in the EU and EEA responsible for maritime surveillance: civil and military, regional/sectorial organizations and EU agencies.
- CISE connects existing maritime surveillance ICT systems. However, CISE is not a new surveillance system, nor a new screen in the surveillance centres.
- CISE promotes a sector-neutral solution: all sectors and systems are important.
- CISE follows a decentralized approach: point-to-point exchange of information.
- Information exchange is voluntary, i.e. not enforced by legislation.

1 Scope

The present document gives terms and definitions for the Data Model of the european Common information sharing environment service and Data Model (CDM), specifying the set of rules for the description of the CISE entities exchanged among participants of the CISE network.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] IETF RFC 6351: "xCard: vCard XML Representation".

[2] ISO 3166-1:2020: "Codes for the representation of names of countries and their subdivisions - Part 1: Country code".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI GS CDM 002: "Common information sharing environment service and Data Model (CDM); System Requirements definition; Release 1".

[i.2] ETSI GS CDM 003: "Common Information sharing environment service and Data Model (CDM); CDM Architecture; Release 1".

[i.3] ETSI GS CDM 004: "Common Information Sharing Environment Service and Data Model (CDM); Service Model; Release 1".

[i.4] Communication from the Commission COM(2009)538 final: "Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain".

[i.5] CISE Architecture Visions Document V3.0 06/11/2013.

[i.6] CISE Architecture, Version 2.0, Date 04/03/2022.

[i.7] CISE Core Vocabulary Specification, Version 1.5.3, Date 23/11/2017.

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the following terms apply:

adaptor: component connecting a CISE Participant to CISE network via standardized interface

NOTE 1: The Adaptor is the bridge between the Legacy System and the Gateway translating LS data to the CISE Data Model. The Adaptor uses available Gateway Services depending on the strategy chosen for message exchange patterns and Data Model.

NOTE 2: The Adaptor could be either software or software/hardware component.

NOTE 3: In case of a new legacy system connected to CISE, the adaptor functionality may be part of the new legacy system.

consumer: participant requesting Services over CISE network, only consuming but not providing information

CoopP: test project on cooperation in execution of various maritime functionalities at sub-regional or sea-basin level in the field of integrated maritime surveillance

NOTE 1: Project financed by the European Commission in 2013 defining the CISE use cases and the first version of the CISE data and service model.

cross-border: exchange of information between EU or EFTA countries

cross-sector: exchange of information between two or more EU maritime sectors

EUCISE2020: EUropean test bed for the maritime Common Information Sharing Environment in the 2020 perspective

NOTE 1: This FP7 project developed the existing CISE Network and software (2014-2019).

NOTE 2: More information on the project can be found at https://cordis.europa.eu/project/id/608385.

legacy system: software designed to perform specific tasks and that exposes certain functionalities through interfaces in the domain of the maritime surveillance

NOTE: In the present document, Public Authorities maintain Legacy Systems. Legacy Systems are the originator and final destinations of messages exchange in CISE.

maritime sector: one of the following seven sectors performing maritime activities:

- Maritime Safety, Security and Prevention of Pollution by Ships;
- Fisheries Control;
- Marine Pollution Preparedness and Response, Marine Environment;
- Customs;
- Border Control;
- General Law Enforcement;
- Defence.

message: one of the structured sentences exchanged between Participants to discover, request and provide Services

node: components that provide CISE infrastructure and access point to CISE network

participant: legacy system connected to the CISE network for exchanging maritime data

provider: participant that provides Services over CISE network

public authority: any organization or legal entity that has an interest in maritime surveillance information

NOTE 1: An authority can be local, regional, national or European.

NOTE 2: This organization may have responsibilities linked to one of the seven sectors of maritime surveillance.

service: self-describing, high-level abstraction of coarse-grained business capability

NOTE 1: The type of a service indicates the main data entity exchanged using this service, e.g. VesselService.

NOTE 2: Service providers can offer several services of the same type handling different subsets of data. For instance, providers could define one service (type VesselService) to exchange information from a vessel database and a second one (type VesselService) to exchange vessel information with their location obtained from a sensor.

