

Tailored IoT & BigData Sandboxes and Testbeds for Smart,  
Autonomous and Personalized Services in the European  
Finance and Insurance Services Ecosystem



## D2.11 – Data Models Specification - I

<b>Lead Beneficiary</b>	LXS
<b>Due Date</b>	2020-06-30
<b>Delivered Date</b>	2020-06-30
<b>Revision Number</b>	3.0
<b>Dissemination Level</b>	Public
<b>Type</b>	Report
<b>Document Status</b>	Final
<b>Review Status</b>	Reviewed by Coordinator, FBK, HPE
<b>Document Acceptance</b>	Coordinator Accepted
<b>EC Project Officer</b>	Pierre-Paul Sondag

HORIZON 2020 - ICT-11-2018



This project has received funding from the European Union's horizon 2020 research and innovation programme under grant agreement no 856632

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## Revision History

Version	Date	Partner(s)	Description
0.1	2020-05-30	LXS	ToC Version
0.2	2020-06-01	LXS	Input on executive summary, sections 1, 2 and introductory input on sections 3 and 4.
0.3	2020-06-10	LXS, UBI	Input on section 4
0.4	2020-06-15	NUIG	Input on Section 3
0.5	2020-06-23	LXS	Input on Section 5 and finalize the document for internal review
1.0	2020-06-23	LXS	First Version for Internal Review
2.0	2020-06-26	INNOV	Version for Quality Assurance
3.0	2020-06-29	LXS	Version for Submission

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<sup>2</sup> Can be left void

## Executive Summary

The goal of task T2.6 “Specification and Design of Integrated Data Models” is the definition of the data models that will be exploited by each pilot deployed in the INFINITECH platform. In particular, the task has the objective of highlighting the specific characteristics of the logical schema of the provided datasets, which will be consumed by the business analytical tools, via the data management components of the platform (mainly the central data repository that stores the data and enables HTAP processing). Towards this direction, the definition of the technical details of the datasets, as were collected in the scope of task T2.5 “Open Banking APIs, Testbeds and Data Assets Specifications” and reported in the D2.9 deliverable, will be further extended in order to further describe the logical schema that defines the data model of each pilot.

Furthermore, one of the purposes of this task is to support the technical development of task T4.1 “Shared Semantics for BigData and IoT Streams” and, most precisely, gather all the requirements from the pilots regarding the needs for ontologies that will define the data semantic interoperability for the datasets. To this end, an initial survey took place regarding the state-of-the-art analysis on existing domain models that are dominant and widely used nowadays in the finance and insurance sectors. This process was vital in order to identify best practices and scenarios regarding domain models on these sectors, and then further validate which of the pilots will rely on semantic interoperability and will make use of integrated and harmonised datasets and how their own logical schemas can fit into an integrated domain model that will be defined in the technical tasks of WP4.

The output of the task T2.6 “Specification and Design of Integrated Data Models” will produce the integrated data model of INFINITECH that will allow for seamless access to data sources, thus enabling business analytics over the integrated data. This common data model will be part of the INFINITECH-RA, and thus the outcome of this task will provide valuable input also to task T2.7 “Reference Architecture for BigData, AI and IoT in Financial Services Industry”.

It is important to highlight the fact that this is the first version of the deliverable, and it only includes preliminary information regarding the work and the results that have been carried out at this phase of the project. This version is influenced by the maturity of the pilot descriptions and their scenarios, and hence an initial analysis of their logical view of the existing schemas is presented, along with the state-of-the-art analysis of existing ontologies and vocabularies in the domains of insurance and finance sectors. A second version of the deliverable is planned to be delivered in M18 of the project, where the use case scenarios of each pilot will be further documented in more detail as part of the scope of task T7.1 “Detailed Pilot Specifications and Pilot Sites Preparation”, while the technical work of the aforementioned T4.1 will be further advanced. Therefore, this version of the document

provides the basis of the work that needs to be carried out in the forthcoming period, and its result will be the integrated data model of the platform.

This document is structured as follows: Section 1 provides an introductory text describing the objectives of this deliverable, giving at the same time insights from other tasks and deliverables. Section 2 provides the general methodology that was presented to the pilot cases in order to obtain the required information at this phase of the project, while section 3 provides a state-of-the-art analysis on existing data domain models and ontologies that are widely used in the finance and insurance sectors. Section 4 provides a general description of the existing data models that each pilot uses. Due to the different levels of maturity of each pilot and the fact that some of the pilots became members of the consortium at a later phase, there is a significant difference on the level of detail for each corresponding subsection. Finally, Section 5 draws some conclusions.

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## Abbreviations

WP	Work Package
INFINITECH-RA	INFINITECH Reference Architecture
DoA	Description of Action
MS	Microsoft
KYB	Know Your Business
KYC	Know Your Customer
ML	Machine Learning
DL	Deep Learning

## 1. Introduction

The scope of task T2.6 "Specification and Design of Integrated Data Models" is the following: to describe the logical view of the pilot datasets and to define an integrated data model that can be used by the INFINITECH platform in order to provide access to harmonised datasets that can be consumed in a seamless manner by the business analytical tools (i.e. risk assessment, fraud detection, recommendation engines, etc.) of the platform. This will enable the re-usage of such tools that will be available by the project's toolkit via the library of ML/DL algorithms, by different stakeholders and pilots, and will enable them to bring their own datasets, harmonize it and make it available in that integrated model. In order for this to happen, the initial definition of the logical view of the datasets of each pilot was necessary, along with an initial survey of existing domain models that are dominant and used by the enterprises in the finance and insurance sectors.

### 1.1. Objective of the Deliverable

This is the first version of the deliverable that reports the work that has been carried out in task T2.6, whose purpose is to analyse the existing data models of the pilots that are part of the project, by describing the logical view of the pilots' datasets, and to further propose an integrated data model based on best practices and existing domain models that are dominant in the insurance and finance sectors. This will be part of the integrated INFINITECH-RA and will provide an harmonised logical view of the heterogeneous datasets coming from the diverse pilots that this project accommodates, by using semantic annotations, and the semantic interoperability mechanisms of the reference architecture. By doing this, it will provide a seamless access to the integrated data model for the business analytical tools of the project.

As it has already been mentioned, there will be a second version of this deliverable that will extend the text and outcomes that are being described here, by reporting the additional work that is planned to be carried out during the forthcoming period of the project. Therefore, the scope of this deliverable is limited at this phase to firstly describe the logical view of the pilot datasets, namely the domain model of each of the individual scenarios, and also to provide a survey of the state-of-the-art analysis of the existing domain models and ontologies used in major organizations in the sectors that this project is focusing on.

### 1.2. Insights from other Tasks and Deliverables

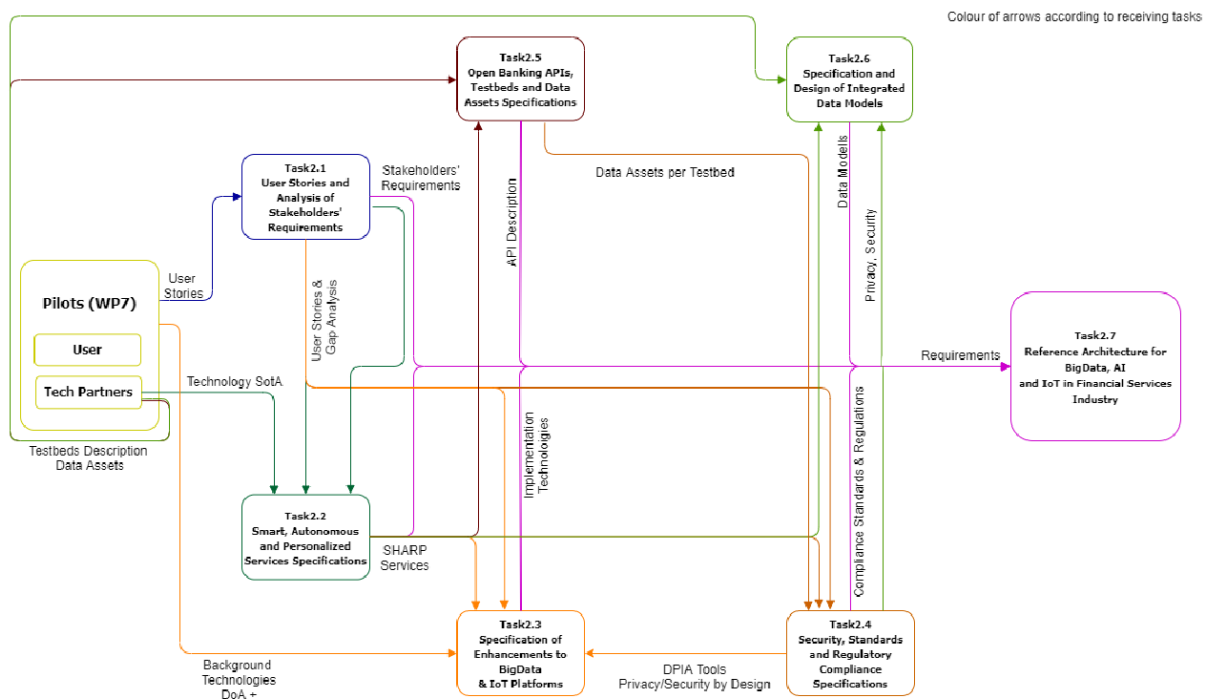
This task is part of WP2, whose main goal is to collect the user and technical requirements of the different pilot applications and baseline technology components of the INFINITECH architecture, in order to drive both the technical development of the overall platform, along with its runtime environments for deployment and execution, and the validation of the project against all pilots that will be accommodated. Therefore it has strong dependencies with various tasks of the project.



First of all, there have been identified all the interactions about the different internal tasks, as they can be depicted in Figure 1. It can be noted that all pilots are providing their valuable input regarding the definition of their scenario and applications via the WP7 which can be considered as the general umbrella under which all use cases are defined. This input aims at defining to T2.1 the user stories of the pilots and the relevant requirements from the user/application perspective.

T2.1 is the fundamental task of WP2, which provides feedback to all others. In that sense, it drives the definition of the specific requirements of T2.5, which focuses on the definition of the datasets that each pilot is planning to make use of. However, as reported in the corresponding deliverable of T2.5, it mainly focuses on the technical aspects of the datasets, like volume and velocity of the data, type of datastore that it is currently stored, format (i.e. structural, un-structural data, etc.), APIs to connect and so on.

On the contrary, the scope of T2.6 is to rather focus on the logical view of the schemas of these datasets in order to identify common terminologies that could lead to the definition of the integrated data model that can be used by the business analytical tools. As the integrated data model using semantic annotations will be part of the INFINITECH-RA, the outcomes of T2.6 provides input to T2.7 that is associated with the reference architecture.



**Figure 1: WP2 internal dependencies per task level**

Apart from the internal WP2 dependencies, T2.6 is tightly related with tasks residing in other work packages. Firstly, as it has already been noted, it gets input from the T7.1. Moreover, the output will be valuable for all main technical work packages (WP3-WP4-WP5) as i) WP3 will benefit from the definition of the data schemas that need to be imported to

the central data repository, ii) WP4 will incorporate the common data model into its ontology for the semantic interoperability and iii) the analytical tools of WP5 will have to consume data in the harmonised integrated data model. As a result, T2.6 is very centric to the whole project and has many interactions with tasks that drive the core development of the platform itself.

## 2. Methodology

In order to obtain all necessary information needed so that we can accomplish the objectives of the task T2.6 different approaches have been followed. As it has been already mentioned, this deliverable will include a description of the logical views of the data assets that will be brought by the pilot applications in order to define the data models that they currently rely on. Additionally, it provides a state-of-the-art analysis of existing domain models that have been proposed in the literature and are widely used in the insurance and finance sectors.

Regarding the collection of the data models that the pilot applications are currently using, this was part of a common methodology that was proposed by the project management board regarding how to address the pilot cases and the responsible partners in order to gather all required information. The INFINITECH project has the peculiarity of having 16 different pilot cases, and more than 50 partners overall, so different methodologies have been established in order to well define the communication channels and how to set and monitor all the requests. Additionally, in order to obtain all the different aspects of the user and technical requirements, there are several complementary tasks in the scope of WP2 that focus on specific parts of the whole requirements, like user requirements, regulatory constraints, restrictions by technological components, etc.

This imposes various challenges for the collection of the latter, as each pilot case would have been requested various and overlapping inputs for all activities of WP2 and of the technical tasks. Thus, the project management board established a common way of communication in order to ease this process. Each pilot case consists of the pilot leader, which is usually the domain expert of the use case: the finance or insurance organization itself, accompanied by numerous technical partners that provide their expertise in order to develop the solution. As in many cases, the business domain experts do not have the technical background to reply to the requests, one of the technical partners involved in a pilot was assigned as the *technical facilitator* and will have the role of the proxy between the domain expert and the overall consortium. This means that all requests are being forwarded to him/her, who is now responsible to communicate and gather the required inputs.

On another level, each pilot participates in one of the identified categories that have been defined in the DoA. It has been decided that all pilots that belong to the same category will be further coordinated by the responsible task leader of WP7, and the overall coordination at WP level will be done by the Pilot leader. In that sense, all communications towards the pilots are being forwarded at WP7 level, then are being pushed down to the level of the technical facilitator that is responsible to execute the request and reply on behalf of the domain expert, in close collaboration with the latter however.

Apart from the definition of the communication channels that have been established between the technical partners and the pilot cases, it was identified that there are similar requests by the different tasks of WP2 that are overlapping, and this thing would have created misunderstandings regarding what it is needed to be reported in each task. To make things even worse, additional tasks in the technical work packages (WP3-WP4-WP5) contain

tasks that require a preliminary interaction with the pilot cases in order to collect initial technical information so that they can be in a position to kick off their technical activities. In order to avoid members of the consortium asking for information all the time, the project management board decided to move all those requests coming from the technical work packages in the WP2 level, which is now the entry point that provides input to all others. To be more concrete, the requirements that were needed to be collected in the scope of the task T4.1 "Shared Semantics for BigData and IoT Streams", have been now moved into T2.6, that carries out a similar work regarding the definition of the integrated data model. Moreover, the technical coordinator along with the leaders of the tasks of WP2 worked together in order to define common questionnaires that are targeting a wider types of requirements (i.e. dataset definition, testbed requirements, data regulatory constraints, etc).

Regarding the needs of task T2.6, an extended questionnaire was circulated to all technical facilitators of the pilots in order to retrieve information regarding the specification of the involved datasets, with additional details about the documentation of the logical schema that defines the data model of the pilot applications. This questionnaire can be found uploaded in the private document repository of the project<sup>3</sup>. Each of the pilots has provided information about all datasets that are planning to exploit during the project, and more precisely the information that was requested per dataset is the following:

- **Dataset name:** The name of the dataset
- **Dataset description:** A brief description of the dataset
- **Owner:** Which stakeholder is the owner of the dataset
- **License:** Whether or not the dataset is under a specific license or it is open
- **Anonymized:** Whether or not the dataset will be anonymized
- **Data Type:** The type of the data (tabular, text, image, etc)
- **Data format:** The format of the data: csv, json, txt, MS Excel file, etc
- **Size:** The estimated size of the provided data
- **Version:** Whether the data will be static, or periodically updated on the fly
- **Coverage:** Time that the data is covering
- **Data Store:** The type of the datastore where the data are currently stored (i.e. Apache Hadoop, MySQL, etc)
- **Data Volume:** The volume of the data
- **Data Velocity:** How often the data is updated
- **Availability:** Whether the data will be later on available to the INFINITECH project, or are confident to the pilot

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<sup>3</sup> <https://drive.google.com/drive/u/1/folders/1s6LJ9P5M6b1uhfdMc7ggcg5DCHg42Ogk>

- **Meta data:** If the dataset describes the metadata of the dataset
- **Link to dataset:** If the dataset is already available
- **Link to sample:** If a sample of the dataset is already available
- **Dataset:** Whether the dataset will be migrated to the central repository or will be available only on-premise
- **Read:** Whether that will be read-only or not

Furthermore, the task T2.6 will also require an initial analysis of the state-of-the-art domain models on the insurance and finance sectors. This analysis was assigned to the domain experts that are involved in this task in order to take it into account at a later phase when the definition of the common data model of the INFINITECH-RA will be developed. It has also been planned for an additional survey to be circulated to the pilot domain experts via their technical facilitators with the respect to the methodology that has been established. This will aim to collect information regarding the current pilot domain terminology, glossary and taxonomy. The results of this survey will be included in the updated version of this deliverable.

### 3. State-of-the-Art analysis on existing domain models

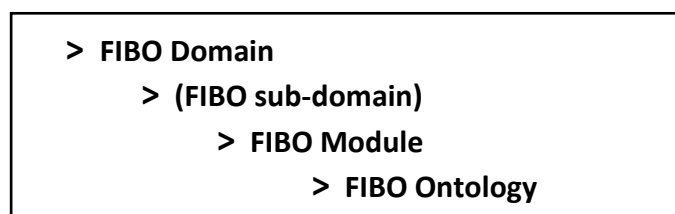
At this first phase of the task T2.6, an initial analysis of the state-of-the-art domain models used by organizations of the insurance and finance sectors has been performed. The following sections provide details regarding information related to the three reference data models identified in the financial sector, i.e. the Financial Industry Business Ontology (FIBO), the Financial Instrument Global Identifier (FIGI) and the Legal Knowledge Interchange Format (LKIF). These three are considered as a starting point for building a semantic model in the context of the INFINITECH project.

