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# **Towards LADM country cadastral profile – case Poland**

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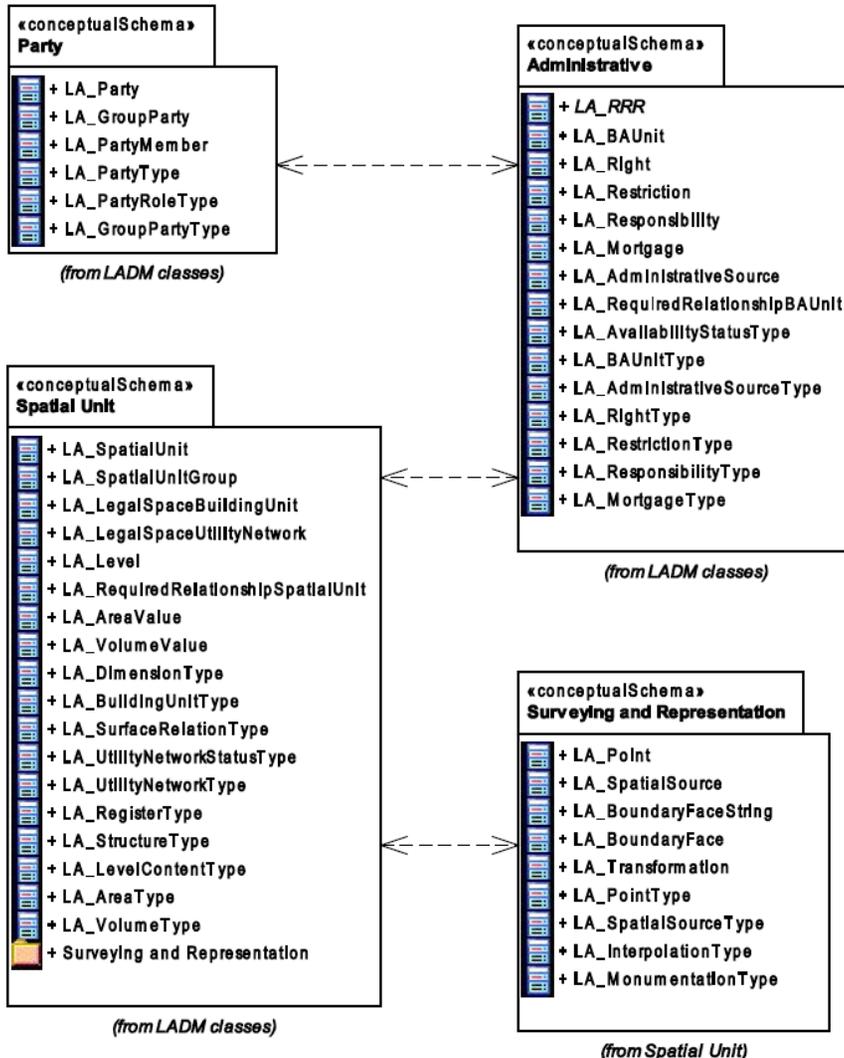
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## Introduction

- The Geographic Information - Land Administration Domain Model was developed by the Technical Committee 211 of International Organization for Standardization.
- It was finally approved as an ISO standard on the 1<sup>st</sup> of November and was formally published by ISO on the 1<sup>st</sup> of December 2012.
- At the same time although independently the new model of Polish cadastral system has been being prepared.
- It is defined as the part of new order concerning the ground and building cadastre.
- The author's idea is to prepare initial Polish cadastral profile. Presently, it is going to be the preliminary profile, since the Polish cadastral model has not been finally approved yet.

# The LADM overview of (sub)packages, with their respective classes



- Totally, the Land Administration Domain Model consists of 48 main classes and special class VersionedObject.
- The classes of Land Administration Model begin with letters "LA". These classes are organized in three packages and one subpackage. They are:
- Party Package,
- Administrative Package,
- Spatial Unit Package,
- Surveying and Spatial Representation Subpackage.