NOTE 3: Providers will decide which attributes and related entities of the main entity will be exchanged using the service. For instance, a service of type VesselService will enable the exchange of Vessel data entities and could also handle information of the Cargo, Incident, Location data entities (and the corresponding relationships), depending on the service provider and the capabilities of the legacy systems.

user: person appointed by the Public Authorities, interacting directly with CISE or with a Legacy System connected to CISE

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply.

AGE	Agent
AIS	Automatic Identification System
AMSL	Above Mean Sea Level
C2	Command and Control system
CBRN	Activities related to chemical, bacteriological, radioactive and nuclear substances
CDM	CISE Data Model
CHEM	Chemical
CISE	Common Information Sharing Environment
CMB	Combat-related area
COG	Course Over Ground
CSO	Company Security Officer
DGR	Dangerous area
DOC	Document
DRZLE	Drizzle
EEA	European Economic Area
EU	European Union
EUCISE2020	European Union Common Information Sharing Environment
EVE	Event
FF	Fire Fighting
FP7	7th Framework Programme
FSTT	Fire Services Technical Intervention
GEN	Generic activities
HUM	Humidity
ICT	Information & Communication Technology
IMO	International Maritime Organization
INT	Intelligence
INW	Inland Waterway
IT	Information Technology
KML	Keyhole Markup Language
LOA	Length Overall

LOC	Location
LS	Legacy System
MAC	Multi-agency Cooperation
MIL	Military activities
MMSI	Maritime Mobile Service Identity
NAT	National
NET	Network and telecommunication activities
OBJ	Object
OPR	Use Operational Resources
OTH	Other
PER	Period
POL	Police activities
QMED	Qualified Member of the Engine Department
REC	Reconstruction/rehabilitation activities
ROV	Remotely Operated Vehicle
RSC	Rescue activities
RSK	Risk
SAV	Save and Rescue Endangered Life
SCS	Support Community Safety
SOC	Social and media/communication activities
SOG	Speed Over Ground
SSO	Special Security Officer
TDS	Thunderstorm
UAV	Unmanned Air Vehicle
UID	Unique Identifier
UML	Unified Modelling Language
UNDG	United Nations Dangerous Goods
UNK	Unknown
USV	Unmanned Surface Vehicle
UUID	Universally Unique Identifier
UUV	Unmanned Underwater Vehicle
UVI	Unique Vessel Identifier defined by the FAO
VEG	Vegetable Oil or Waste
VULN	Vulnerability area
WGH	Weigth
WIN	Windy
WKT	Well Known Text
XML	eXtensible Markup Language
XSD	XML Schema Definition

4 Overview

The present document describes the CISE Data Model to support the requirements defined in ETSI GS CDM 002 [i.1], ETSI GS CDM 003 [i.2] and ETSI GS CDM 004 [i.3] for the implementation of the European Common Information sharing environment.

Clause 5 informs on how the CISE Data Model can be used to exchange messages between CISE participants, describing the CISE entities and their information.

Clause 6 provides the specifications of the CISE Data Model. These specifications include also the list of available CISE Service Type mentioned in ETSI GS CDM 004 [i.3].

5 The CISE Information Model

The CISE Information Model consists of seven (7) core entities:

- Agent.
- Document.

- Event.
- Location.
- Object.
- Period.
- Risk.

Agent is an operative entity that provides information about individual persons or organizations which are involved as actors or targets in the events and activities subject to information exchange through the CISE network.

Document entity allows tracing and exchanging information in a persistent manner in almost any possible electronic format.

Event is an entity that provides information about movements, anomalies, incidents or actions which occur in the events and activities subject to information exchange through the CISE network.

Location entity provides information about the localization of objects, events and activities shared through the CISE network. Locations can be described using a place name, a geometry or an address.

Object is an abstract entity that handles information about physical entities like vehicles (vessels, aircrafts and land vehicles) and cargo.

Period is an entity used to define a time interval relevant to the object, event or activity shared through the CISE network. It can be expressed by any combination of a duration, a start date, a start time, an end date and an end time.

Risk entity represents a situation at sea that can lead to a potentially dangerous event.

The seven core entities encapsulate relation entities that support the full description of the CISE information model.

The relation entities of the Agent entity are:

- Organization.
- Person.

The relation entities of the Document entity are:

- Metadata.
- UID.