#### 3.1 Financial Industry Business Ontology (FIBO)

The Financial Industry Business Ontology (FIBO) defines the sets of things that are of interest in financial business applications and the ways that those things can relate to one another. In this way, FIBO can give meaning to any data (e.g., spreadsheets, relational databases, XML documents) that describe the business of finance. FIBO is developed as an ontology in the Web Ontology Language (OWL). FIBO is a trademark of EDM Council, Inc. It is also standardized by the Object Management Group (OMG).

##### 3.1.1 FIBO Structure

FIBO is not a single ontology but a set of ontologies. It is organized in a hierarchical directory structure to organize the ontologies. Top-level directories are called *domains*; beneath that may be one or two levels of *sub-domains* and then *modules* and dozens of *ontologies* at the bottom level.



Website:	<a href="http://www.fibo.org/">http://www.fibo.org/</a>
FIBO Ontology Viewer:	<a href="https://spec.edmouncil.org/fibo/ontology">https://spec.edmouncil.org/fibo/ontology</a>
FIBO Viewer Github:	<a href="https://github.com/edmouncil/fibo-viewer">https://github.com/edmouncil/fibo-viewer</a>
FIBO OWL:	<a href="https://spec.edmouncil.org/fibo">https://spec.edmouncil.org/fibo</a>

Figure 2 represents the structure of FIBO in terms of domains, modules and ontologies. At the top level are FIBO Domains, e.g. Business Entities, Business Process Domain, Financial Business and Commerce, Loans, Securities etc. In the next level, there are modules within each domain or sub-domain. For example, Corporations and Functional Entities are modules within the Business Entities domain. Then at the next level, there are ontologies within each module, e.g. Loans Core Ontology and Loans HMDS Ontology are ontologies within the Loans Contracts Module under the Loans domain.



Figure 2: FIBO Structure

### 3.1.2 Financial Business and Commerce Domain (FBC)

The financial business and commerce domain covers business concepts that are common to a number of financial areas, such as loans, securities, and corporate actions, including products and services, financial intermediaries, registrars and regulators, and financial instruments and products.

### 3.1.2.1 FIBO FBC Products and Services Module

The products and services module extends the FND Products and Services module via ontologies defining financial products, financial services, financial service providers, and product catalogs as well as customer/client accounts.

### 3.1.2.2 Clients and Accounts Ontology

This ontology provides basic concepts such as account, account holder, account provider, relationship manager that are commonly used by financial services providers to describe customers and to determine counterparty identities. Figure 3 shows the internal classes of Clients and Accounts Ontology.



account  
account holder  
account identifier  
account provider  
account-specific service agreement  
accounting transaction  
balance  
bank account  
bank account identifier  
bank identifier  
basic bank account identifier  
brokerage account  
certificate of deposit  
demand deposit account  
deposit account  
fee  
financial service account  
general ledger  
international bank account identifier  
investment account  
investment or deposit account  
ledger account  
loan or credit account  
non-transaction deposit account  
relationship manager  
time certificate of deposit account  
time deposit account  
time deposit open account  
transaction deposit account

**Figure 3: Internal classes of Clients and Accounts Ontology**

### 3.1.2.3 Bank Account

It is defined as “Account held or provided by, as a service, a bank” and depicted in Figure 4.

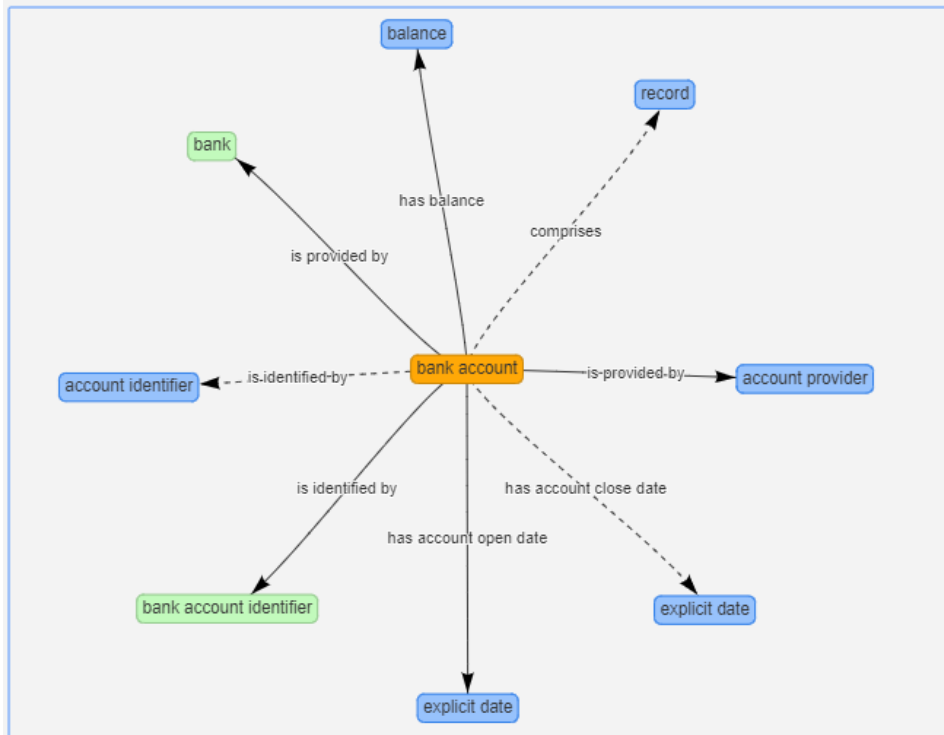


Figure 4: Bank Account Model

### 3.1.2.4 Account Holder

It is defined as “party holding an account” and is shown in Figure 5.

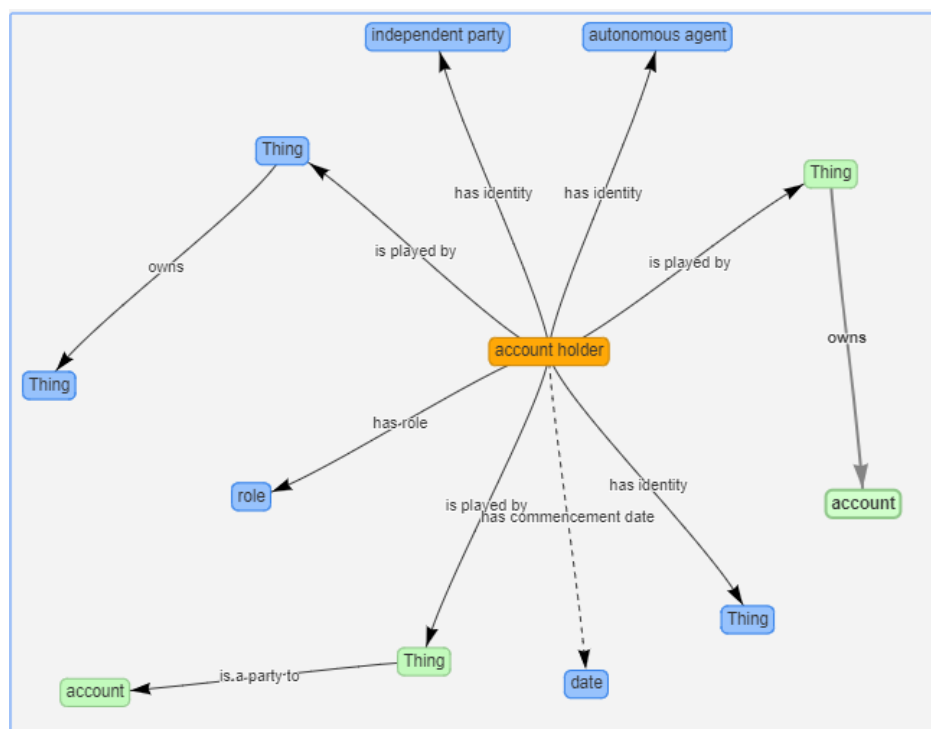


Figure 5: Account Holder Model

### 3.1.3 Foundations Domain

The Foundations (FND) domain includes ontologies that define general purpose concepts required to support other FIBO domains. These include concepts and relationships about people, organizations, places, and most importantly, contracts that are essential to domains such as Business Entities (BE), Financial Business and Commerce (FBC), Indices and Indicators (IND), and Securities (SEC).

The scope of the definitions provided in FND is limited to the coverage of exactly those concepts needed by other FIBO specifications. They may be useful for other domains, such as insurance, but are intentionally underspecified to avoid unintended consequences and thus do not provide exhaustive coverage for any concept contained herein. However, Foundations is designed for growth over time. The expectation is that as additional foundational knowledge is needed to define concepts in other FIBO domain areas, additional ontologies and/or concepts will be integrated into Foundations as required.

#### 3.1.3.1 Agreements

This module includes ontologies describing agreements between parties and contracts that formalize those agreements. This covers the written and verbal contracts, including contracts which may be transferred from one party to another. The latter form the basis for financial securities contracts. The contracts ontology also describes fundamental properties of contracts such as contractual terms, contract parties and so on, many of which form the basis for more specialized financial industry concepts such as interest payment terms, bond issuers and so on.

### 3.1.3.2 Agreements Ontology

This ontology defines concepts for agreements, for use in other ontology elements. Agreements as defined here are the actual agreements between parties, and this ontology is intended to be referred to in conjunction with the contracts ontology which defines the actual contracts which formalize such agreements. Figure 6 shows the concepts of agreement and contract are intended to be kept distinct in the FIBO ontologies, that is neither intended to be regarded as a subtype of the other.

agreement  
 beneficiary  
 commitment  
 commitment at large  
 individual unilateral commitment  
 mutual agreement  
 mutual commitment  
 obligee  
 obligor  
 unilateral commitment

Figure 6: Internal Classes of Agreement Ontology

### 3.1.3.3 Agreement

It is defined as “a negotiated understanding between two or more parties, reflecting the offer and acceptance of commitments on the part of either party” and shown in the Figure 8 below.

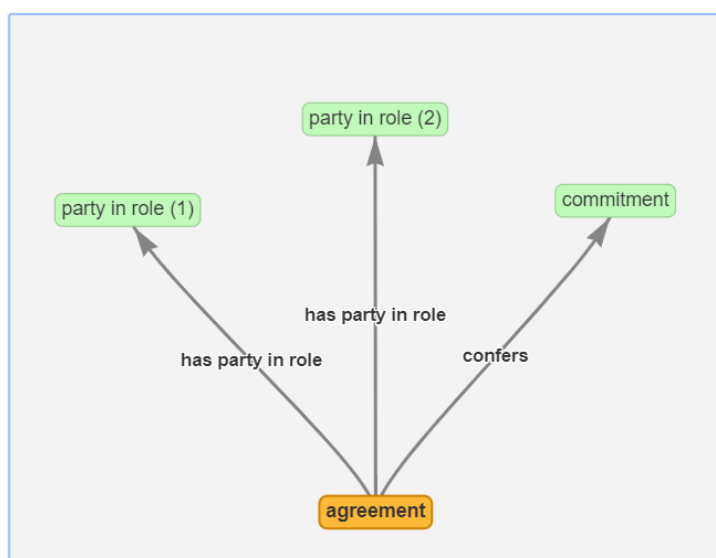


Figure 7: Agreement Model

### 3.1.3.4 Contracts Ontology

This ontology defines concepts relating to contracts, for use in other FIBO ontology elements. These include written contracts which are the concrete evidence of agreements between parties, along with verbal contracts. Contracts are further broken down into bilateral and transferable contracts, the latter being the basis for most financial instruments. Properties of contracts are also defined, in particular contractual terms and contract parties. Figure 8 shows these concepts all form the basis of concepts in the financial services industry, for example interest payment terms are a kind of contract terms set, and security holders are a kind of contract counterparty.

condition precedent
contract
contract document
contract originator
contract party
contract principal
contract third party
contractual commitment
contractual definition
contractual element
counterparty
mutual contractual agreement
non-binding terms
promissory note
term sheet
transferable contract
transferable contract holder
unilateral contract
verbal contract
written contract

**Figure 8: Internal Classes of Contracts Ontology**

### 3.1.3.5 Contract

It is defined as “voluntary, deliberate agreement between two or more competent parties to which those parties agree to be legally bound, and to which the parties must have provided valuable consideration” and shown in the Figure 9 below.



**Figure 9: Contract Model**

### 3.2 Financial Instrument Global identifier (FIGI)

The Financial Instrument Global Identifier (FIGI)<sup>4 5</sup> is an open standard, unique identifier of financial instruments that can be assigned to instruments including common stocks, options, derivatives, futures, corporate and government bonds, municipals, currencies, and mortgage products. The FIGI structure is represented in Figure 10, it is defined and copyrighted by the Object Management Group. Bloomberg L.P. is the Registration Authority and Certified Provider of the standard. FIGI have been created for more than 300 million unique securities, representing most asset classes of the financial markets.

The FIGI is a 12-character alpha-numerical code that does not contain information characterizing financial instruments, but serves for uniform unique global identification. Once issued, a FIGI is never reused and represents the same instrument in perpetuity. Unique FIGIs identify securities as well as individual exchanges on which they trade. Composite FIGIs are also issued to represent unique securities across related exchanges. There exists a unique FIGI to identify the common stock on each individual exchange, but also a composite FIGI to represent the company's common stock traded on United States exchanges.

<sup>4</sup> <https://www.openfigi.com/>

<sup>5</sup> <https://www.omg.org/spec/FIGI>

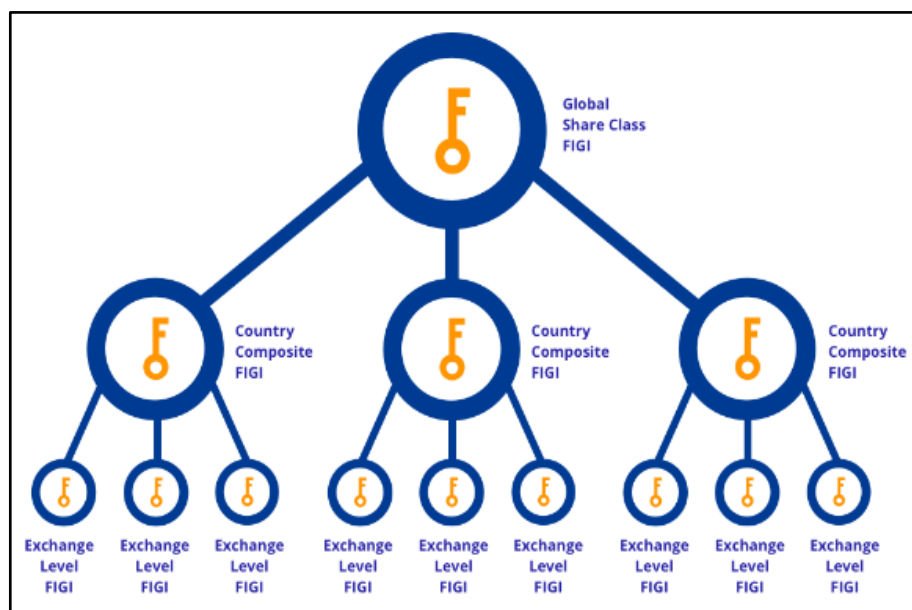


Figure 10: FIGI Identifier Structure

### 3.3 Legal Knowledge Interchange Format (LKIF)

The Legal Knowledge Interchange Format (LKIF) is an OWL ontology of legal concepts, allowing legal knowledge bases to be represented in OWL. LKIF defines epistemological concepts for legal reasoning and argumentation, such as legal rules, meta-level rules for reasoning about rule priorities and exceptions, legal arguments, legal procedures, cases and case factors, values and principles. In addition, LKIF defines an ontology of generally useful substantive legal concepts, such as obligations, permissions, rights and powers, which can be reused when modeling specific legal domains, such as tax law. LKIF provides a direct support for representing three types of knowledge, which have been identified as most indispensable to law and legal reasoning: (i) terminological knowledge, (ii) legal rules, and (iii) normative statements.

LKIF Website: <http://www.estrellaproject.org/lkif-core/>  
 LKIF Github: <https://github.com/RinkeHoekstra/lkif-core>  
 LKIF Ontology: [http://www.estrellaproject.org/?page\\_id=3](http://www.estrellaproject.org/?page_id=3)

#### 3.3.1 Terminological Knowledge

The layer of terminological knowledge is supported in LKIF through the Web Ontology Language (OWL). The terminological support provided by LKIF is extended with the LKIF-Core ontology of basic legal concepts.

#### 3.3.2 Legal Rules

LKIF rules extend SWRL (Semantic Web rules-language) with support for negation and defeasible reasoning. The rule layer provides a language expressive enough to model legal rules in a way which comes much closer to the ideal of isomorphic modeling, i.e. in a way which reflects the structure of the rules in a legislation. The rules layer supports rules with

exceptions, assumptions, and exclusionary conditions, and enables meta-level information about rules to be represented, such as date of enactment, which is used in other rules, such as *lex posterior*, to reason about rule priorities.