Source: ISO 19152: 2012. Geographic information - Land Administration Domain Model (LADM)

## LADM Application in Country Profiles

- Eight country profiles are mentioned in the informative Annex D to the ISO 19152 Land Administration Domain Model. They are Portugal, Queensland (Australia), Indonesia, Japan, Hungary, The Netherlands, Russian Federation and Republic of Korea.
- The individual country profiles include either only respective classes originating from LADM or both Land Administration Domain Model original classes and respective country classes. The first applies to the Dutch and Korean profiles with classes names starting from country shortcuts (NL or KR respectively), whilst the second to the rest of country profiles mentioned in ISO 19152.
- According to the author, the presentation of country profiles within ISO 19152 seems to have two purposes. The first is helping to understand the structure and relationships within the individual country land administration system, whilst the other is to show examples of structures, that can be helpful in building profiles for other countries.

## The Model of Polish Cadastre

- Presently, the Polish cadastral system is defined by the Order of Ministry of Regional Development and Buildings – in case of Cadastre for Grounds and Buildings. The new order that is in the final draft version defines the new model of Polish cadastral system. The Unified Modelling Language is used for describing schemas and Geographic Markup Language as basic data exchange format, there.
- The new model of Polish cadastral system is prepared to achieve several goals. They are, inter alia:
  - cadastral data sets harmonization with Polish terrain information system data sets,
  - enabling cadastral data accessibility, according to the act on spatial information infrastructure, that is a transposition of INSPIRE directive into the Polish law,
  - accepting Geographic Markup Language (GML) as a essential format for cadastral data exchange and sharing.

## The Model of Polish Cadastre

- The application schema of cadastral database was prepared applying UML notation, according to the ISO 19100 series standards methodology, as well.
- The Polish cadastral model contains 71 classes. The classes of Polish cadastral model begin with letters "EGB". Relations between classes are presented at 16 diagrams. For organizational purposes these classes are grouped in 8 thematic packages. The names of packages are as follows: General Object, Objects, Parties, Rights To Properties, Address, Boundary Point, Lease and Legal Basis.
- All cadastral model objects have attributes concerning creation and archiving dates for particular objects versions and spatial information infrastructure attributes. These attributes are inherited from abstract class EGB\_GeneralObject.



# The „main” cadastral objects in Poland

EGB_GeneralObject	
«FeatureType» EGB_CadastralParcel	
+ geometry	
+ georeference	
+ idParcel	
+ informationOnAreaPresentationAccuracy	
+ AdditionalInformation	
+ registeredArea :Area	
«voidable»	
+ validFrom	
+ validTill	
+ landValue	
+ DateofValuation	
+ numberOfKW	
+ otherDocumentsOnRights	
+ nrRegisterOfMonuments	
+ idStatisticRegion	
constraints	
{AreaUnitHa}	
{DZPforSmallPEW}	
{Parcellocation}	
{GroundvalueUnit}	
{WRTandDWRoccurTogether}	