The relation entities of the Event entity are:

- Action.
- Anomaly.
- Incident.
- Movement.

The relation entity of the Location entity is:

- Meteo-Oceanographic Condition.

The relation entities of the Object entity are:

- Cargo.
- Operational Asset.
- Vessel.

Also, each core entity can be associated with another core entity to create complex descriptions.

Figure 5.1 depicts the CISE information model presenting in a graphical way the relationship between the core entities and the associated relation entities.

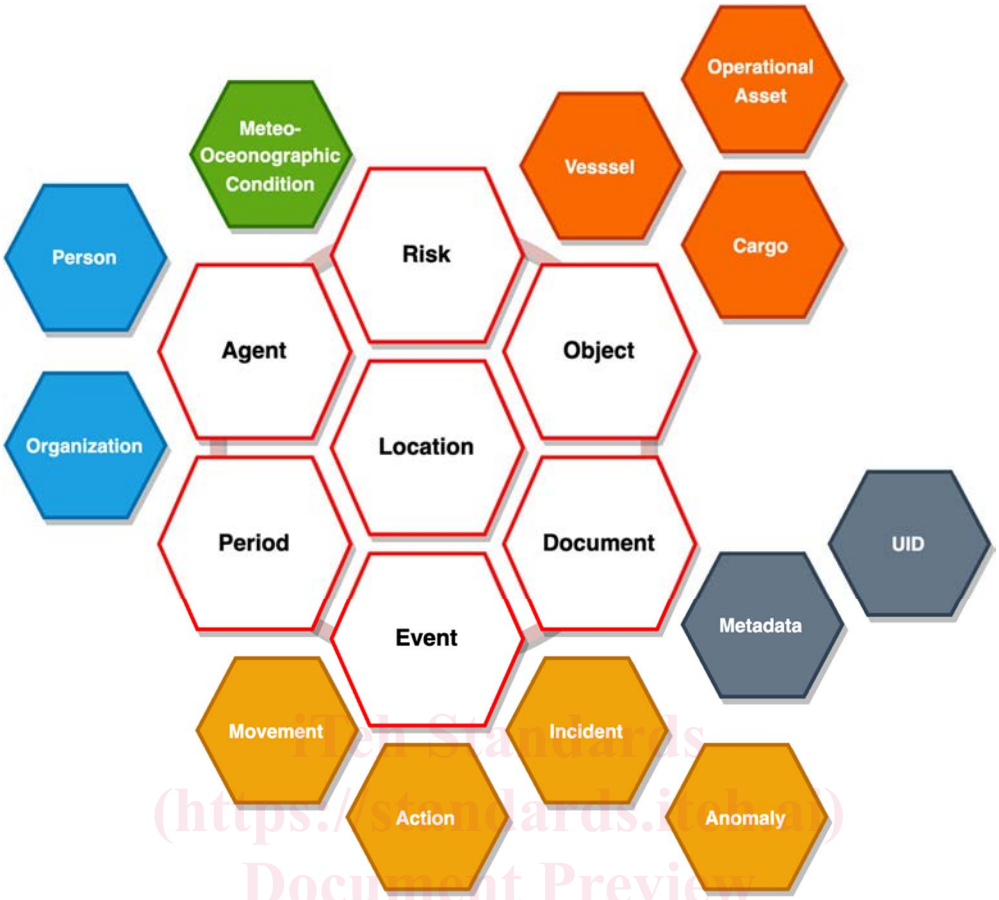

Figure 5.1: The CISE Information Model [i.7]

6 Common Data Model

6.1 Introduction

This clause defines the requirements of the CISE Data Model.

6.2 CISE Entity Specifications

6.2.1 Agent Core Entity

6.2.1.1 Agent Core Entity General Requirements

[Cdm-AGE-001] The Agent core entity shall be described by means of:

- Agent Class Attributes.
- Agent Relation Entities:
  - Organization Entity.
  - Person Entity.

- Agent Associated Entities:
  - Agent Core Entity.
  - Location Core Entity.
  - Object Core Entity.
  - Risk Core Entity.

Figure 6.2.1.1-1 illustrates the Agent Core Entity model.