### 3.3.3 Normative Statements

Normative statements are given a direct support via the “norm” module included in LKIF-Core ontology. The module contains minimally restricted definitions of deontic concepts and properties, based on the notion of subjunctive betterness, which are intended as basic constructs for modeling various deontic settings. Nevertheless, there exists a preferable mapping of normative statements into OWL representation, which preserves some essential properties of the modal frames semantics, associated with deontic logics.

### 3.3.4 LKIF Core

The LKIF core legal ontology is a library of ontologies relevant for the legal domain. It consists of 15 modules, each of which describes a set of closely related concepts from both legal and commonsense domains.

#### 3.3.4.1 Abstract Concepts

The most abstract concepts are defined in five closely related modules: (i) top, (ii) place, (iii) mereology, (iv) time, and (v) spacetime.

*Top:* The LKIF top ontology is largely based on the top-level of LRI-Core but has less ontological commitment in the sense that it imposes less restrictions on subclasses of the top categories.

*Place:* The place module partially implements the theory of relative places (Donnelly, 2005) in OWL DL.

*Mereology:* The mereology module defines mereological concepts such as parts and whole, and typical mereological relations such as part of, component of, containment, membership etc.

*Time:* The time module provides an OWL DL implementation of the theory of time by Allen (1984).

#### 3.3.4.2 Basic Concepts

Basic-level concepts are distributed across four modules: (i) process, (ii) role, (iii) action, and (iv) expression.

*Process:* The process module extends the LKIF top ontology module with a definition of changes, processes (being causal changes) and physical objects. It introduces a limited set of properties for describing participant roles of processes.

*Role:* The role module defines a typology of roles (epistemic roles, functions, person roles, organisation roles) and the plays-property for relating a role filler to a role.



*Action:* The action module describes the vocabulary for representing actions in general. Actions are processes which are performed by some agent (the actor of the action). This module does not commit itself to a particular theory on thematic roles.

*Expression:* The expression module describes a vocabulary for describing propositions and propositional attitudes (belief, intention), qualifications, statements and media. It furthermore extends the role module with a number of epistemic roles, and it is the basis for the definition of norms.

#### 3.3.4.3 Legal Concepts

These basic clusters are extended by three modules that form the legal ontology: (i) legal action, (ii) legal role, and (iii) norm.

*Legal-action:* The legal action module extends the action module with a number of legal concepts related to action and agent, such as public acts, public bodies, legal person, natural person, etc.

*Legal-role:* The legal role module extends the role module with a small number of legal concepts related to roles, legal professions, etc.

*Norm:* The norm module is an extension of the expression module where norms are defined as qualifications. It furthermore defines a number of legal sources, e.g. legal documents, customary law, etc., and a typology of rights and powers.

#### 3.3.4.4 Framework Modules

In addition to these legal clusters, two modules are provided that cover the basic vocabulary of two frameworks: (i) modification, and (ii) rules.

*Modification:* The modification module is both an extension of the time module and the legal action module. The time module is extended with numerous intervals and moments describing the efficacy and being in force of legal documents. The action module is extended with a typology of modifications.

*Rules:* The rules & argumentation module defines roles central to argumentation, and describes the vocabulary for LKIF rules.

#### 3.3.4.5 Core and Extended Ontology

Finally, the twelve modules of the abstract, basic and legal level are integrated in the LKIF Core ontology module. This module does not provide any additional definitions, but functions as an entry-point for users of the ontology library. The two framework modules are accessible through the LKIF Extended ontology module. This module imports the LKIF Core module.

## 4. Terminology Analysis of Pilot Datasets

After the collection of the answers from the survey that was distributed to the pilot leaders regarding the definition of the data sets that are planned to be exploited during the progress of the project, the description of their logical representation was followed, in order for the technical partners to better understand the schemas that they rely on. In parallel, an analysis of their main entities, properties and attributes took place, which was the first attempt to collect information about the terminology that each pilot is using. The scope of this process is to identify common terminologies that are frequently shared among pilots, so that this can be a valuable input for the definition of a common data model that will be used inside the project, and we call it the **Infinitech data model**.

In the next subsections, the results of this analysis are presented. We identify the common terminologies in each pilot and we cite all terms that the pilots are using. We note the name of the term, a synonym that can be found, and a short description of the term. Furthermore, we categorize each term according to each kind: Actor, Object, Process or Property. It has been noted that all pilots share some commonly used terms like *Score, Risk Assessment Score, Risk Assessment, Risk, Product, Processing System, Process, Financial Product and Client*.

### 4.1 Pilot #1: Invoices Processing Platform for a more Sustainable Banking Industry

Pilot 1 belongs to the category of *Smart, Reliable and Accurate Risk and Scoring Assessment*, so it is expected that terms like *Score, Risk, Assessment, Product* will be mainly used, along with the other terms expected to be commonly used like *Customer or Client, Bank and Service*. This pilot is related to the extraction of information from notary invoices in order to create a sustainability index of each notary that the bank is working with based on the number of physical copies that the notary is issuing. Then promote those with the highest index by promoting them to their customers. As a result, this pilot uses some very specific terms such as *notary, invoices, and sustainability index* that are not expected to be found in other pilots. In fact, the terms *Score, Risk Assessment Score, Risk Assessment, Risk, Product, Processing System, Process, Financial Product, Client, Service* are found in all pilots, followed by the terms *Bank, Assessment, Report, Financial Service* which are found mostly in the pilots of the finance sector. On the contrary, terms like *Index, Credit Risk Score, Credit Risk, Credit, Business, Sustainable Business, Sustainability Score, Sustainability Index, Sustainability, Notary Rate, Notary, Notarial Service, Invoice, Document, Credit Reporting Service, Credit Report and Accuracy* are pilot specific and can only be found in this case.

Table 1 shows the list of all terminologies that have been identified for Pilot 1.

**Table 1: Identified terms for Pilot 1**

Term	Synonym	Kind	Description
<b>Accuracy</b>	Risk of failure, risk of non-repayment, risk of	Property	The possibility of a loss resulting from a borrower's failure to repay a loan or meet contractual obligations

	insolvency		
<b>Assessment</b>	Credit Risk rating, credit worthiness	Property	The number used by lenders that provides a snapshot of your credit risk picture at a particular point in time
<b>Bank</b>	Certificate, record, form, report	Object	Paper or a set of papers with written or printed information, especially of an official type
<b>Business</b>	Financial instruments, financial tools	Object	A financial product is a product (typically in the form of a contract) provided to consumers and businesses or other organizations (municipalities or sovereigns) by financial institutions such as banks, insurance companies, brokerage firms, consumer finance companies, and investment companies all of which comprise the financial services industry
<b>Client</b>	Banking, business services, financial affairs	Process	Service provided by the finance industry involving the investment, lending, and management of money and assets
<b>Cost</b>	Indicator, indication	Property	System of numbers used for comparing values of things that change according to each other or a fixed standard
<b>Credit</b>	Bill	Object	Itemized list of goods shipped, usually specifying the price and terms of sale
<b>Credit Report</b>	Notarize, notarizations	Process	Notary Services are services rendered by a state commissioned notary public
<b>Credit Reporting Service</b>	Notary public, public official, certifier	Actor	A person who has been licensed/authorized by a state to perform certain legal functions, especially to draw up or certify contracts, deeds, and other documents
<b>Credit Risk</b>	Notary fees	Property	The fee that a notary charges for their notary services
<b>Credit Risk Score</b>	Procedure, transaction	Process	A series of actions or steps taken in order to achieve a particular end
<b>Document</b>	Information processing, data processing	Process	The combination of machines, people, and processes that for a set of inputs produces a defined set of outputs
<b>Financial Product</b>	Commodity, output, solution	Object	It is an object or system made available for consumer use; it is anything that can be offered to a market to satisfy the desire or need of a customer
<b>Financial Service</b>	Account, story, chronicle, record	Object	An account, statement or document describing in detail an event, situation, or the like, usually as the result of observation, inquiry, etc.
<b>Index</b>	Hazard, pitfall, threat, trouble	Property	Risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return. Risk includes the possibility of losing some or all of an original investment.
<b>Invoice</b>	Risk evaluation, risk analysis	Process	The systematic process of evaluating the potential risks and/or to determine the likelihood of loss on an asset, loan, or investment
<b>Notarial Service</b>	Risk rating score, risk scoring	Property	It is a calculated number (score) that reflects the severity of a risk due to some factors
<b>Notary</b>	Amount, number, amount, final	Property	It is a number that expresses facts about an actual situation

	count		
<b>Notary Rate</b>	Assistance, support, utility	Object	The organized system of apparatus, appliances, employees, etc. for supplying some accommodation required by the public
<b>Process</b>	Service charge, additional charge	Property	The expense associated with having another person performs a valuable task for which specialized expertise may be required
<b>Processing System</b>	Maintainable, supportable	Property	The ability to be maintained at a certain rate or level
<b>Product</b>	Performance indicator	Property	Instrument to measure the responsibility of a certain company in social, environmental and economic development. It can be used to predict a debtor's financial performance and improve the predictive validity of the credit rating process
<b>Report</b>	Sustainability rating	Property	It allows for a quick assessment of how well a company is run
<b>Risk</b>	Green business	Object	Enterprise that has minimal negative impact on the global or local environment, community, society, or economy
<b>Document</b>	Risk of failure, risk of non-repayment, risk of insolvency	Property	The possibility of a loss resulting from a borrower's failure to repay a loan or meet contractual obligations
<b>Risk Assessment Score</b>	Credit Risk rating, credit worthiness	Property	The number used by lenders that provides a snapshot of your credit risk picture at a particular point in time
<b>Score</b>	Certificate, record, form, report	Object	Paper or a set of papers with written or printed information, especially of an official type
<b>Service</b>	Financial instruments, financial tools	Object	A financial product is a product (typically in the form of a contract) provided to consumers and businesses or other organizations (municipalities or sovereigns) by financial institutions such as banks, insurance companies, brokerage firms, consumer finance companies, and investment companies all of which comprise the financial services industry
<b>Service Cost</b>	Banking, business services, financial affairs	Process	Service provided by the finance industry involving the investment, lending, and management of money and assets
<b>Sustainability</b>	Indicator, indication	Property	System of numbers used for comparing values of things that change according to each other or a fixed standard
<b>Sustainability Index</b>	Bill	Object	Itemized list of goods shipped, usually specifying the price and terms of sale
<b>Sustainability Score</b>	Sustainability rating	Property	It allows for a quick assessment of how well a company is run
<b>Sustainable Business</b>	Green business	Object	Is an enterprise to be that has minimal negative impact on the global or local environment, community, society, or economy

This pilot is not currently relying on a specific ontology to build its overall solution.

## 4.2 Pilot #2: Real-time risk assessment in Investment Banking, Partners

Pilot 2 belongs to the category of *Smart, Reliable and Accurate Risk and Scoring Assessment*, so it is expected to use the commonly shared terms that were identified before, along with pilot specific ones for this scenario. This pilot plans to implement a procedure for real-time risk assessment and to monitor the risk for standard metrics that are being used in the sector. Its objective is to estimate the market risk and continuously re-evaluate it upon the change of market prices. As a result, it is expected the presence of pilot specific terms such as the names of the metrics, trades, assets, etc. In fact, the terms *Score, Risk Assessment Score, Risk Assessment, Risk, Product, Processing System, Process, Financial Product, Client, Service* are found in all pilots, followed by the terms *Bank, Assessment, Financial Regulator, Portfolio* which are found mostly in the pilots of the finance sector. On the contrary, terms like *Trade, Trade Analysis, Market, Asset Management, Asset, Value-at-Risk, Trader, Supervisory Authority, Sales Manager, Rules, Risk Metrics, Risk Manager, Policy, Market Risk, Manager, Lead, Expected Shortfall* and *Asset Manager* are unique and specific to this pilot.

Table 2 shows the list of all terminologies that have been identified for Pilot 2.

**Table 2: Identified terms for Pilot 2**

Term	Synonym	Kind	Description
<b>Assessment</b>	Determination, rating, estimation, valuation	Process	The process of judging or deciding the amount, value, quality, or importance of something, or the judgment or decision that is made
<b>Asset</b>	Resource, property	Object	An asset is a resource with economic value that an individual, corporation, or country owns or controls with the expectation that it will provide a future benefit.
<b>Asset Management</b>	Investment management, portfolio management, wealth management	Process	Refers to the active management of an investor's portfolio by a financial services company (usually an investment bank)
<b>Asset Manager</b>	Investment manager, portfolio manager, wealth manager	Actor	A person that determines what investments to make, or avoid, that will grow a client's portfolio
<b>Bank</b>	Investment Firm, Trust Company	Actor	It is a type of financial institution that accepts deposits, offers checking account services, purchases various loans, and offers basic financial products like certificates

			of deposit (CDs) and savings accounts to individuals and small businesses. A commercial bank is where most people do their banking, as opposed to an investment bank
<b>Client</b>	Customer	Actor	A person or organization who engages or use the services of a lawyer or of another professional person or company
<b>Expected Shortfall</b>	ES, CVaR, Expected Tail loss	Property	It is a risk assessment measure used in the field of financial risk measurement to evaluate the market risk or credit risk of a portfolio. It is the expected return on the portfolio if the worst-case threshold is ever crossed
<b>Financial Organization</b>	Financial Institution, Trust Company, Bank	Actor	It is an institution (public or private) that collects funds (from the public or other institutions) and invests them in financial assets
<b>Financial Product</b>	Financial instruments, financial tools	Object	A financial product is a product (typically in the form of a contract) provided to consumers and businesses or other organizations (municipalities or sovereigns) by financial institutions such as banks, insurance companies, brokerage firms, consumer finance companies, and investment companies all of which comprise the financial services industry
<b>Financial Regulator</b>	Financial supervisor, financial authority	Actor	A financial regulator is an institution that supervises and controls a financial system and related financial services. Their objective is to guarantee fair and efficient markets and financial stability
<b>Lead</b>	Potential customer, potential client, interested customer, interested client	Actor	It is an individual or organization with an interest in what you are selling
<b>Manager</b>	Administrator, director	Actor	It is a person who manages or is in charge of something
<b>Market</b>	Retail, exchange, marketplace	Object	It is a place where two parties can gather to facilitate the exchange of goods and services. The parties involved are usually buyers and sellers
<b>Market Risk</b>	Systematic risk	Property	It is the possibility of an investor experiencing losses due to factors that affect the overall performance of the financial markets in which he or she is involved
<b>Policy</b>	Plan, strategy	Object	A course or principle of action adopted or proposed by an organization or individual
<b>Portfolio</b>	Collection of investments	Object	It is a grouping of financial assets such as stocks, bonds, commodities, currencies and cash equivalents, as well as their fund counterparts, including mutual, exchange-traded and closed funds
<b>Process</b>	Procedure, transaction	Process	A series of actions or steps taken in order to achieve a particular end
<b>Processing</b>	Information	Process	The combination of machines, people, and processes

<b>System</b>	processing, data processing, DP		that for a set of inputs that produces a defined set of outputs
<b>Product</b>	Commodity, output, solution	Object	It is an object or system made available for consumer use; it is anything that can be offered to a market to satisfy the desire or need of a customer
<b>Regulatory Authority</b>	Regulatory agency, regulatory institution	Actor	A regulatory authority is an autonomous authority or agency established by a federal, state or provincial government
<b>Risk</b>	Hazard, pitfall, threat, trouble	Property	Risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return. Risk includes the possibility of losing some or all of an original investment.
<b>Risk Assessment</b>	Risk evaluation, risk analysis	Process	The systematic process of evaluating the potential risks and/or to determine the likelihood of loss on an asset, loan, or investment
<b>Risk Assessment Score</b>	Risk rating score, risk scoring	Property	It is a calculated number (score) that reflects the severity of a risk due to some factors
<b>Risk Manager</b>	Risk supervisor, director risk	Actor	An individual responsible for managing an organization's risks and minimizing the adverse impact of losses on the achievement of the organization's objectives
<b>Risk Metrics</b>	Risk measures	Property	The attribute of a risk that is being measured. Risk metrics are the statistical features used in risk measure calculations
<b>Rules</b>	Law, regulation	Complex Property	An accepted principle or instruction that states the way things are or should be done, and tells you what you are allowed or are not allowed to do
<b>Sales Manager</b>	Sales supervisor, sales leader	Actor	A manager in charge of the sales department and responsible for its performance, organization and planning
<b>Score</b>	Amount, number, amount, final count	Property	It is a number that expresses facts about an actual situation
<b>Supervisory Authority</b>	SA, DPA	Actor	It is an independent public authority that supervises, through investigative and corrective powers, the application of European data protection law
<b>Trade</b>	Exchange, transaction	Process	The action of buying and selling goods and services with compensation paid by a buyer to a seller, or the exchange of goods or services between parties
<b>Trade Analysis</b>	Technical analysis	Process	A trading discipline employed to evaluate investments and identify trading opportunities by analyzing statistical trends gathered from trading activity, such as price movement and volume
<b>Trader</b>	dealer, buyer, seller	Actor	An individual who engages in the buying and selling of financial assets in any financial market, either for himself or on behalf of another person or institution
<b>Value-at-Risk</b>	VaR	Property	It is a statistic that measures and quantifies the level of

			financial risk within a firm, portfolio or position over a specific time frame
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This pilot is not currently relying on a specific ontology to build its overall solution.