EGB_GeneralObject	
«FeatureType» EGB_Building	
+ idBuilding	
+ statusOfBuilding	
+ typeWgKST	
+ /totalUsableAreaOfNotSeparatedPremises	
+ /totalUsableAreaOfSeparatedPremises	
+ areaOfRoomsBelongingToPremises	
+ usableAreaOfBuilding	
+ additionalInformation	
+ yearOfReconstructionEnd	
+ CenturyOfConstructionEnd	
+ CenturyOfReconstructionEnd	
+ RangeOfReconstruction	
+ certaintyDegreeOfReconstructionDateEstablishing	
+ georeference	
«voidable»	
+ geometry	
+ numberOfKW	
+ classAccordingToPKB	
+ detailedFunctionOfBuilding	
+ dateOfValuation	
+ numberOfOvergroundStoreys	
+ numberOfUndergroundStoreys	
+ /numberOfRevealedSeparatePremises	
+ makingOfOuterWalls	
+ numberOfRegisterOfMonuments	
+ areaOfBuildup	
+ yearOfConstructionEnd	
+ valueOfBuilding	
+ certaintyDegreeOfConstructionDateEstablishing	
+ stateOfBuildingUse	
+ DateOfBuildingHandingToUse	
+ DateOfBuildingDismantling	
+ ReasonOfBuildingDismantling	
+ informationOnBuildingPart	
+ numberOfPremisesHavingDeterminedNumberOfRooms	
+ totalNumberOfRoomsInBuilding	
constraints	
{WRTandDWRoccurTogether}	
{areaOfBuildupUnitM2}	
{areaOfBuildupRecordingPrecision}	
{areaOfBuildingUsableAreaUnitM2}	
{areaOfBuildingUsableAreaRecordingPrecision}	
{areaOfSeparatePremisesUsableAreaUnitM2}	
{areaOfSeparatePremisesUsableAreaRecordingPrecision}	
{areaOfNotSeparatePremisesUsableAreaUnitM2}	
{areaOfNotSeparatePremisesUsableAreaRecordingPrecision}	
{attributesGUS}	
{GUSHousingBuildings}	
{valueOfBuilding-Unit}	
{centuryOfConstructionEnd}	
{centuryOfReconstructionEnd}	
{requirementOfGeoreference}	

EGB_GeneralObject	
«FeatureType» EGB_Premises	
+ idPremises	
+ typeOfPremises	
+ usablePremisesArea	
+ numberOfRooms	
+ numberOfRoomsBelongingToPremises	
+ AdditionalInformation	
«voidable»	
+ numberOfKW	
+ areaOfRoomsBelongingToPremises	
+ numberOfStorey	
+ valueOfPremises	
+ DateofValuation	
constraints	
{WRTandDWRoccurTogether}	
{usablePremisesAreaUnitM2}	
{areaOfRoomsBelongingToPremisesUnitM2}	
{valueOfPremisesUnitM2}	

(source: The Order of Ministry of Administration and Digitization changing the order in case of Cadastre for Grounds and Buildings (draft version), 2013 – translation of names made by author)