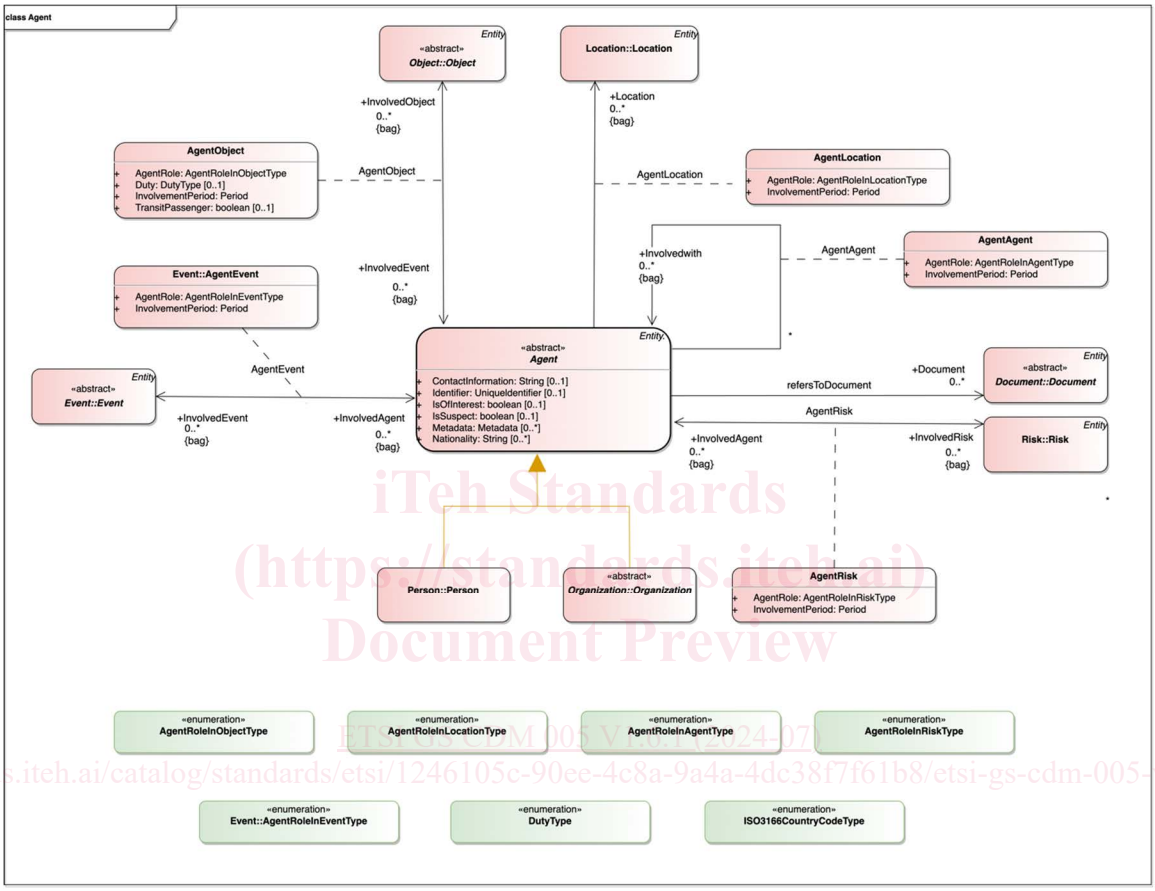

Figure 6.2.1.1-1: CISE Agent UML conceptual model [i.7]

[Cdm-AGE-002] The Agent entity shall be described by the following attributes:

- ContactInformation
- Identifier
- IsOfInterest
- IsSuspect
- Metadata
- Nationality

Table 6.2.1.1-1 illustrates the data structure supported by the CISE Agent entity.

Table 6.2.1.1-1: Data structure of CISE Agent entity

Field Name	Data Type	Note
ContactInformation	String	XCard [1]
Identifier	UniqueIdentifierType	Ref.to [Cdm-DOC-003]
IsOfInterest	Boolean	
IsSuspect	Boolean	True if there is suspect related to the agent
Metadata	MetadataType	Ref.to [Cdm-DOC-006]
Nationality	String	Three-letter country code [2]

6.2.1.2 Agent Relation Entity

6.2.1.2.1 Organization Entity

Figure 6.2.1.2.1-1 illustrates the Organization Entity model.