### 4.3 Pilot #3: Collaborative Customer-centric Data Analytics for Financial Services

Pilot 3 belongs to the category of *Personalized Retail and Investment Banking Services*. Apart from the commonly used terms, we expect to find terminologies related with the KYC and KYB aspects. Its scope is to use intelligent support tools for new customer services using permission-based mechanisms for data sharing with associated analytics capability and improve the KYC by sharing data from external sources related to the customer. This activity will improve credit scoring, while at the same time will detect possible transactions related with money laundering. This pilot shares terms with many pilots of the same category such as *Financial Organization, Digital Service, Data, Customer Service, Customer Data, Bank, Assessment, Financial Service, Financial Data*. Terms that are specific to this pilot are hardly found in others and are the following ones: *Loyalty, Anti-Money Laundering, Data Anonymization, Business, Data Custodian Service*.

Table 3 shows the list of all terminologies that have been identified for Pilot 3.

**Table 3: Identified terms for Pilot 3**

Term	Synonym	Kind	Description
<b>Anti-Money Laundering</b>	AML	Process	Anti-money laundering refers to a set of laws, regulations, and procedures intended to prevent criminals from disguising illegally obtained funds as legitimate income.
<b>Assessment</b>	Determination, rating, estimation, valuation	Process	The process of judging or deciding the amount, value, quality, or importance of something, or the judgment or decision that is made
<b>Bank</b>	Investment Firm, Trust Company	Actor	It is a type of financial institution that accepts deposits, offers checking account services, makes various loans, and offers basic financial products like certificates of deposit (CDs) and savings accounts to individuals and small businesses. A commercial bank is where most people do their banking, as opposed to an investment bank
<b>Business</b>	Affair, trade, transaction, contract	Process	The activity/process of buying and selling goods and services
<b>Client</b>	Costumer	Actor	A person or organization who engages or use the services of a lawyer or other professional person or company



<b>Cost</b>	Expense, expenditure, score	Property	An outlay or expenditure of money, time, effort, labour, trouble to acquire, produce, accomplish or maintain anything
<b>Credit</b>	Loan	Object	The ability and/or contractual agreement in which a customer obtains goods or services before payment, based on the trust that payment will be made in the future
<b>Credit Risk</b>	Risk of failure, risk of non-repayment, risk of insolvency	Property	The possibility of a loss resulting from a borrower's failure to repay a loan or meet contractual obligations
<b>Credit Risk Score</b>	Credit Risk rating, credit worthiness	Property	The number used by lenders that provides a snapshot of your credit risk picture at a particular point in time
<b>Customer Data</b>	Consumer Data	Object	Refers to all personal, behavioural, and demographic data that is collected by marketing companies and departments from their customer base.
<b>Customer Service</b>	Client service	Process	It is the direct one-on-one interaction between a consumer making a purchase and a representative of the company that is selling it
<b>Data</b>	Info, facts	Object	The facts and statistics collected together for reference or analysis
<b>Data Anonymization</b>	Data de-identification, data privacy, data obfuscation, data masking	Process	It is the process of removing sensitive information from a document or other message whose intent is privacy protection
<b>Data Custodian Service</b>	Data custody service	Process	It is responsible for the safe custody, transport, storage of the data and implementation of business rules
<b>Digital Service</b>	Electronic service, computer service	Process	Refers to the electronic delivery of information including data and content across multiple platforms and devices like web or mobile
<b>Financial Data</b>	Financial statements	Object	Financial data consists of pieces or sets of information related to the financial health of a business
<b>Financial Organization</b>	Financial Institution, Trust Company, Bank	Actor	It is an institution (public or private) that collects funds (from the public or other institutions) and invests them in financial assets
<b>Financial Product</b>	Financial instruments, financial tools	Object	A financial product is a product (typically in the form of a contract) provided to consumers and businesses or other organizations (municipalities or sovereigns) by financial institutions such as banks, insurance companies, brokerage firms, consumer finance companies, and investment companies all of which comprise the financial services industry
<b>Financial Service</b>	Banking, business services, financial affairs	Process	Service provided by the finance industry involving the investment, lending, and management of money and assets
<b>Loyalty</b>	Allegiance, devotion	Property	In general, loyalty is a devotion and faithfulness to a nation, cause, philosophy, country, group, or person

<b>Process</b>	Procedure, transaction, faithfulness	Process	A series of actions or steps taken in order to achieve a particular end
<b>Processing System</b>	Information processing, data processing, DP	Process	The combination of machines, people, and processes that for a set of inputs produces a defined set of outputs
<b>Product</b>	Commodity, output, solution	Object	It is an object or system made available for consumer use; it is anything that can be offered to a market to satisfy the desire or need of a customer
<b>Risk</b>	Hazard, pitfall, threat, trouble	Property	Risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return. Risk includes the possibility of losing some or all of an original investment.
<b>Risk Assessment</b>	Risk evaluation, risk analysis	Process	The systematic process of evaluating the potential risks and/or to determine the likelihood of loss on an asset, loan, or investment
<b>Risk Assessment Score</b>	Risk rating score, risk scoring	Property	It is a calculated number (score) that reflects the severity of a risk due to some factors
<b>Score</b>	Amount, number, amount, final count	Property	It is a number that expresses facts about an actual situation
<b>Service</b>	Assistance, support, utility	Object	The organized system of apparatus, appliances, employees, etc., for supplying some accommodation required by the public
<b>Service Cost</b>	Service charge, additional charge	Property	The expense associated with having another person perform a valuable task for which specialized expertise may be required

**Table 3: Identified terms for Pilot 3**

This pilot already uses an internal model for data representation and currently a study is being carried out to identify if this model is compliant with FIBO, FIGI or even LKIF, by looking at the legal framework terms. The general idea is to be able to have a way to semantically describe the format of this pilot in order to make it compatible with one of the three ontologies, or generate or create extensions of them that can be proposed to be adapted in the INFINITECH Data Model as semantic annotations to datasets.

#### 4.4 Pilot #4: Personalized Portfolio Management (“Why Private Banking cannot be for everyone?”)

Pilot 4 belongs to the category of *Personalized Retail and Investment Banking Services*. Apart from the commonly used terms, we expect to find terminologies related with the KYC and KYB aspects. Its scope is to explore the possibilities of AI Based Portfolio construction for Wealth Management in general, regardless which amount has to be invested, thus enabling interested advisors and customers to use the existing platform of this bank in order to make a risk-profiling, calculate their portfolio and identify and suggest different ways to invest or

to “fit” the portfolio. Terms that are widely found among other pilots and especially to those of this category are the following: *Digital Service, Data, Customer Service, Customer Data, Regulatory Authority, Artificial Intelligence, Big Data, Bank, Risk profiling, Financial Service, Financial Regulator, Financial Data, Portfolio, Fund*. However, the terminologies that are pilot specific and are hardly found on others include terms such as *Service Cost, Loyalty, Wealth-Management, Relationship Manager, Open Data, Advisor* and *Optimization*.

Table 4 shows the list of all terminologies that have been identified for Pilot 4.

**Table 4: Identified terms for Pilot 4**

Term	Synonym	Kind	Description
<b>Advisor</b>	Consultant	Actor	A person who gives advice in a particular field
<b>Artificial Intelligence</b>	AI, machine intelligence	Process	It refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions
<b>Bank</b>	Investment Firm, Trust Company	Actor	It is a type of financial institution that accepts deposits, offers checking account services, makes various loans, and offers basic financial products like certificates of deposit (CDs) and savings accounts to individuals and small businesses. A commercial bank is where most people do their banking, as opposed to an investment bank
<b>Big Data</b>	Massive data, BDA	Process	It is a field that treats ways to analyze, systematically extract information from, or otherwise deal with data sets that are too large or complex to be dealt with by traditional data-processing application software
<b>Client</b>	Customer	Actor	A person or organization who engages or use the services of a lawyer or other professional person or company
<b>Customer Data</b>	Consumer Data	Object	Refers to all personal, behavioural, and demographic data that is collected by marketing companies and departments from their customer base.
<b>Customer Service</b>	Client service	Process	It is the direct one-on-one interaction between a consumer making a purchase and a representative of the company that is selling it
<b>Data</b>	Info, facts	Object	The facts and statistics collected together for reference or analysis
<b>Digital Service</b>	Electronic service, computer service	Process	Refers to the electronic delivery of information including data and content across multiple platforms and devices like web or mobile
<b>Financial Data</b>	Financial statements	Object	Financial data consists of pieces or sets of information related to the financial health of a business
<b>Financial Organization</b>	Financial Institution, Trust Company, Bank	Actor	It is an institution (public or private) that collects funds (from the public or other institutions) and invests them in financial assets
<b>Financial Product</b>	Financial	Object	A financial product is a product (typically in the form of

	instruments, financial tools		a contract) provided to consumers and businesses or other organizations (municipalities or sovereigns) by financial institutions such as banks, insurance companies, brokerage firms, consumer finance companies, and investment companies all of which comprise the financial services industry
<b>Financial Regulator</b>	Financial supervisor, financial authority	Actor	A financial regulator is an institution that supervises and controls a financial system and related financial services. Their objective is to guarantee fair and efficient markets and financial stability
<b>Financial Service</b>	Banking, business services, financial affairs	Process	Service provided by the finance industry involving the investment, lending, and management of money and assets
<b>Fund</b>	Capital, endowment, foundation	Object	It is a pool of money that is allocated for a specific purpose
<b>Loyalty</b>	Allegiance, devotion	Property	In general use, loyalty, is a devotion and faithfulness to a nation, cause, philosophy, country, group, or person
<b>Open Data</b>	Free data, free accessible data	Object	Open data is the idea that some data should be freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control
<b>Optimization</b>	Enhancement, improvement	Process	The action of making the best or most effective use of a situation or resource
<b>Portfolio</b>	Collection of investments	Object	It is a grouping of financial assets such as stocks, bonds, commodities, currencies and cash equivalents, as well as their fund counterparts, including mutual, exchange-traded and closed funds
<b>Process</b>	Procedure, transaction, faithfulness	Process	A series of actions or steps taken in order to achieve a particular end
<b>Processing System</b>	Information processing, data processing, DP	Process	The combination of machines, people, and processes that for a set of inputs produces a defined set of outputs
<b>Product</b>	Commodity, output, solution	Object	It is an object or system made available for consumer use; it is anything that can be offered to a market to satisfy the desire or need of a customer
<b>Regulatory Authority</b>	Regulatory agency, regulatory institution	Actor	A regulatory authority is an autonomous authority or agency established by a federal, state or provincial government
<b>Relationship Manager</b>	Account manager, account executive	Actor	Relationship managers work to improve business relationships with partner firms and clients. Relationship management is generally divided into two fields: client relationship management and business relationship management
<b>Risk</b>	Hazzard, pitfall, threat, trouble	Property	Risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an

			expected outcome or return. Risk includes the possibility of losing some or all of an original investment.
<b>Risk Assessment</b>	Risk evaluation, risk analysis	Process	The systematic process of evaluating the potential risks and/or to determine the likelihood of loss on an asset, loan, or investment
<b>Risk Assessment Score</b>	Risk rating score, risk scoring	Property	It is a calculated number (score) that reflects the severity of a risk due to some factors
<b>Risk profiling</b>	Risk-profile	Process	Evaluation of an individual's willingness and ability to take risks
<b>Score</b>	Amount, number, amount, final count	Property	It is a number that expresses facts about an actual situation
<b>Service</b>	Assistance, support, utility	Object	The organized system of apparatus, appliances, employees, etc., for supplying some accommodation required by the public
<b>Service Cost</b>	Service charge, additional charge	Property	The expense associated with having another person perform a valuable task for which specialized expertise may be required
<b>Wealth-Management</b>	Customer relationship management, CRM	Process	It is an investment advisory service that combines other financial services to address the needs of affluent clients. It is a consultative process whereby the advisor gleans information about the client's wants and tailors a bespoke strategy utilizing appropriate financial products and services

**Table 4: Identified terms for Pilot 4**

This pilot is not currently relying on a specific ontology to build its overall solution.

### 3.5a Pilot #5a: Smart and Personalized Pocket Assistant for Personal Financial Management

There has been no information regarding the terminologies that are being used by this pilot at this phase of the project. This pilot is under development. A detailed description will be included in the second version of the deliverable.

This pilot is not currently relying on a specific ontology to build its overall solution.

### 4.5b Pilot #5b: Business Financial Management (BFM) tools delivering a Smart Business Advice

There has been no information regarding the terminologies that are being used by this pilot at this phase of the project. This pilot is under development. A detailed description will be included in the second version of the deliverable.

This pilot is not currently relying on a specific ontology to build its overall solution.

## 4.6 Pilot #6: Personalized Closed-Loop Investment Portfolio Management for Retail Customers

Pilot 6 belongs to the category of *Personalized Retail and Investment Banking Services*. Apart from the commonly used terms, we expect to find terminologies related with the KYC and KYB aspects. Its objective is implement an integrated BigData/AI workflow for the automation in order to automate and personalize investment recommendations, including client research and profiling, prospects identification, portfolio construction and monitoring. It uses terminologies that are usually found in pilots of the insurance sector, especially the ones of the personalized retail and investment banking category, such as *Customer Service, Customer Data, Regulatory Authority, Artificial Intelligence, Customer Profile, Big Data, Bank, Risk profiling, Financial Service, Financial Regulator, Financial Data, Retail Customer, Portfolio, Investment*. However, there can be found additional terms that are pilot specific, such as *Trade, Loyalty, Wealth-Management, Trade Analysis, Relationship Manager, Open Data, Market, Know Your Client, Advisor, Service Provider, Investor profile, Investor, Investment profile, Investment Advice*.

Table 5 shows the list of all terminologies that have been identified for pilot 6.

**Table 5: Identified terms for Pilot 6**

Term	Synonym	Kind	Description
<b>Advisor</b>	Consultant	Actor	A person who gives advice in a particular field
<b>Artificial Intelligence</b>	AI, machine intelligence, machine learning, ML	Process	It refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions
<b>Bank</b>	Investment Firm, Trust Company	Actor	It is a type of financial institution that accepts deposits, offers checking account services, makes various loans, and offers basic financial products like certificates of deposit (CDs) and savings accounts to individuals and small businesses. A commercial bank is where most people do their banking, as opposed to an investment bank
<b>Big Data</b>	Massive data, BDA	Process	It is a field that treats ways to analyze, systematically extract information from, or otherwise deal with data sets that are too large or complex to be dealt with by traditional data-processing application software
<b>Client</b>	Costumer	Actor	A person or organization who engages or use the services of a lawyer or other professional person or company
<b>Customer Data</b>	Consumer Data, customer dataset	Object	Refers to all personal, behavioural, and demographic data that is collected by marketing companies and departments from their customer base.