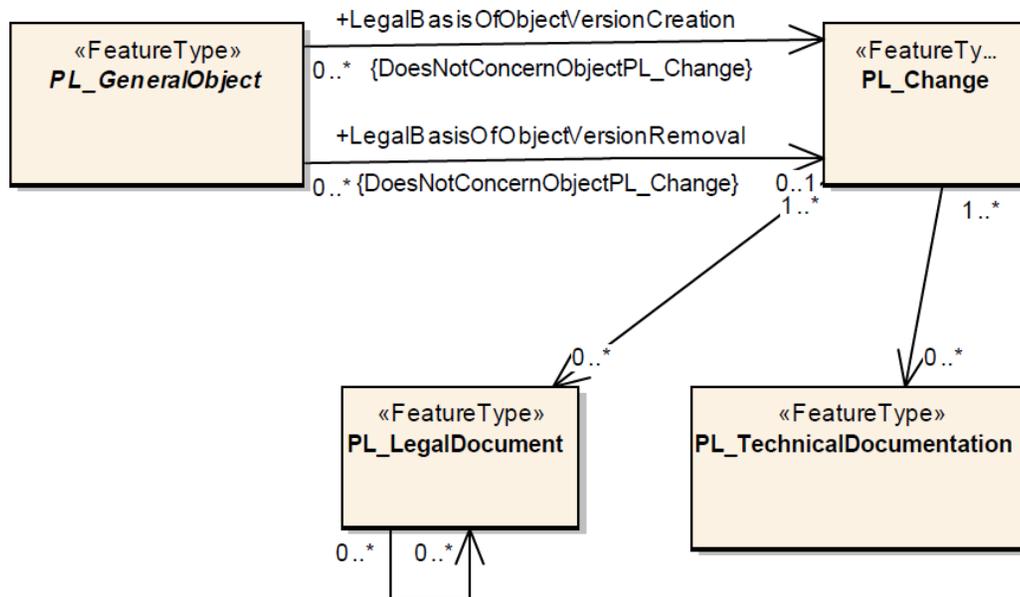


# Classes specification for building cadastral profile for Poland

Polish model original class name	Name in the Poland's profile	Corresponding LADM class
EGB_OgolnyObiekt	PL_GeneralObject	VersionedObject
EGB_ObrebEwidencyjny	PL_CadastralSection	LA_SpatialUnitGroup
EGB_DzialkaEwidencyjna	PL_CadastralParcel	LA_SpatialUnit
EGB_KonturUzytkuGruntowego	PL_ContourOfLandUse	LA_SpatialUnit
EGB_Budynek	PL_Building	LA_LegalSpaceBuilding Unit
EGB_LokalSamodzielny	PL_Premises	LA_LegalSpaceBuilding Unit
EGB_OsobaFizyczna	PL_NaturalPerson	LA_Party
EGB_PodmiotGrupowy	PL_GroupParty	LA_GroupParty
EGB_Podmiot	PL_Party	LA_Party
EGB_JednostkaRejestrowaGruntow	PL_RegisterUnitOfLand	LA_BAUnit
EGB_UdzialWlasnosci	PL_ShareOfOwnership	LA_Right