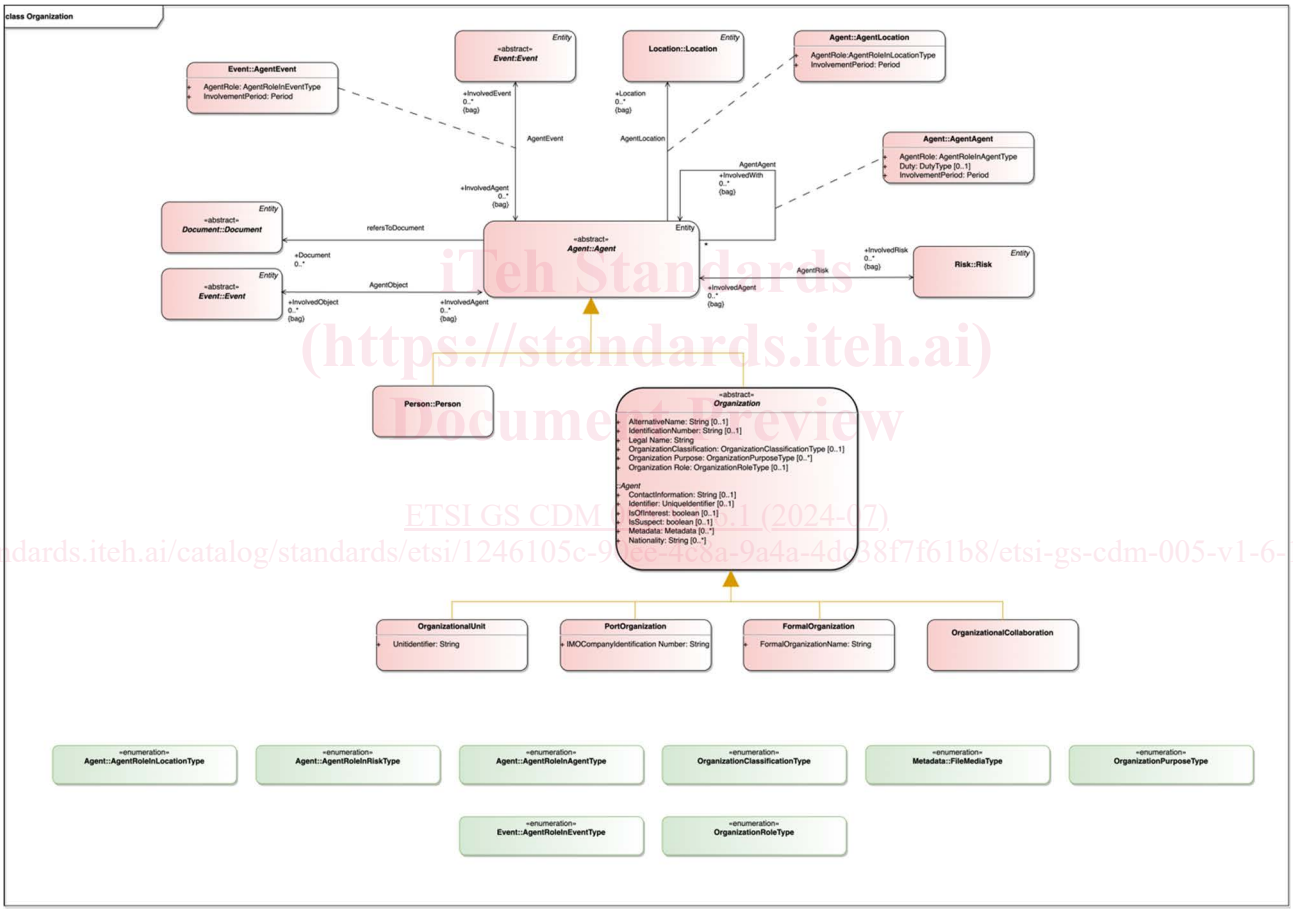

Figure 6.2.1.2.1-1: CISE Organization UML conceptual model [i.7]

[Cdm-AGE-003] The Organization entity shall be described by means of:

- Organization attributes:
- Organization sub-classes:
  - Organizational Unit.
  - Port Organization.
  - Formal Organization.