<b>Customer Profile</b>	Client Profile, client profiling	Process	It is a summary of a specific customer type that is based primarily on available statistical information, such as demographics, income (or company revenue if B2B), gender, age, location, etc.
<b>Customer Service</b>	Client service	Process	It is the direct one-on-one interaction between a consumer making a purchase and a representative of the company that is selling it
<b>Data</b>	Info, facts	Object	The facts and statistics collected together for reference or analysis
<b>Digital Service</b>	Electronic service, computer service	Process	Refers to the electronic delivery of information including data and content across multiple platforms and devices like web or mobile
<b>Financial Data</b>	Financial statements	Object	Financial data consists of pieces or sets of information related to the financial health of a business
<b>Financial Organization</b>	Financial Institution, Trust Company, Bank	Actor	It is an institution (public or private) that collects funds (from the public or other institutions) and invests them in financial assets
<b>Financial Product</b>	Financial instruments, financial tools	Object	A financial product is a product (typically in the form of a contract) provided to consumers and businesses or other organizations (municipalities or sovereigns) by financial institutions such as banks, insurance companies, brokerage firms, consumer finance companies, and investment companies all of which comprise the financial services industry
<b>Financial Regulator</b>	Financial supervisor, financial authority	Actor	A financial regulator is an institution that supervises and controls a financial system and related financial services. Their objective is to guarantee fair and efficient markets and financial stability
<b>Financial Service</b>	Banking, business services, financial affairs	Process	Service provided by the finance industry involving the investment, lending, and management of money and assets
<b>Investment</b>	Transaction, expenditure, funding	Process	It is the purchase of goods that are not consumed today but are used in the future to create wealth
<b>Investment Advice</b>	Investment recommendation	Process	It is any recommendation or guidance that attempts to educate, inform, or guide an investor regarding a particular investment product or series of products.
<b>Investment profile</b>	investment profiling	Process	It brings together a group of investments with a similar level of risk. It is made up of key data relating to investments or financial assets
<b>Investor</b>	shareholder, stockholder	Actor	It is any person or other entity (such as a firm or mutual fund) who commits capital with the expectation of receiving financial returns
<b>Investor profile</b>	Investment style	Process	It defines an individual's preferences in investment decisions
<b>Know Your Client</b>	KYC	Process	It is a standard in the investment industry that ensures investment advisors know detailed information about their clients' risk tolerance, investment knowledge, and

			financial position
<b>Loyalty</b>	Allegiance, devotion	Property	In general use, loyalty, is a devotion and faithfulness to a nation, cause, philosophy, country, group, or person
<b>Market</b>	Retail, exchange, marketplace	Object	It is a place where two parties can gather to facilitate the exchange of goods and services. The parties involved are usually buyers and sellers
<b>Open Data</b>	Free data, free accessible data	Object	Open data is the idea that some data should be freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control
<b>Portfolio</b>	Collection of investments	Object	It is a grouping of financial assets such as stocks, bonds, commodities, currencies and cash equivalents, as well as their fund counterparts, including mutual, exchange-traded and closed funds
<b>Process</b>	Procedure, transaction, faithfulness	Process	A series of actions or steps taken in order to achieve a particular end
<b>Processing System</b>	Information processing, data processing, DP	Process	The combination of machines, people, and processes that for a set of inputs produces a defined set of outputs
<b>Product</b>	Commodity, output, solution	Object	It is an object or system made available for consumer use; it is anything that can be offered to a market to satisfy the desire or need of a customer
<b>Regulatory Authority</b>	Regulatory agency, regulatory institution	Actor	A regulatory authority is an autonomous authority or agency established by a federal, state or provincial government
<b>Relationship Manager</b>	Account manager, account executive	Actor	Relationship managers work to improve business relationships with partner firms and clients. Relationship management is generally divided into two fields: client relationship management and business relationship management
<b>Retail Customer</b>	Retail client	Actor	It is customer who is going to buy in small quantity and the product usage would be by him or by his family or friends
<b>Risk</b>	Hazard, pitfall, threat, trouble	Property	Risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return. Risk includes the possibility of losing some or all of an original investment.
<b>Risk Assessment</b>	Risk evaluation, risk analysis	Process	The systematic process of evaluating the potential risks and/or to determine the likelihood of loss on an asset, loan, or investment
<b>Risk Assessment Score</b>	Risk rating score, risk scoring	Property	It is a calculated number (score) that reflects the severity of a risk due to some factors
<b>Risk profiling</b>	Risk-profile	Process	The evaluation of an individual's willingness and ability to take risks
<b>Score</b>	Amount, number,	Property	It is a number that expresses facts about an actual



	amount, final count		situation
<b>Service</b>	Assistance, support, utility	Object	The organized system of apparatus, appliances, employees, etc., for supplying some accommodation required by the public
<b>Service Provider</b>	SP, service bureau	Actor	Organization, business or individual which offers service to others in exchange for payment
<b>Trade</b>	Exchange, transaction, financial transaction	Process	The action of buying and selling goods and services with compensation paid by a buyer to a seller, or the exchange of goods or services between parties
<b>Trade Analysis</b>	Technical analysis	Process	A trading discipline employed to evaluate investments and identify trading opportunities by analyzing statistical trends gathered from trading activity, such as price movement and volume
<b>Wealth-Management</b>	Customer relationship management, CRM	Process	It is an investment advisory service that combines other financial services to address the needs of affluent clients. It is a consultative process whereby the advisor gleans information about the client's wants and tailors a bespoke strategy utilizing appropriate financial products and services

**Table 5: Identified terms for Pilot 6**

This pilot is not currently relying on a specific ontology to build its overall solution.

#### 4.7 Pilot #7: Operation Whitetail – Avoiding Financial Crime

Pilot 7 belongs to the category called *Financial Crime and Fraud Detection*, where we expect to use more specific terms related with these topics. Its scope is to create a more accurate, comprehensive and near real-time picture of suspicious behaviour in the Financial Crime remit, using high performance computing and machine learning in order to allow the detection algorithms to respond the moment such a transaction takes place. It shares terms that are commonly found in other pilots of the insurance sector, like *Customer Service, Customer Data, Regulatory Authority, Artificial Intelligence, Customer Profile, Bank, Risk profiling, Financial Service, Financial Regulator, Financial Data, Alert, Retail Customer, Investment, Fund*. As all pilots, it also contains terms that are specific to this scenario such as *Financial Crime Risk, Financial Crime, Anti-Money Laundering, Terrorist Financing*.

Table 6 shows the list of all terminologies that have been identified for pilot 7.

**Table 6: Identified terms for Pilot 7**

Term	Synonym	Kind	Description
<b>Alert</b>	Warning, notice, notification	Property	An announcement, notice, or signal warning of potential dangerous situations and/or circumstances

<b>Artificial Intelligence</b>	AI, machine intelligence, machine learning, ML	Process	It refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions
<b>Anti-Money Laundering</b>	AML	Process	Anti-money laundering refers to a set of laws, regulations, and procedures intended to prevent criminals from disguising illegally obtained funds as legitimate income.
<b>Bank</b>	Investment Firm, Trust Company	Actor	It is a type of financial institution that accepts deposits, offers checking account services, makes various loans, and offers basic financial products like certificates of deposit (CDs) and savings accounts to individuals and small businesses. A commercial bank is where most people do their banking, as opposed to an investment bank
<b>Client</b>	Customer	Actor	A person or organization who engages or use the services of a lawyer or other professional person or company
<b>Customer Data</b>	Consumer Data, customer dataset	Object	Refers to all personal, behavioural, and demographic data that is collected by marketing companies and departments from their customer base.
<b>Customer Profile</b>	Client Profile, client profiling	Process	It is a summary of a specific customer type that is based primarily on available statistical information, such as demographics, income (or company revenue if B2B), gender, age, location, etc.
<b>Customer Service</b>	Client service	Process	It is the direct one-on-one interaction between a consumer making a purchase and a representative of the company that is selling it
<b>Data</b>	Info, facts	Object	The facts and statistics collected together for reference or analysis
<b>Digital Service</b>	Electronic service, computer service	Process	Refers to the electronic delivery of information including data and content across multiple platforms and devices like web or mobile
<b>Financial Crime</b>	Financial infraction, financial misconduct, financial transgression	Process	It is crime committed against property, involving the unlawful conversion of the ownership of property (belonging to one person) to one's own personal use and benefit
<b>Financial Crime Risk</b>	Financial infringement risk, financial misconduct risk, financial transgression risk	Property	It is the risk of an organization to become victim of a financial crime
<b>Financial Data</b>	Financial statements	Object	Financial data consists of pieces or sets of information related to the financial health of a business
<b>Financial</b>	Financial	Actor	It is an institution (public or private) that collects funds

<b>Organization</b>	Institution, Trust Company, Bank		(from the public or other institutions) and invests them in financial assets
<b>Financial Product</b>	Financial instruments, financial tools	Object	A financial product is a product (typically in the form of a contract) provided to consumers and businesses or other organizations (municipalities or sovereigns) by financial institutions such as banks, insurance companies, brokerage firms, consumer finance companies, and investment companies all of which comprise the financial services industry
<b>Financial Regulator</b>	Financial supervisor, financial authority	Actor	A financial regulator is an institution that supervises and controls a financial system and related financial services. Their objective is to guarantee fair and efficient markets and financial stability
<b>Financial Service</b>	Banking, business services, financial affairs	Process	Service provided by the finance industry involving the investment, lending, and management of money and assets
<b>Fund</b>	Capital, endowment, foundation	Object	It is a pool of money that is allocated for a specific purpose
<b>Investment</b>	Transaction, expenditure, funding	Process	It is the purchase of goods that are not consumed today but are used in the future to create wealth
<b>Know Your Client</b>	KYC	Process	It is a standard in the investment industry that ensures investment advisors know detailed information about their clients' risk tolerance, investment knowledge, and financial position
<b>Process</b>	Procedure, transaction, faithfulness	Process	A series of actions or steps taken in order to achieve a particular end
<b>Processing System</b>	Information processing, data processing, DP	Process	The combination of machines, people, and processes that for a set of inputs produces a defined set of outputs
<b>Product</b>	Commodity, output, solution	Object	It is an object or system made available for consumer use; it is anything that can be offered to a market to satisfy the desire or need of a customer
<b>Regulatory Authority</b>	Regulatory agency, regulatory institution	Actor	A regulatory authority is an autonomous authority or agency established by a federal, state or provincial government
<b>Retail Customer</b>	Retail client	Actor	It is customer who is going to buy in small quantity and the product usage would be by him or by his family or friends
<b>Risk</b>	Hazard, pitfall, threat, trouble	Property	Risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return. Risk includes the possibility of losing some or all of an original investment.
<b>Risk Assessment</b>	Risk evaluation,	Process	The systematic process of evaluating the potential risks

	risk analysis		and/or to determine the likelihood of loss on an asset, loan, or investment
<b>Risk Assessment Score</b>	Risk rating score, risk scoring	Property	It is a calculated number (score) that reflects the severity of a risk due to some factors
<b>Risk profiling</b>	Risk-profile	Process	Evaluation of an individual's willingness and ability to take risks
<b>Score</b>	Amount, number, amount, final count	Property	It is a number that expresses facts about an actual situation
<b>Service</b>	Assistance, support, utility	Object	The organized system of apparatus, appliances, employees, etc., for supplying some accommodation required by the public
<b>Terrorist Financing</b>	TF	Process	is the provision of funds or providing financial support to individual terrorists or non-state actors

**Table 6: Identified terms for Pilot 7**

This pilot is not currently relying on a specific ontology to build its overall solution.

#### 4.8 Pilot #8: Platform for Anti Money Laundering Supervision (PAMLS)

Pilot 8 belongs to the category called *Financial Crime and Fraud Detection*, where we expect to use more specific terms related with these topics. Its scope is to improve the effectiveness of the existing supervisory activities in the area of anti money laundering and combating terrorist financing. It shares terms with a wide list of pilots such as *Financial Organization, Digital Service, Data, Customer Service, Customer Data, Regulatory Authority, Artificial Intelligence, Customer Profile, Big Data, Bank, Risk profiling, Report, Financial Service, Financial Regulator, Financial Data, Alert, Retail Customer, Investment, Fund*, while it also contains terms that are specific to the pilots of this category: *Financial Crime Risk, Financial Crime, Risk-based Supervision, Forensics Analyst, Anti-Money Laundering, Terrorist Financing*.

Table 7 shows the list of all terminologies that have been identified for pilot 8.

**Table 7: Identified terms for Pilot 8**

Term	Synonym	Kind	Description
<b>Alert</b>	Warning, notice, notification	Property	An announcement, notice, or signal warning of potentially dangerous situations and/or circumstances
<b>Artificial Intelligence</b>	AI, machine intelligence, machine learning, ML	Process	It refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions
<b>Anti-Money Laundering</b>	AML	Process	Anti-money laundering refers to a set of laws, regulations, and procedures intended to prevent criminals from disguising illegally obtained funds as

			legitimate income.
<b>Bank</b>	Investment Firm, Trust Company	Actor	It is a type of financial institution that accepts deposits, offers checking account services, makes various loans, and offers basic financial products like certificates of deposit (CDs) and savings accounts to individuals and small businesses. A commercial bank is where most people do their banking, as opposed to an investment bank
<b>Big Data</b>	Massive data, BDA	Process	It is a field that treats ways to analyze, systematically extract information from, or otherwise deal with data sets that are too large or complex to be dealt with by traditional data-processing application software
<b>Client</b>	Costumer	Actor	A person or organization who engages or use the services of a lawyer or other professional person or company
<b>Customer Data</b>	Consumer Data, customer dataset	Object	Refers to all personal, behavioural, and demographic data that is collected by marketing companies and departments from their customer base.
<b>Customer Profile</b>	Client Profile, client profiling	Process	It is a summary of a specific customer type that is based primarily on available statistical information, such as demographics, income (or company revenue if B2B), gender, age, location, etc.
<b>Customer Service</b>	Client service	Process	It is the direct one-on-one interaction between a consumer making a purchase and a representative of the company that is selling it
<b>Data</b>	Info, facts	Object	The facts and statistics collected together for reference or analysis
<b>Digital Service</b>	Electronic service, computer service	Process	Refers to the electronic delivery of information including data and content across multiple platforms and devices like web or mobile
<b>Financial Crime</b>	Financial infraction, financial misconduct, financial transgression	Process	It is crime committed against property, involving the unlawful conversion of the ownership of property (belonging to one person) to one's own personal use and benefit
<b>Financial Crime Risk</b>	Financial infringement risk, financial misconduct risk, financial transgression risk	Property	It is the risk of an organization to become victim of a financial crime
<b>Financial Data</b>	Financial statements	Object	Financial data consists of pieces or sets of information related to the financial health of a business
<b>Financial Organization</b>	Financial Institution, Trust Company, Bank	Actor	It is an institution (public or private) that collects funds (from the public or other institutions) and invests them in financial assets
<b>Financial Product</b>	Financial	Object	A financial product is a product (typically in the form of

	instruments, financial tools		a contract) provided to consumers and businesses or other organizations (municipalities or sovereigns) by financial institutions such as banks, insurance companies, brokerage firms, consumer finance companies, and investment companies all of which comprise the financial services industry
<b>Financial Regulator</b>	Financial supervisor, financial authority	Actor	A financial regulator is an institution that supervises and controls a financial system and related financial services. Their objective is to guarantee fair and efficient markets and financial stability
<b>Financial Service</b>	Banking, business services, financial affairs	Process	Service provided by the finance industry involving the investment, lending, and management of money and assets
<b>Forensics Analyst</b>	Financial Forensics	Actor	It may help with risk management and risk reduction through customized design of accounting and auditing systems and procedures. As a function of due diligence and investment analysis, they will advise on a wide variety of financial transactions
<b>Fund</b>	Capital, endowment, foundation	Object	It is a pool of money that is allocated for a specific purpose
<b>Investment</b>	Transaction, expenditure, funding	Process	It is the purchase of goods that are not consumed today but are used in the future to create wealth
<b>Process</b>	Procedure, transaction, faithfulness	Process	A series of actions or steps taken in order to achieve a particular end
<b>Processing System</b>	Information processing, data processing, DP	Process	The combination of machines, people, and processes that for a set of inputs produces a defined set of outputs
<b>Product</b>	Commodity, output, solution	Object	It is an object or system made available for consumer use; it is anything that can be offered to a market to satisfy the desire or need of a customer
<b>Regulatory Authority</b>	Regulatory agency, regulatory institution	Actor	A regulatory authority is an autonomous authority or agency established by a federal, state or provincial government
<b>Report</b>	Account, story, chronicle, record	Object	An account, statement or document describing in detail an event, situation, or the like, usually as the result of observation, inquiry, etc.
<b>Retail Customer</b>	Retail client	Actor	It is customer who is going to buy in small quantity and the product usage would be by him or by his family or friends
<b>Risk</b>	Hazard, pitfall, threat, trouble	Property	Risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return. Risk includes the possibility of losing some or all of an original investment.

<b>Risk Assessment</b>	Risk evaluation, risk analysis	Process	The systematic process of evaluating the potential risks and/or to determine the likelihood of loss on an asset, loan, or investment
<b>Risk Assessment Score</b>	Risk rating score, risk scoring	Property	It is a calculated number (score) that reflects the severity of a risk due to some factors
<b>Risk-based Supervision</b>	RBS	Process	It is a comprehensive, formally structured system that assesses risks within the financial system, giving priority to the resolution of those risks
<b>Risk profiling</b>	Risk-profile	Process	Evaluation of an individual's willingness and ability to take risks
<b>Score</b>	Amount, number, amount, final count	Property	It is a number that expresses facts about an actual situation
<b>Service</b>	Assistance, support, utility	Object	The organized system of apparatus, appliances, employees, etc., for supplying some accommodation required by the public
<b>Terrorist Financing</b>	TF	Process	It is the provision of funds or providing financial support to individual terrorists or non-state actors

This pilot is not currently relying on a specific ontology to build its overall solution.

#### 4.9 Pilot #9: Analyzing Blockchain Transaction Graphs for Fraudulent Activities

Pilot 9 belongs to the category called *Financial Crime and Fraud Detection*, where we expect to use more specific terms related with these topics. Its scope is to develop and deploy a scalable and high performance blockchain transaction graph analysis system for investigating whether customer blockchain account transactions can be traced to fraudulent activities or accounts. It shares terms with a variety of other pilots of the finance sector such as *Financial Organization, Digital Service, Data, Customer Service, Customer Data, Regulatory Authority, Artificial Intelligence, Customer Profile, Big Data, Bank, Assessment, Risk profiling, Report, Financial Service, Financial Regulator, Financial Data, Alert, Retail Customer, Investment, Fund*. It additionally shares some terms with pilots of the same category, such as *Financial Crime Risk, Financial Crime, Risk-based Supervision, Fraud, Forensics Analyst, Asset Management, Asset, Exchange Company*.

Table 8 shows the list of all terminologies that have been identified for pilot 9.