EGB_UdzialWeWladaniuGruntamiSPiJST	PL_ShareOfHoldind	LA_Right
EGB_Dzierzawa	PL_Lease	LA_Responsibility
EGB_Zmiana	PL_Change	-

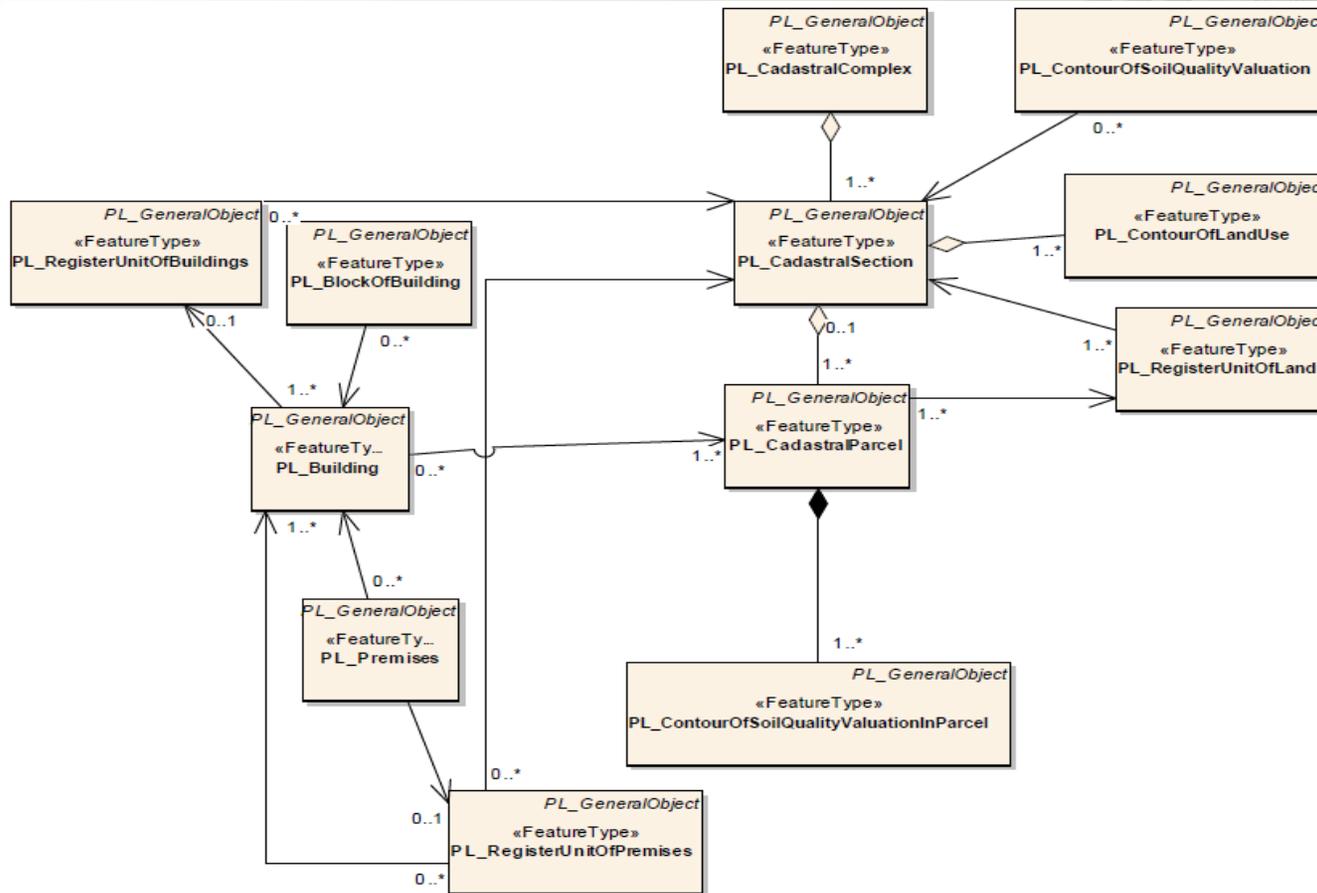
- During both Land Administration Domain Model development and the construction of Polish cadastral model, the idea of preparing the country profile of Poland appeared.
- The first step was to chose the main classes of Polish cadastral model, provide them with English names and assign related LADM classes.
- The prefix "PL\_" was added to the class name for application in the country profile instead of original prefix "EGB\_".
- Then the corresponding class in LADM was provided
- The earlier works concerning comparison of Polish cadastral system and Land Administration Domain Model we helpful here.

# Building cadastral profile for Poland applying ISO 19152



- The fundamental class of Polish cadastral system is PL\_GeneralObject. Its attributes concern identification in spatial information infrastructure, dates and times of object or its versions creation in the data base and dates and times of moving object or its versions to the archive in the data base. All classes of Polish cadastral data base inherit these attributes by the generalization relationship from PL\_GeneralObject.
- The class PL\_Change is the realization of new object's creation or changing at least one of its attributes or relationships. The PL\_Change indicates PL\_LegalDocument or PL\_TechnicalDocumentation.
- Practically, it means, that PL\_Change is basis for introducing changes resulting from legal or technical documents into the cadastral database.

# Building cadastral profile for Poland applying ISO 19152 (main relationships between Objects section classes)

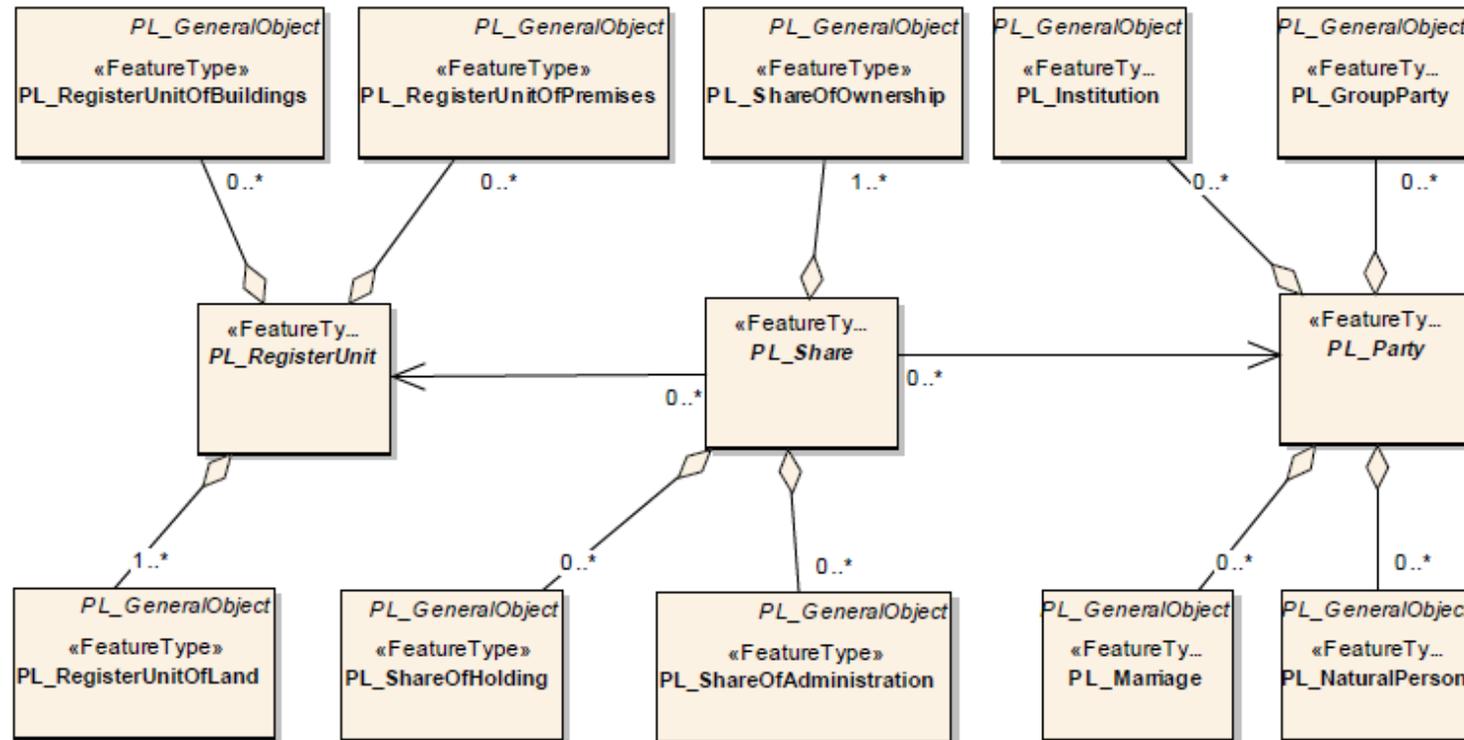


The following step was analysis of diagrams presenting the Polish cadastral model and identifying the key connections among its classes.

The connections between main classes of Objects section of Polish cadastral model were identified.