**Table 8: Identified terms for Pilot 9**

Term	Synonym	Kind	Description
<b>Alert</b>	Warning, notice, notification	Property	An announcement, notice, or signal warning of potentially dangerous situations and/or circumstances
<b>Artificial Intelligence</b>	AI, machine intelligence, machine learning, ML	Process	It refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions

<b>Assessment</b>	Determination, Rating, Estimation, Valuation	Process	The process of judging or deciding the amount, value, quality, or importance of something, or the judgment or decision that is made
<b>Asset</b>	Resource, property	Object	An asset is a resource with economic value that an individual, corporation, or country owns or controls with the expectation that it will provide a future benefit.
<b>Asset Management</b>	Investment management, portfolio management, wealth management	Process	It refers to the active management of an investor's portfolio by a financial services company (usually an investment bank)
<b>Bank</b>	Investment Firm, Trust Company	Actor	It is a type of financial institution that accepts deposits, offers checking account services, makes various loans, and offers basic financial products like certificates of deposit (CDs) and savings accounts to individuals and small businesses. A commercial bank is where most people do their banking, as opposed to an investment bank
<b>Big Data</b>	Massive data, BDA	Process	It is a field that treats ways to analyze, systematically extract information from, or otherwise deal with data sets that are too large or complex to be dealt with by traditional data-processing application software
<b>Client</b>	Customer	Actor	A person or organization who engages or use the services of a lawyer or other professional person or company
<b>Customer Data</b>	Consumer Data, customer dataset	Object	It refers to all personal, behavioural, and demographic data that is collected by marketing companies and departments from their customer base.
<b>Customer Profile</b>	Client Profile, client profiling	Process	It is a summary of a specific customer type that is based primarily on available statistical information, such as demographics, income (or company revenue if B2B), gender, age, location, etc.
<b>Customer Service</b>	Client service	Process	It is the direct one-on-one interaction between a consumer making a purchase and a representative of the company that is selling it
<b>Data</b>	Info, facts	Object	The facts and statistics collected together for reference or analysis
<b>Digital Service</b>	Electronic service, computer service	Process	It refers to the electronic delivery of information including data and content across multiple platforms and devices like web or mobile
<b>Exchange Company</b>	Exchange broker	Actor	It is a company that offers currency exchange and international payments to private individuals and companies
<b>Financial Crime</b>	Financial infraction,	Process	It is crime committed against property, involving the unlawful conversion of the ownership of property



	financial misconduct, financial transgression		(belonging to one person) to one's own personal use and benefit
<b>Financial Crime Risk</b>	Financial infringement risk, financial misconduct risk, financial transgression risk	Property	It is the risk of an organization to become victim of a financial crime
<b>Financial Data</b>	Financial statements	Object	Financial data consists of pieces or sets of information related to the financial health of a business
<b>Financial Organization</b>	Financial Institution, FI, Trust Company, Bank	Actor	It is an institution (public or private) that collects funds (from the public or other institutions) and invests them in financial assets
<b>Financial Product</b>	Financial instruments, financial tools	Object	A financial product is a product (typically in the form of a contract) provided to consumers and businesses or other organizations (municipalities or sovereigns) by financial institutions such as banks, insurance companies, brokerage firms, consumer finance companies, and investment companies all of which comprise the financial services industry
<b>Financial Regulator</b>	Financial supervisor, financial authority	Actor	A financial regulator is an institution that supervises and controls a financial system and related financial services. Their objective is to guarantee fair and efficient markets and financial stability
<b>Financial Service</b>	Banking, business services, financial affairs	Process	Service provided by the finance industry involving the investment, lending, and management of money and assets
<b>Forensics Analyst</b>	Financial Forensics	Actor	It may help with risk management and risk reduction through customized design of accounting and auditing systems and procedures. As a function of due diligence and investment analysis, they will advise on a wide variety of financial transactions
<b>Fraud</b>	Fraudulence, criminal deception	Process	It is an intentionally deceptive action designed to provide the perpetrator with an unlawful gain or to deny a right to a victim. Fraud can occur in finance, real estate, investment, and insurance
<b>Fund</b>	Capital, endowment, foundation	Object	It is a pool of money that is allocated for a specific purpose
<b>Investment</b>	Transaction, expenditure, funding	Process	It is the purchase of goods that are not consumed today but are used in the future to create wealth
<b>Process</b>	Procedure, transaction, faithfulness	Process	A series of actions or steps taken in order to achieve a particular end

<b>Processing System</b>	Information processing, data processing, DP	Process	The combination of machines, people, and processes that for a set of inputs produces a defined set of outputs
<b>Product</b>	Commodity, output, solution	Object	It is an object or system made available for consumer use; it is anything that can be offered to a market to satisfy the desire or need of a customer
<b>Regulatory Authority</b>	Regulatory agency, regulatory institution	Actor	A regulatory authority is an autonomous authority or agency established by a federal, state or provincial government
<b>Report</b>	Account, story, chronicle, record	Object	An account, statement or document describing in detail an event, situation, or the like, usually as the result of observation, inquiry, etc.
<b>Retail Customer</b>	Retail client	Actor	It is customer who is going to buy in small quantity and the product usage would be by him or by his family or friends
<b>Risk</b>	Hazard, pitfall, threat, trouble	Property	Risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return. Risk includes the possibility of losing some or all of an original investment.
<b>Risk Assessment</b>	Risk evaluation, risk analysis	Process	The systematic process of evaluating the potential risks and/or to determine the likelihood of loss on an asset, loan, or investment
<b>Risk Assessment Score</b>	Risk rating score, risk scoring	Property	It is a calculated number (score) that reflects the severity of a risk due to some factors
<b>Risk-based Supervision</b>	RBS	Process	It is a comprehensive, formally structured system that assesses risks within the financial system, giving priority to the resolution of those risks
<b>Risk profiling</b>	Risk-profile	Process	evaluation of an individual's willingness and ability to take risks
<b>Score</b>	Amount, number, amount, final count	Property	It is a number that expresses facts about an actual situation
<b>Service</b>	Assistance, support, utility	Object	the organized system of apparatus, appliances, employees, etc., for supplying some accommodation required by the public

This pilot is not currently relying on a specific ontology to build its overall solution.

#### 4.10 Pilot #10: Real-time cyber security analytics on Financial Transactions' BigData

Pilot 10 belongs to the category called *Financial Crime and Fraud Detection*, where we expect to use more specific terms related with these topics. Its scope is to enable the identification of security-related anomalies while they are occurring, allowing, proactive and prompt interventions on such potential security threats by building a sophisticated tool that

will analyse in real-time the financial transactions of a home and mobile banking system, thus improving significantly the detection rate of malicious events in the very same moment in which they are happening. It shares terminologies with other pilots such as *Financial Organization, Digital Service, Data, Customer Service, Customer Data, Regulatory Authority, Artificial Intelligence, Customer Profile, Big Data, Bank, Assessment, Risk profiling, Report, Financial Service, Financial Regulator, Financial Data, Alert, Retail Customer, Investment, Fund*, while it additionally uses some terms specific to this category of use cases such as *Financial Crime Risk, Financial Crime, Trade, Risk-based Supervision, Fraud, Forensics Analyst, Open-banking, Cyber-security, Cyber-attack, Ancillary service*.

Table 9 shows the list of all terminologies that have been identified for pilot 10.

**Table 9: Identified terms for Pilot 10**

Term	Synonym	Kind	Description
<b>Alert</b>	Warning, notice, notification	Property	An announcement, notice, or signal warning of potentially dangerous situations and/or circumstances
<b>Ancillary service</b>	Secondary services, supporting services	Process	A variety of other services or products a bank provides along with the necessary banking services
<b>Artificial Intelligence</b>	AI, machine intelligence, machine learning, ML	Process	It refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions
<b>Assessment</b>	Determination, Rating, Estimation, Valuation	Process	The process of judging or deciding the amount, value, quality, or importance of something, or the judgment or decision that is made
<b>Bank</b>	Investment Firm, Trust Company	Actor	It is a type of financial institution that accepts deposits, offers checking account services, makes various loans, and offers basic financial products like certificates of deposit (CDs) and savings accounts to individuals and small businesses. A commercial bank is where most people do their banking, as opposed to an investment bank
<b>Big Data</b>	Massive data, BDA	Process	It is a field that treats ways to analyze, systematically extract information from, or otherwise deal with data sets that are too large or complex to be dealt with by traditional data-processing application software
<b>Client</b>	Customer	Actor	A person or organization who engages or use the services of a lawyer or other professional person or company
<b>Cyber-attack</b>	Attack, threat action, cyber-threat	Process	A cyberattack is any type of offensive maneuver that targets computer information systems, infrastructures, computer networks, or personal computer device
<b>Cyber-security</b>	IT security,	Process	It refers to the practice of securing electronic devices

	network security, or computer security		from unauthorized access or attack or the measures taken in pursuit of this practice
<b>Customer Data</b>	Consumer Data, customer dataset	Object	It refers to all personal, behavioural, and demographic data that is collected by marketing companies and departments from their customer base.
<b>Customer Profile</b>	Client Profile, client profiling	Process	It is a summary of a specific customer type that is based primarily on available statistical information, such as demographics, income (or company revenue if B2B), gender, age, location, etc.
<b>Customer Service</b>	Client service	Process	It is the direct one-on-one interaction between a consumer making a purchase and a representative of the company that is selling it
<b>Data</b>	Info, facts	Object	The facts and statistics collected together for reference or analysis
<b>Data stream</b>	data transmission, data flow	Process	A set of digital signals used for different kinds of content transmission
<b>Digital Service</b>	Electronic service, computer service	Process	It refers to the electronic delivery of information including data and content across multiple platforms and devices like web or mobile
<b>Financial Crime</b>	Financial infraction, financial misconduct, financial transgression	Process	It is crime committed against property, involving the unlawful conversion of the ownership of property (belonging to one person) to one's own personal use and benefit
<b>Financial Crime Risk</b>	Financial infringement risk, financial misconduct risk, financial transgression risk	Property	It is the risk of an organization to become victim of a financial crime
<b>Financial Data</b>	Financial statements	Object	Financial data consists of pieces or sets of information related to the financial health of a business
<b>Financial Organization</b>	Financial Institution, Trust Company, Bank	Actor	It is an institution (public or private) that collects funds (from the public or other institutions) and invests them in financial assets
<b>Financial Product</b>	Financial instruments, financial tools	Object	A financial product is a product (typically in the form of a contract) provided to consumers and businesses or other organizations (municipalities or sovereigns) by financial institutions such as banks, insurance companies, brokerage firms, consumer finance companies, and investment companies all of which comprise the financial services industry
<b>Financial Regulator</b>	Financial supervisor, financial	Actor	A financial regulator is an institution that supervises and controls a financial system and related financial services. Their objective is to guarantee fair and

	authority		efficient markets and financial stability
<b>Financial Service</b>	Banking, business services, financial affairs	Process	Service provided by the finance industry involving the investment, lending, and management of money and assets
<b>Forensics Analyst</b>	Financial Forensics	Actor	It may help with risk management and risk reduction through customized design of accounting and auditing systems and procedures. As a function of due diligence and investment analysis, they will advise on a wide variety of financial transactions
<b>Fraud</b>	Fraudulence, criminal deception	Process	It is an intentionally deceptive action designed to provide the perpetrator with an unlawful gain or to deny a right to a victim. Fraud can occur in finance, real estate, investment, and insurance
<b>Fund</b>	Capital, endowment, foundation	Object	It is a pool of money that is allocated for a specific purpose
<b>Investment</b>	Transaction, expenditure, funding	Process	It is the purchase of goods that are not consumed today but are used in the future to create wealth
<b>Open-banking</b>	Open data bank	Process	It is a banking practice that provides third-party financial service providers open access to consumer banking, transaction, and other financial data from banks and non-bank financial institutions through the use of application programming interfaces (APIs).
<b>Process</b>	Procedure, transaction, faithfulness	Process	A series of actions or steps taken in order to achieve a particular end
<b>Processing System</b>	Information processing, data processing, DP	Process	The combination of machines, people, and processes that for a set of inputs produces a defined set of outputs
<b>Product</b>	Commodity, output, solution	Object	It is an object or system made available for consumer use; it is anything that can be offered to a market to satisfy the desire or need of a customer
<b>Regulatory Authority</b>	Regulatory agency, regulatory institution	Actor	A regulatory authority is an autonomous authority or agency established by a federal, state or provincial government
<b>Report</b>	Account, story, chronicle, record	Object	An account, statement or document describing in detail an event, situation, or the like, usually as the result of observation, inquiry, etc.
<b>Retail Customer</b>	Retail client	Actor	It is customer who is going to buy in small quantity and the product usage would be by him or by his family or friends
<b>Risk</b>	Hazard, pitfall, threat, trouble	Property	The risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return. Risk includes the possibility of losing some or all of an original investment.

<b>Risk Assessment</b>	Risk evaluation, risk analysis	Process	The systematic process of evaluating the potential risks and/or to determine the likelihood of loss on an asset, loan, or investment
<b>Risk Assessment Score</b>	Risk rating score, risk scoring	Property	It is a calculated number (score) that reflects the severity of a risk due to some factors
<b>Risk-based Supervision</b>	RBS	Process	It is a comprehensive, formally structured system that assesses risks within the financial system, giving priority to the resolution of those risks
<b>Risk profiling</b>	Risk-profile	Process	Evaluation of an individual's willingness and ability to take risks
<b>Score</b>	Amount, number, amount, final count	Property	It is a number that expresses facts about an actual situation
<b>Service</b>	Assistance, support, utility	Object	The organized system of apparatus, appliances, employees, etc., for supplying some accommodation required by the public
<b>Trade</b>	Exchange, transaction, financial transaction	Process	The action of buying and selling goods and services with compensation paid by a buyer to a seller, or the exchange of goods or services between parties

This pilot is not currently relying on a specific ontology to build its overall solution.

#### 4.11 Pilot #11: Personalized insurance products based on IoT connected vehicles

Pilot 11 belongs to the insurance sector and has been put under the umbrella of the *Personalized Usage Based Insurance Products* category. Its scope is to improve risk insurance profiles for vehicle insurance using the vast amount of information collected by connected vehicle, in order to provide personalized insurance plans, to collect additional data about the status of the vehicle and the reaction of the drive in case of an accident in order to inform him/her properly when there is damages in it over a specific threshold and to provide a dynamic billing system. It mostly shares terms that are commonly found in the majority of all pilots such as *Digital Service, Data, Customer Service, Customer Data, Regulatory Authority, Artificial Intelligence, Customer Profile, Big Data, Assessment, Report, Alert, Data stream, Insured, Insurance premium, Insurance Product, Insurance Company, Insurance*. Other terms, more specific to this pilot are *Sensor, Internet of Things, Device, Vehicle insurance, Vehicle identification number, Vehicle Inspection, Vehicle, Usage-based Insurance, Ministry of Transport, Ministry database, Manufacturer Maintenance Program, Location Data, License, Fraud detection, Driver's behaviour Monitoring, Data vehicle, Car owner, Bill, Accident*. It can be noted that pilots of the insurance sector tend to make use of terminologies that are of a narrow scope and more related with the specific type of insurances

Table 10 shows the list of all terminologies that have been identified for pilot 11.