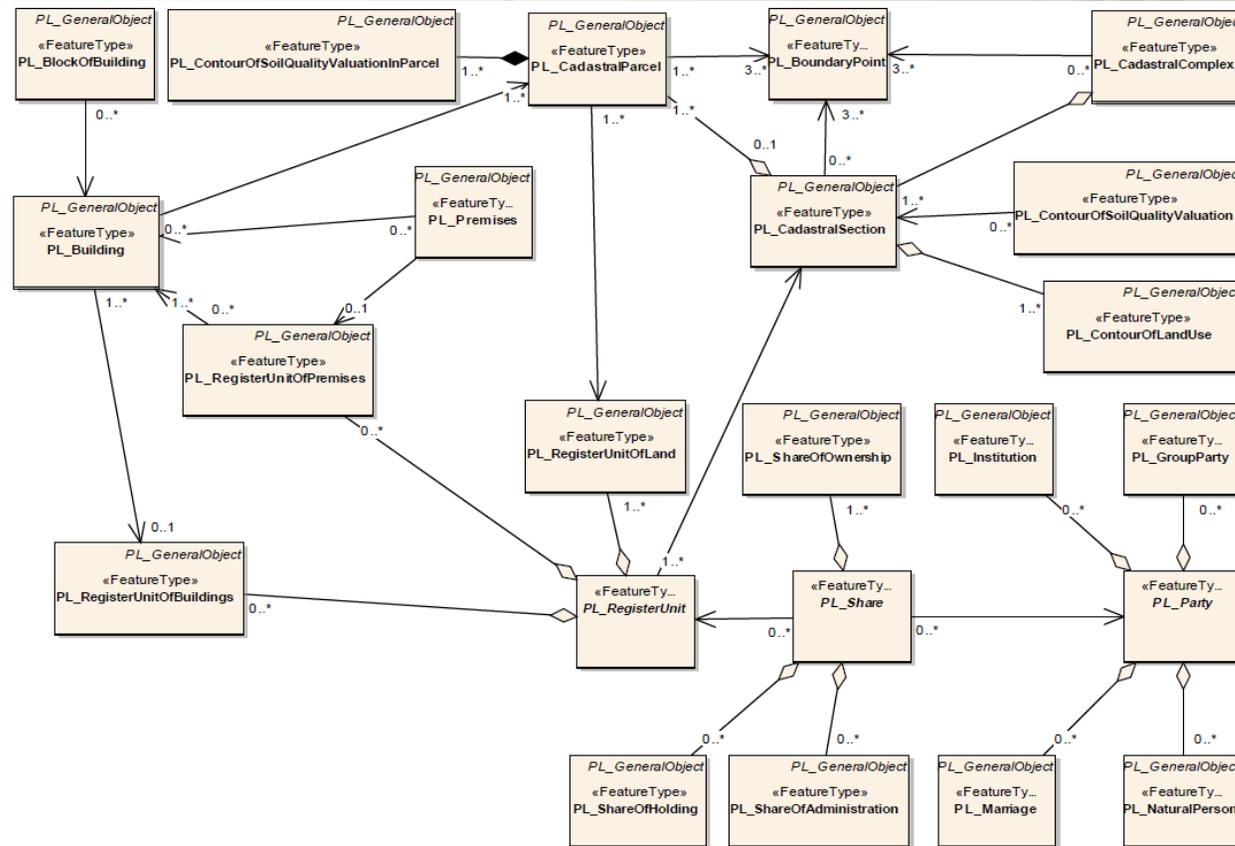
Classes concerned with soil valuation, resulting with type of agricultural or forestry land use were also added.

# Building cadastral profile for Poland applying ISO 19152 (relationships between classes concerning Parties and Rights to Properties)



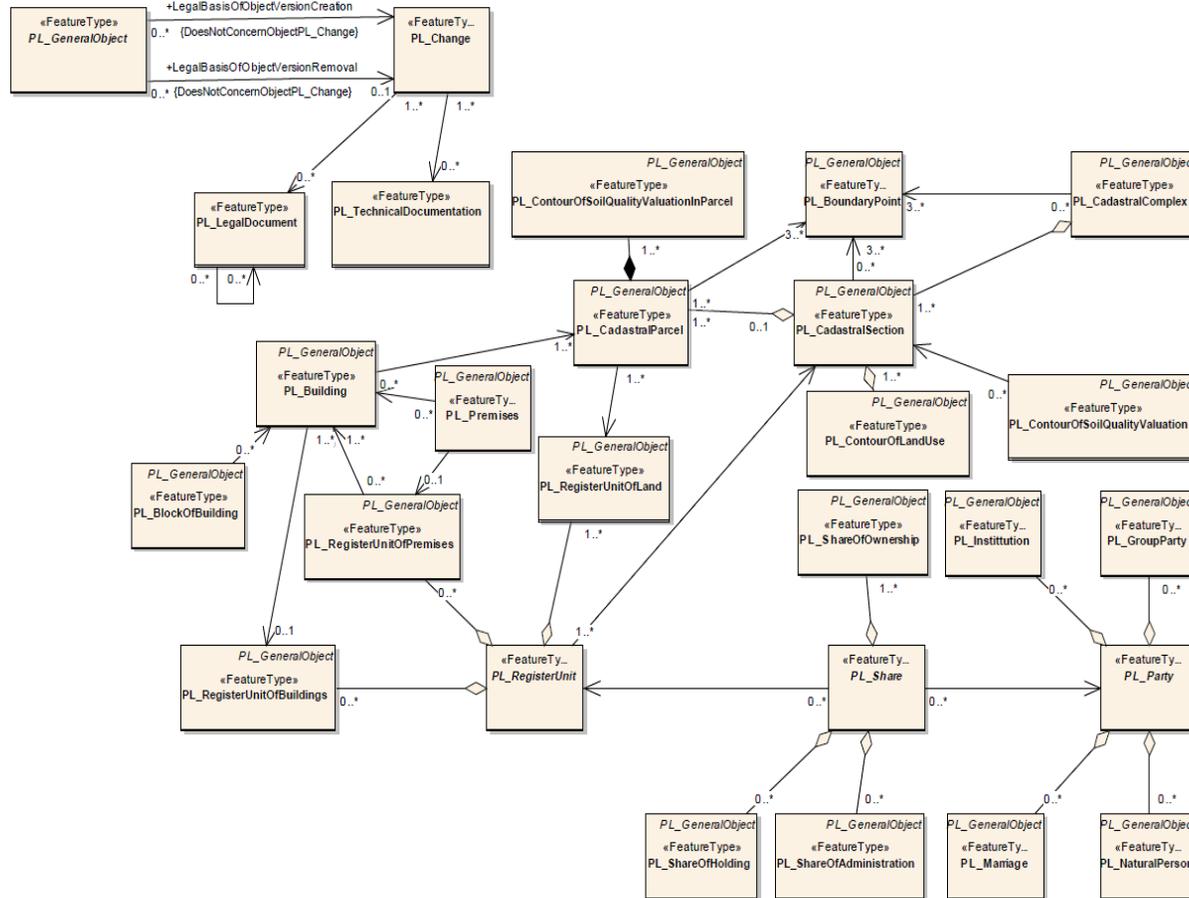
- The key connections between three abstract classes `PL_RegisterUnit`, `PL_Party` and `PL_Share` were drawn.
- The two abstract classes mentioned first are defined within the Polish cadastral model, whereas the `PL_Share` class is suggested by the author for easier presentation and visualization of the country profile.
- The `PL_RegisterUnit` abstract class comprises classes `PL_RegisterUnitOfLand`, `PL_RegisterUnitOfBuildings` and `PL_RegisterUnitOfPremises`.
- The `PL_Share` class groups three real classes of Polish cadastral model (`PL_ShareOfOwnership`, `PL_ShareOfHolding` and `PL_ShareOfAdministration`).
- The `PL_Party` abstract class includes `PL_NaturalPerson`, `PL_Institution`, `PL_GroupParty` and `PL_Marriage` classes.

# Building cadastral profile for Poland applying ISO 19152 (the result of joining "Objects" with "Parties and Right to Properties")



- Then diagrams Objects with Parties and Right to Properties sections were merged and `PL_BoundaryPoint` class and its associations added. The result seems complicated, so some trials were performed to make it simpler.
- The associations between classes `PL_RegisterUnitOfLand`, `PL_RegisterUnitOfBuildings`, `PL_RegisterUnitOfPremises` and class `PL_CadastralSection`, which occur in the model of Polish cadastre were substituted by one relationship between classes `PL_RegisterUnit` and `PL_CadastralSection` with constraint that class `PL_RegisterUnit` consists of at least one instance of class `PL_RegisterUnitOfLand`.

# The country profile of Polish cadastre based on „Land Administration Domain Model”



After adding diagram with relationships between classes PL\_GeneralObject ,PL\_Change ,PL\_LegalDocument and PL\_TechnicalDocumentation to the last diagram, we obtained the proposed country cadastral profile for Poland. 13

## FUTURE WORK

- When the „new Order in case of Ground and Building Cadastre” is finally published, it is necessary to check if some changes have been made to the cadastral model there.
- If so, then they should be introduced to the suggested country cadastral profile.
- The author believes that the proposed profile should be consulted with experts dealing with cadastre, especially academic and government administration ones.
- Since the preliminary works on conformance testing of Polish cadastral model against Land Administration Domain Model have already been performed, the following works may be conducted to check the compliance level of the Polish cadastral model with LADM.



**Thank you very much**

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