Table 10: Identified terms for Pilot 11

Term	Synonym	Kind	Description
<b>Accident</b>	Collision, crush	Process	An unfortunate incident that happens unexpectedly and unintentionally, typically resulting in damage or injury
<b>Alert</b>	Warning, notice, notification	Property	An announcement, notice, or signal warning of potential dangerous situations and/or circumstances
<b>Artificial Intelligence</b>	AI, machine intelligence, machine learning, ML	Process	It refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions
<b>Assessment</b>	Determination, Rating, Estimation, Valuation	Process	The process of judging or deciding the amount, value, quality, or importance of something, or the judgment or decision that is made
<b>Big Data</b>	Massive data, BDA	Process	It is a field that treats ways to analyze, systematically extract information from, or otherwise deal with data sets that are too large or complex to be dealt with by traditional data-processing application software
<b>Bill</b>	Invoice	Object	A statement of money owed for goods or services supplied
<b>Car owner</b>	Registered owner	Actor	It is usually used in instances of title of a vehicle (such as an automobile) to refer to the person who has right of possession of the vehicle
<b>Client</b>	Costumer	Actor	A person or organization who engages or use the services of a lawyer or other professional person or company
<b>Customer Data</b>	Consumer Data, customer dataset	Object	Refers to all personal, behavioural, and demographic data that is collected by marketing companies and departments from their customer base.
<b>Customer Profile</b>	Client Profile, client profiling	Process	It is a summary of a specific customer type that is based primarily on available statistical information, such as demographics, income (or company revenue if B2B), gender, age, location, etc.
<b>Customer Service</b>	Client service	Process	It is the direct one-on-one interaction between a consumer making a purchase and a representative of the company that is selling it
<b>Data</b>	Info, facts	Object	The facts and statistics collected together for reference or analysis
<b>Data stream</b>	data transmission, data flow	Process	A set of digital signals used for different kinds of content transmission
<b>Data vehicle</b>	Vehicle telemetry, car data, car telemetry	Object	Live data collected from the vehicle
<b>Device</b>	Appliance,	Object	A thing made or adapted for a particular purpose,

	instrument		especially a piece of mechanical or electronic equipment
<b>Digital Service</b>	Electronic service, computer service	Process	It refers to the electronic delivery of information including data and content across multiple platforms and devices like web or mobile
<b>Driver's behaviour Monitoring</b>	Driver behaviour estimation, driver behaviour service	Process	It is the process that allows to gain valuable insights into driving behavior and vehicle usage patterns from collected vehicle data
<b>Financial Organization</b>	Financial Institution, Trust Company, Bank	Actor	It is an institution (public or private) that collects funds (from the public or other institutions) and invests them in financial assets
<b>Financial Product</b>	Financial instruments, financial tools, insurance	Object	A financial product is a product (typically in the form of a contract) provided to consumers and businesses or other organizations (municipalities or sovereigns) by financial institutions such as banks, insurance companies, brokerage firms, consumer finance companies, and investment companies all of which comprise the financial services industry
<b>Fraud</b>	Fraudulence, criminal deception, theft	Process	It is an intentionally deceptive action designed to provide the perpetrator with an unlawful gain or to deny a right to a victim. Fraud can occur in finance, real estate, investment, and insurance
<b>Fraud detection</b>	Fraud prevention, fraudulent activities detection	Process	It is a set of activities undertaken to prevent money or property from being obtained through false pretenses
<b>Insurance</b>	Assurance, protection	Object	Insurance is a contract, represented by a policy, in which an individual or entity receives financial protection or reimbursement against losses from an insurance company
<b>Insurance Company</b>	Insurance firm, insurer	Actor	A business that provides coverage, in the form of compensation resulting from loss, damages, injury, treatment or hardship in exchange for premium payments
<b>Insurance premium</b>	Insurance price, tariffs	Property	It is the amount of money an individual or business pays for an insurance policy. Insurance premiums are paid for policies that cover healthcare, auto, home, life, and others
<b>Insurance Product</b>	Insurance contract, insurance service	Object	Insurance products are common financial arrangements in which an insurance provider states its guarantee to pay on covered claims. In return, the buyer agrees to pay a monthly premium cost.
<b>Insured</b>	Protected, covered, assured	Actor	Person covered by insurance
<b>Internet of Things</b>	IoT	Object	It is a system of interrelated computing devices, mechanical and digital machines provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-



			to-computer interaction
<b>License</b>	Drive license	Object	It is an official document, permitting a specific individual to operate one or more types of motorized vehicles, such as a motorcycle, car, truck, or bus on a public road
<b>Location Data</b>	Vehicle Location Data	Object	It is the big data collection of vehicle locations, including automatic vehicle location data
<b>Manufacturer Maintenance Program</b>	Servicing program, car care program, car care service	Object	It is a document containing the maintenance scheduled servicing, inspections, and vehicle repairs that needs to be carried out to prevent potential problems and maximize vehicle availability
<b>Ministry database</b>	Ministry db	Object	A set of structured data about driver and vehicle information that is available to the public
<b>Ministry of Transport</b>	Ministry of Transportation	Actor	Ministry responsible for transportation within a country
<b>Process</b>	Procedure, transaction, faithfulness	Process	A series of actions or steps taken in order to achieve a particular end
<b>Processing System</b>	Information processing, data processing, DP	Process	The combination of machines, people, and processes that for a set of inputs produces a defined set of outputs
<b>Product</b>	Commodity, output, solution	Object	It is an object or system made available for consumer use; it is anything that can be offered to a market to satisfy the desire or need of a customer
<b>Regulatory Authority</b>	Regulatory agency, regulatory institution	Actor	A regulatory authority is an autonomous authority or agency established by a federal, state or provincial government
<b>Report</b>	Account, story, chronicle, record	Object	An account, statement or document describing in detail an event, situation, or the like, usually as the result of observation, inquiry, etc.
<b>Risk</b>	Hazzard, pitfall, threat, trouble	Property	Risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return. Risk includes the possibility of losing some or all of an original investment.
<b>Risk Assessment</b>	Risk evaluation, risk analysis	Process	The systematic process of evaluating the potential risks and/or to determine the likelihood of loss on an asset, loan, or investment
<b>Risk Assessment Score</b>	Risk rating score, risk scoring	Property	It is a calculated number (score) that reflects the severity of a risk due to some factors
<b>Score</b>	Amount, number, amount, final count	Property	It is a number that expresses facts about an actual situation
<b>Sensor</b>	Detector, sensing device, transducer	Object	A device which detects or measures a physical property and records, indicates, or otherwise responds to it
<b>Service</b>	Assistance,	Object	The organized system of apparatus, appliances,

	support, utility		employees, etc., for supplying some accommodation required by the public
<b>Usage-based Insurance</b>	UBI, PAYD, PHYD, mile-based auto insurance	Object	It is a type of vehicle insurance whereby the costs are dependent upon type of vehicle used, measured against time, distance, behavior and place
<b>Vehicle</b>	Car, automobile	Object	A road vehicle, typically with four wheels, powered by an internal combustion engine and able to carry a small number of people
<b>Vehicle identification number</b>	VIN, car identification number	Property	It is the identifying code for a specific automobile
<b>Vehicle Inspection</b>	Technical Inspection	Object	Vehicle inspection is a procedure mandated by national or subnational governments in many countries, in which a vehicle is inspected to ensure that it conforms to regulations governing safety, emissions, or both
<b>Vehicle insurance</b>	Auto insurance, car insurance, motor insurance	Object	It is insurance for cars, trucks, motorcycles, and other road vehicles

This pilot makes use of the FIWARE approach and the data models described in within the FIWARE Foundation<sup>6</sup> in order to define ontologies. Therefore, it makes use of the FIWARE Vehicle Data Model<sup>7</sup> to represent the data linked to vehicle related entities. Accordingly, the corresponding data models are being used in order to describe data related to *Roads* and *RoadSegments*.

#### 4.12 Pilot #12: Real World Data for Novel Health-Insurance products

Pilot 12 belongs to the insurance sector and has been put under the umbrella of the *Personalized Usage Based Insurance Products* category. Its scope is to demonstrate how Real World Data can be utilized from insurance companies to result in novel insurance products for the benefit of the insurer and the customers. Common terminologies that are usually found in other pilots are *Digital Service, Data, Customer Service, Customer Data, Regulatory Authority, Artificial Intelligence, Customer Profile, Big Data, Assessment, Report, Alert, Data stream*. It also contains terms that are commonly on pilots of the insurance sector like *Insured, Insurance premium, Insurance Product, Insurance Company, Insurance*, while it also uses terms that are specific to the pilots of this category like *Sensor, Internet of Things, Device, Medical device, Health Risk Assessment, Health Insurance*.

Table 11 shows the list of all terminologies that have been identified for pilot 12.

**Table 11: Identified terms for Pilot 12**

Term	Synonym	Kind	Description
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<sup>6</sup> <https://www.fiware.org/>

<sup>7</sup> <https://fiware-datamodels.readthedocs.io/en/latest/Transportation/Vehicle/VehicleModel/doc/spec/index.html>

<b>Alert</b>	Warning, notice, notification	Property	An announcement, notice, or signal warning of potentially dangerous situations and/or circumstances
<b>Artificial Intelligence</b>	AI, machine intelligence, machine learning, ML	Process	It refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions
<b>Assessment</b>	Determination, Rating, Estimation, Valuation	Process	The process of judging or deciding the amount, value, quality, or importance of something, or the judgment or decision that is made
<b>Big Data</b>	Massive data, BDA	Process	It is a field that treats ways to analyze, systematically extract information from, or otherwise deal with data sets that are too large or complex to be dealt with by traditional data-processing application software
<b>Client</b>	Customer	Actor	A person or organization who engages or use the services of a lawyer or other professional person or company
<b>Customer Data</b>	Consumer Data, customer dataset	Object	It refers to all personal, behavioural, and demographic data that is collected by marketing companies and departments from their customer base.
<b>Customer Profile</b>	Client Profile, client profiling	Process	It is a summary of a specific customer type that is based primarily on available statistical information, such as demographics, income (or company revenue if B2B), gender, age, location, etc.
<b>Customer Service</b>	Client service	Process	It is the direct one-on-one interaction between a consumer making a purchase and a representative of the company that is selling it
<b>Data</b>	Info, facts	Object	The facts and statistics collected together for reference or analysis
<b>Data stream</b>	Data transmission, data flow	Process	A set of digital signals used for different kinds of content transmission
<b>Device</b>	Appliance, instrument	Object	A thing made or adapted for a particular purpose, especially a piece of mechanical or electronic equipment
<b>Digital Service</b>	Electronic service, computer service	Process	It refers to the electronic delivery of information including data and content across multiple platforms and devices like web or mobile
<b>Financial Organization</b>	Financial Institution, Trust Company, Bank	Actor	It is an institution (public or private) that collects funds (from the public or other institutions) and invests them in financial assets
<b>Financial Product</b>	Financial instruments, financial tools, insurance	Object	A financial product is a product (typically in the form of a contract) provided to consumers and businesses or other organizations (municipalities or sovereigns) by financial institutions such as banks, insurance companies, brokerage firms, consumer finance companies, and investment companies all of which comprise the financial services industry

<b>Health Insurance</b>	Medicare, medical insurance, health plan	Object	It is a type of insurance coverage that pays for medical, surgical, and sometimes dental expenses incurred by the insured
<b>Health Risk Assessment</b>	HRA, health risk appraisal, health & well-being assessment	Process	It is a health questionnaire, used to provide individuals with an evaluation of their health risks and quality of life
<b>Insurance</b>	Assurance, protection	Object	Insurance is a contract, represented by a policy, in which an individual or entity receives financial protection or reimbursement against losses from an insurance company
<b>Insurance Company</b>	Insurance firm, insurer	Actor	A business that provides coverage, in the form of compensation resulting from loss, damages, injury, treatment or hardship in exchange for premium payments
<b>Insurance premium</b>	Insurance price, tariffs	Property	It is the amount of money an individual or business pays for an insurance policy. Insurance premiums are paid for policies that cover healthcare, auto, home, life, and others
<b>Insurance Product</b>	Insurance contract, insurance service	Object	Insurance products are common financial arrangements in which an insurance provider states its guarantee to pay on covered claims. In return, the buyer agrees to pay a monthly premium cost.
<b>Insured</b>	Protected, covered, assured	Actor	Person covered by insurance
<b>Internet of Things</b>	IoT	Object	It is a system of interrelated computing devices, mechanical and digital machines provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction
<b>Medical device</b>	Medical appliance, medical instrument	Object	Any instrument, apparatus, implement, machine, appliance, implant, reagent for in vitro use, software, material or other similar or related article, intended by the manufacturer to be used, alone or in combination, for human beings, for one or more of the specific medical purpose(s)
<b>Process</b>	Procedure, transaction, faithfulness	Process	A series of actions or steps taken in order to achieve a particular end
<b>Processing System</b>	Information processing, data processing, DP	Process	The combination of machines, people, and processes that for a set of inputs produces a defined set of outputs
<b>Product</b>	Commodity, output, solution	Object	It is an object or system made available for consumer use; it is anything that can be offered to a market to satisfy the desire or need of a customer
<b>Regulatory Authority</b>	Regulatory agency,	Actor	A regulatory authority is an autonomous authority or agency established by a federal, state or provincial

	regulatory institution		government
<b>Report</b>	Account, story, chronicle, record	Object	An account, statement or document describing in detail an event, situation, or the like, usually as the result of observation, inquiry, etc.
<b>Risk</b>	Hazard, pitfall, threat, trouble	Property	The risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return. Risk includes the possibility of losing some or all of an original investment.
<b>Risk Assessment</b>	Risk evaluation, risk analysis	Process	The systematic process of evaluating the potential risks and/or to determine the likelihood of loss on an asset, loan, or investment
<b>Risk Assessment Score</b>	Risk rating score, risk scoring	Property	It is a calculated number (score) that reflects the severity of a risk due to some factors
<b>Score</b>	Amount, number, amount, final count	Property	It is a number that expresses facts about an actual situation
<b>Sensor</b>	Detector, sensing device, transducer, measuring device	Object	A device which detects or measures a physical property and records, indicates, or otherwise responds to it
<b>Service</b>	Assistance, support, utility	Object	The organized system of apparatus, appliances, employees, etc., for supplying some accommodation required by the public

This pilot is not currently relying on a specific ontology to build its overall solution.

#### 4.13 Pilot #13: Alternative/automated insurance risk selection - product recommendation for SME

Pilot 13 belongs to the insurance sector and has been put under the umbrella of the *Configurable and Personalized Insurance Products* category. Its scope is to develop an insurance product configuration platform for SMEs, which will leverage large amounts of digital data in order to compute the offering. It shares common terms with other pilots like *Data, Customer Service, Customer Data, Regulatory Authority, Artificial Intelligence, Customer Profile, Big Data, Assessment, Risk profiling, Report, Portfolio, Data stream, Insured, Insurance premium, Insurance Product, Insurance Company, Insurance, Cost*, while it also defines its own pilot specific such as *Unsupervised Learning, Underwriting, Supervised Learning, Insurer, Data Anonymization, Client Portfolio, Agent, Small and Medium Enterprise, Data protection*

Table 12 shows the list of all terminologies that have been identified for pilot 13.

**Table 12: Identified terms for Pilot 13**

Term	Synonym	Kind	Description
<b>Agent</b>	Broker	Actor	He/She is a person who has been legally empowered to act on behalf of another person or an entity
<b>Artificial Intelligence</b>	AI, machine intelligence, machine learning, ML	Process	It refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions
<b>Assessment</b>	Determination, Rating, Estimation, Valuation	Process	The process of judging or deciding the amount, value, quality, or importance of something, or the judgment or decision that is made
<b>Big Data</b>	Massive data, BDA	Process	It is a field that treats ways to analyze, systematically extract information from, or otherwise deal with data sets that are too large or complex to be dealt with by traditional data-processing application software
<b>Client</b>	Costumer	Actor	A person or organization who engages or use the services of a lawyer or other professional person or company
<b>Cost</b>	Expense, expenditure, score	Property	An outlay or expenditure of money, time, effort, labour, trouble to acquire, produce, accomplish or maintain anything
<b>Client Portfolio</b>	Customer base, customer wallet, client base	Object	It is a segmented list of the various groups that do business with you
<b>Customer Data</b>	Consumer Data, customer dataset	Object	It refers to all personal, behavioural, and demographic data that is collected by marketing companies and departments from their customer base.
<b>Customer Profile</b>	Client Profile, client profiling	Process	It is a summary of a specific customer type that is based primarily on available statistical information, such as demographics, income (or company revenue if B2B), gender, age, location, etc.
<b>Customer Service</b>	Client service	Process	It is the direct one-on-one interaction between a consumer making a purchase and a representative of the company that is selling it
<b>Data</b>	Info, facts	Object	The facts and statistics collected together for reference or analysis
<b>Data Anonymization</b>	Data de-identification, data privacy	Process	It is the process of removing sensitive information from a document or other message whose intent is privacy protection
<b>Data protection</b>	Data privacy	Process	It is the process of protecting data and involves the relationship between the collection and dissemination of data and technology, the public perception and expectation of privacy and the political and legal underpinnings surrounding that data
<b>Data stream</b>	data transmission, data flow	Process	A set of digital signals used for different kinds of content transmission

<b>Digital Service</b>	Electronic service, computer service	Process	It refers to the electronic delivery of information including data and content across multiple platforms and devices like web or mobile
<b>Financial Organization</b>	Financial Institution, Trust Company, Bank	Actor	It is an institution (public or private) that collects funds (from the public or other institutions) and invests them in financial assets
<b>Financial Product</b>	Financial instruments, financial tools, insurance	Object	A financial product is a product (typically in the form of a contract) provided to consumers and businesses or other organizations (municipalities or sovereigns) by financial institutions such as banks, insurance companies, brokerage firms, consumer finance companies, and investment companies all of which comprise the financial services industry
<b>Insurance</b>	Assurance, protection	Object	Insurance is a contract, represented by a policy, in which an individual or entity receives financial protection or reimbursement against losses from an insurance company
<b>Insurance Company</b>	Insurance firm, insurer	Actor	A business that provides coverage, in the form of compensation resulting from loss, damages, injury, treatment or hardship in exchange for premium payments
<b>Insurance premium</b>	Insurance price, tariffs	Property	It is the amount of money an individual or business pays for an insurance policy. Insurance premiums are paid for policies that cover healthcare, auto, home, life, and others
<b>Insurance Product</b>	Insurance contract, insurance service	Object	Insurance products are common financial arrangements in which an insurance provider states its guarantee to pay on covered claims. In return, the buyer agrees to pay a monthly premium cost.
<b>Insured</b>	Protected, covered, assured	Actor	Person covered by insurance
<b>Insurer</b>	Underwriter, insurance underwriter	Actor	A person or company that underwrites an insurance risk; the party in an insurance contract undertaking to pay compensation
<b>Portfolio</b>	Collection of investments	Object	It is a grouping of financial assets such as stocks, bonds, commodities, currencies and cash equivalents, as well as their fund counterparts, including mutual, exchange-traded and closed funds
<b>Process</b>	Procedure, transaction, faithfulness	Process	A series of actions or steps taken in order to achieve a particular end
<b>Processing System</b>	Information processing, data processing, DP	Process	The combination of machines, people, and processes that for a set of inputs produces a defined set of outputs
<b>Product</b>	Commodity, output, solution	Object	It is an object or system made available for consumer use; it is anything that can be offered to a market to satisfy the desire or need of a customer
<b>Regulatory</b>	Regulatory	Actor	A regulatory authority is an autonomous authority or

<b>Authority</b>	agency, regulatory institution		agency established by a federal, state or provincial government
<b>Report</b>	Account, story, chronicle, record	Object	An account, statement or document describing in detail an event, situation, or the like, usually as the result of observation, inquiry, etc.
<b>Risk</b>	Hazard, pitfall, threat, trouble	Property	The risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return. Risk includes the possibility of losing some or all of an original investment.
<b>Risk Assessment</b>	Risk evaluation, risk analysis	Process	The systematic process of evaluating the potential risks and/or to determine the likelihood of loss on an asset, loan, or investment
<b>Risk Assessment Score</b>	Risk rating score, risk scoring	Property	It is a calculated number (score) that reflects the severity of a risk due to some factors
<b>Risk profiling</b>	Risk-profile	Process	Evaluation of an individual's willingness and ability to take risks
<b>Score</b>	Amount, number, amount, final count	Property	It is a number that expresses facts about an actual situation
<b>Service</b>	Assistance, support, utility	Object	The organized system of apparatus, appliances, employees, etc., for supplying some accommodation required by the public
<b>Small and Medium Enterprise</b>	SME, SMB	Actor	They are businesses that maintain revenues, assets or a number of employees below a certain threshold
<b>Supervised Learning</b>	Classification	Process	It is the machine learning task of learning a function that maps an input to an output based on example input-output pairs
<b>Underwriting</b>	Insure, subscription	Process	Underwriting is the process through which an individual or institution takes on financial risk for a fee
<b>Unsupervised Learning</b>	Clustering	Process	It is a type of machine learning that looks for previously undetected patterns in a data set with no pre-existing labels and with a minimum of human supervision

This pilot is not currently relying on a specific ontology to build its overall solution.

#### 4.14 Pilot #14: Big Data and IoT for the Agricultural Insurance Industry (GEN)

Pilot 14 belongs to the insurance sector and has been put under the umbrella of the *Configurable and Personalized Insurance Products* category. Its scope is to define, structure and pilot test a decision intelligence framework that will offer to the Agricultural Insurance sector a variety of innovative services. It uses terms that are can be often found in the majority of the pilots of the project, such as *Data, Customer Service, Customer Data, Artificial Intelligence, Customer Profile, Big Data, Assessment, Risk profiling, Report, Portfolio, Data stream*, while it also shares terms that are most likely to be found in pilots of



the insurance sector, such as *Insured, Insurance premium, Insurance Product, Insurance Company, Insurance, Cost*. Finally, it uses terms that are pilot specific and can be found only at this case: *climate risk management, Wind Storm indicator, Weather-index Insurance, Weather index, Weather data, Water stress , Warm Spell Duration Index, Underwriter, Topography, Temperature, Sowing date shifting Indicator, Soil Map, Sales Agent, Remote Sensing, Precipitation, Phenological Indicator, Pesticide, Pest Impact Indicator, Normalized Difference Vegetation Index, Loss adjuster, Late frost Indicator, Land Use, Insurance Broker, Heat stress, Hail Storm Indicator, Geographical Data, Evotranspiration, Disaster Risk Management, Damage Assessment, Crop, Cold Spell Indicator, Agroclimatic advisories, Agroclimatic Indicator, Agricultural Insurance, Actuary*

Table 13 shows the list of all terminologies that have been identified for pilot 14.

**Table 13: Identified terms for Pilot 14**

Term	Synonym	Kind	Description
<b>Actuary</b>	Statistician	Actor	A person who compiles and analyses statistics and uses them to calculate insurance risks and premiums
<b>Agent</b>	Broker	Actor	He/She is a person who has been legally empowered to act on behalf of another person or an entity
<b>Agricultural Insurance</b>	Agl, Crops Insurance	Object	It is a valuable business risk management tool that provides farmers with financial protection against production losses (loss or damage to crops) caused by natural perils, such as drought, excessive moisture, hail, frost, wind and wildlife
<b>Agroclimatic advisories</b>	Agroclimatic advisory services	Object	Agrometeorological advisory involves research and applied work aimed at communicating weather information and agricultural advice to farmers, based on weather monitoring and forecasting
<b>Agroclimatic Indicator</b>	Agroclimatic index	Property	A measure or indicator of an aspect of the climate that has specific agricultural significance
<b>Artificial Intelligence</b>	AI, machine intelligence, machine learning, ML	Process	It refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions
<b>Assessment</b>	Determination, Rating, Estimation, Valuation	Process	The process of judging or deciding the amount, value, quality, or importance of something, or the judgment or decision that is made
<b>Big Data</b>	Massive data, BDA	Process	It is a field that treats ways to analyze, systematically extract information from, or otherwise deal with data sets that are too

			large or complex to be dealt with by traditional data-processing application software
<b>Client</b>	Customer	Actor	A person or organization who engages or use the services of a lawyer or other professional person or company
<b>climate risk management</b>		Process	It is the systematic approach to and practice of considering climate-related trends and events in development decision-making to minimize potential harm (UNDP BCPR 2013)
<b>Client Portfolio</b>	Customer base, customer wallet, client base	Object	It is a segmented list of the various groups that do business with you
<b>Cold Spell Indicator</b>	Cold spell duration index, CSDI	Property	It measures the number of days with a minimum daily temperature below its climatological 10th percentile for at least 6 consecutive days
<b>Cost</b>	Expense, expenditure, score	Property	An outlay or expenditure of money, time, effort, labour, trouble to acquire, produce, accomplish or maintain anything
<b>Crop</b>	Selection, Batch, lot, collection	Object	It is a plant or animal product that can be grown and harvested extensively for profit or subsistence
<b>Customer Data</b>	Consumer Data, customer dataset	Object	It refers to all personal, behavioural, and demographic data that is collected by marketing companies and departments from their customer base.
<b>Customer Profile</b>	Client Profile, client profiling	Process	It is a summary of a specific customer type that is based primarily on available statistical information, such as demographics, income (or company revenue if B2B), gender, age, location, etc.
<b>Customer Service</b>	Client service	Process	It is the direct one-on-one interaction between a consumer making a purchase and a representative of the company that is selling it
<b>Damage Assessment</b>		Process	Preliminary but fairly accurate onsite evaluation of damage or loss caused by an accident or natural event before filing a formal claim or disaster declaration. Damage assessment records the extent of damage, what can be replaced, restored, or salvaged, and time required for their execution
<b>Data</b>	Info, facts	Object	The facts and statistics collected together for reference or analysis
<b>Data stream</b>	Data transmission, data flow	Process	A set of digital signals used for different kinds of content transmission
<b>Digital Service</b>	Electronic	Process	It refers to the electronic delivery of

	service, computer service		information including data and content across multiple platforms and devices like web or mobile
<b>Disaster Risk Management</b>	DRM	Process	The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster
<b>Evotranspiration</b>	ET	Property	It is the sum of evaporation and plant transpiration. It is the water lost from an area through the combined effects of evaporation from the ground surface and transpiration from the vegetation
<b>Financial Organization</b>	Financial Institution, Trust Company, Bank	Actor	It is an institution (public or private) that collects funds (from the public or other institutions) and invests them in financial assets
<b>Financial Product</b>	Financial instruments, financial tools, insurance	Object	A financial product is a product (typically in the form of a contract) provided to consumers and businesses or other organizations (municipalities or sovereigns) by financial institutions such as banks, insurance companies, brokerage firms, consumer finance companies, and investment companies all of which comprise the financial services industry
<b>Geographical Data</b>	Spatial data	Property	Data that contains information about the spatial location (position) and the attribute being monitored (yield, seed population, etc.)
<b>Hail Storm Indicator</b>	Potential Hail Indicator, Potential Hail Index, PHI	Property	It quantifies the atmospheric potential for hailstorms and can be derived from atmospheric numerical models
<b>Heat stress</b>		Property	Temperatures above the optimum for growth can be deleterious, causing injury or irreversible damage, which is generally called 'heat stress' (Wahid et al. 2007)
<b>Index</b>	indicator, indication, measure	Property	System of numbers used for comparing values of things that change according to each other or a fixed standard
<b>Insurance</b>	Assurance, protection	Object	Insurance is a contract, represented by a policy, in which an individual or entity receives financial protection or reimbursement against losses from an insurance company
<b>Insurance Broker</b>	Broker	Actor	An individual or firm who represents buyers of insurance and deals with insurance companies or their agents in arranging for insurance

			coverage for the buyer
<b>Insurance Company</b>	Insurance firm, insurer	Actor	A business that provides coverage, in the form of compensation resulting from loss, damages, injury, treatment or hardship in exchange for premium payments
<b>Insurance premium</b>	Insurance price, tariffs	Property	It is the amount of money an individual or business pays for an insurance policy. Insurance premiums are paid for policies that cover healthcare, auto, home, life, and others
<b>Insurance Product</b>	Insurance contract, insurance service	Object	Insurance products are common financial arrangements in which an insurance provider states its guarantee to pay on covered claims. In return, the buyer agrees to pay a monthly premium cost.
<b>Insured</b>	Protected, covered, assured	Actor	Person covered by insurance
<b>Insurer</b>	Underwriter, insurance underwriter	Actor	A person or company that underwrites an insurance risk; the party in an insurance contract undertaking to pay compensation
<b>Land Use</b>		Process	Human activities, which are directly related to the land, making use of its resources, or having an impact upon it. A given land use may take place on one or more than one piece of land, and several land uses may occur on the same piece of land
<b>Late frost Indicator</b>		Property	It provides a prediction of the last late frost of the season
<b>Loss adjuster</b>	Claims adjuster	Actor	An insurance agent who assesses the amount of compensation that should be paid after a person has claimed on their insurance policy
<b>Normalized Difference Vegetation Index</b>	NDVI	Property	It is a simple graphical indicator that can be used to analyze remote sensing measurements, often from a space platform, assessing whether or not the target being observed contains live green vegetation
<b>Pest Impact Indicator</b>	Assessment Indicator of Damage	Property	It measures the pest and/or disease damage
<b>Pesticide</b>	Insecticide, fungicide	Object	Substances intended to repel, mitigate, control or destroy diseases and pests in plants or animals and to prevent any harm to agricultural commodities during production, storage, transport, processing and marketing etc.
<b>Phenological Indicator</b>	Crop Phenology Indicator	Property	It is an indicator s associated to the periodic events in the life cycle of living species, used to manage crop activities
<b>Portfolio</b>	Collection of	Object	It is a grouping of financial assets such as

	investments		stocks, bonds, commodities, currencies and cash equivalents, as well as their fund counterparts, including mutual, exchange-traded and closed funds
<b>Precipitation</b>	Rainfall, hail, hailstorm, snow	Property	The quantity of such water falling in a specific area within a specific period
<b>Process</b>	Procedure, transaction, faithfulness	Process	A series of actions or steps taken in order to achieve a particular end
<b>Processing System</b>	Information processing, data processing, DP	Process	The combination of machines, people, and processes that for a set of inputs produces a defined set of outputs
<b>Product</b>	Commodity, output, solution	Object	It is an object or system made available for consumer use; it is anything that can be offered to a market to satisfy the desire or need of a customer
<b>Remote Sensing</b>	Remote-sensing, remote monitoring	Process	The act of detection and/or identification of an object, series of objects, or landscape without having the sensor in direct contact with the object. The most common forms include color and color infrared aerial photography, satellite imaging and radar sensing
<b>Report</b>	Account, story, chronicle, record	Object	An account, statement or document describing in detail an event, situation, or the like, usually as the result of observation, inquiry, etc.
<b>Risk</b>	Hazard, pitfall, threat, trouble	Property	The risk is defined in financial terms as the chance that an outcome or investment's actual gains will differ from an expected outcome or return. Risk includes the possibility of losing some or all of an original investment.
<b>Risk Assessment</b>	Risk evaluation, risk analysis	Process	The systematic process of evaluating the potential risks and/or to determine the likelihood of loss on an asset, loan, or investment
<b>Risk Assessment Score</b>	Risk rating score, risk scoring	Property	It is a calculated number (score) that reflects the severity of a risk due to some factors
<b>Risk profiling</b>	Risk-profile	Process	Evaluation of an individual's willingness and ability to take risks
<b>Sales Agent</b>	Insurance agent	Actor	It helps insurance companies generate new business by contacting potential customers and selling one or more types of insurance. Insurance sales agents explain various insurance policies and help clients choose plans that suit them
<b>Score</b>	Amount,	Property	It is a number that expresses facts about an

	number, amount, final count		actual situation
<b>Service</b>	Assistance, support, utility	Object	The organized system of apparatus, appliances, employees, etc., for supplying some accommodation required by the public
<b>Soil Map</b>	Soil features, earth features	Object	A map that indicates differences in soil properties (texture, fertility, organic matter, pH, etc.) within a field
<b>Sowing date shifting Indicator</b>	Planting date shifting indicator	Property	It measures the optimal planting time
<b>Supervised Learning</b>	Classification	Process	It is the machine learning task of learning a function that maps an input to an output based on example input-output pairs
<b>Temperature</b>	TI, Thermal reading	Property	The degree or intensity of heat present in a substance or object, especially as expressed according to a comparative scale and shown by a thermometer or perceived by touch
<b>Topography</b>	Chorography, geomorphology	Process	A detailed description or representation on a map of the physical features of an area
<b>Underwriter</b>	Guarantor, risk- taker, insurance underwriter	Actor	It is any party that evaluates and assumes another party's risk for a fee.
<b>Underwriting</b>	Insure, subscription	Process	Underwriting is the process through which an individual or institution takes on financial risk for a fee
<b>Unsupervised Learning</b>	Clustering	Process	It is a type of machine learning that looks for previously undetected patterns in a data set with no pre-existing labels and with a minimum of human supervision
<b>Warm Spell Duration Index</b>	WSDI	Property	It defines periods of excessive warmth, cold, wetness or dryness. WSDI is defined as the annual count of days with at least 6 consecutive days when the daily maximum temperature is exceeding the threshold T90
<b>Water stress</b>		Property	It occurs when water demand exceeds water supply. Increased drought occurrence will lead to increased crop water stress in areas where irrigation infrastructure is lacking, or plants are unable access groundwater (Lobell and Gourdji 2012)
<b>Weather data</b>	Weather indication, climatological data	Property	Information about precipitation, wind, temperature, and other climate conditions
<b>Weather index</b>		Property	It is based on specific weather parameters measured over a pre-specified period of time at a particular weather station (World Bank

			2011)
<b>Weather-index Insurance</b>		Object	A class of insurance products that can allow weather-related risk to be insured in developing countries where traditional agricultural insurance may not always be feasible, thereby helping to increase farmers' ability (and willingness) to invest in measures that might increase their productivity
<b>Wind Storm indicator</b>	Wind Storm Index	Property	It measures the changes in wind speed

This pilot is not currently relying on a specific ontology to build its overall solution.

## 5. Conclusions

This document reports the work that has been carried out in the scope of task T2.6 “Specification and Design of Integrated Data Models”. The aim of this task is to provide a common data model that will be referenced as the *Infinitech data model* whose purpose is to harmonize the way that pilots from the insurance and finance sector describe their datasets. This will allow the re-usability of datasets (either real or synthetic) that are being available by the platform to be taken into account by business intelligence and analytical tools of other pilots. For instance, the objective is for a pilot to be able to use an already available dataset for fraud detection in order to train their own model, and then, to use their trained tools in order to provide real-time fraud detection of their customers’ transactions. In order to achieve this, data needs to be harmonized and mapped on a common logical data model.

Towards this direction, an initial analysis of the existing data models and logical schemas of all pilots is required, in order to identify common or widely used *entities* and *attributes*, along with their relationships. To this end, at this phase of the task, there has been initial surveys and interviews with the majority of the pilots. The results of this process have been reported in section 4. The results of this analysis is that most pilots use common terms, however, pilots that belong to the same category tend to share a lot more common *entities*. Another outcome was that pilots that belong to the insurance sector have a lot of diversities as they tend to specialize in the specific sector they are involved: car insurance make use of terms related with *vehicles, roads etc*, health insurances make us of terms related to the quality of life, while insurance companies that are involved with agricultural products focus more on terms related with weather conditions. However, even if they specialize in their sector, they all use common terms as *clients, products* and *risk*.

Apart from the analysis of the existing data models, an effort has been spent on the analysis of existing domain specific ontologies that are widely used in the insurance and finance sectors. We identified that the most commonly used ones are the FIBO that is related with the financial business, the FiGi that is used to model identifiers and the LKIF that is used for interchanges. An analytical presentation of those ontologies has been reported in section 3. Our goal is to rely on those and try to extend them in order to support additional terms that the pilots are using in their solutions.

It is important to highlight that this deliverable is the first version, and an updated document will be released on M18. Due to this, this document reports the work that has already been carried out at this phase of the project. The next version is expected to report the whole work of the task T2.6, where all aforementioned analysis will be concluded and the results will be the common data model that will be proposed by the infinitech platform, and will be mainly used by the semantic interoperability framework of the project.