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Profile Definition for a Standardized Cadastral Model

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Outline

- Our interest in the Core Cadastre Domain Model
- Identification of a practical need for this standard
- The Cadastral Feature Catalogue
- The usefulness of the Unified Modeling Language
  - In a development environment
  - For performing Gap Analyses
- Summary

CARIS Interest in this Workshop

- 1990- CARIS identified as Standard for Digital Mapping in New Brunswick
- 1996- Develops first internet mapping product for SNB
- 1998- Development with SNB on their modernized Land Registry
- Present- Marketing Integrated Land Information System as CARIS LIN worldwide
- CARIS CPD –Database driven cadastral maintenance solution

Our Experience (the challenge)

- In many parts of the world the majority of the cadastre (where and how much), is held at the municipal level and tied to the fiscal cadastre;
- While the real property registry (who and how) is administered at the state level.
- Integration Challenge
  - Between municipalities
  - Integrating the cadastre to the land registration system
  - Integrating integrated cadastral / land registration systems

Core Cadastral Domain Model

- A simple, generic, standardized data model could encourage and support the **flow of information relating land property between different government agencies, and in turn to the public.**
- Components:
  - Core
  - Specialization or RealEstateObject
  - Surveying
  - Geometry/Topology
  - Legal/Administrative
- Components in principle could be managed by separate organizations.

Keeping an Eye on Standards

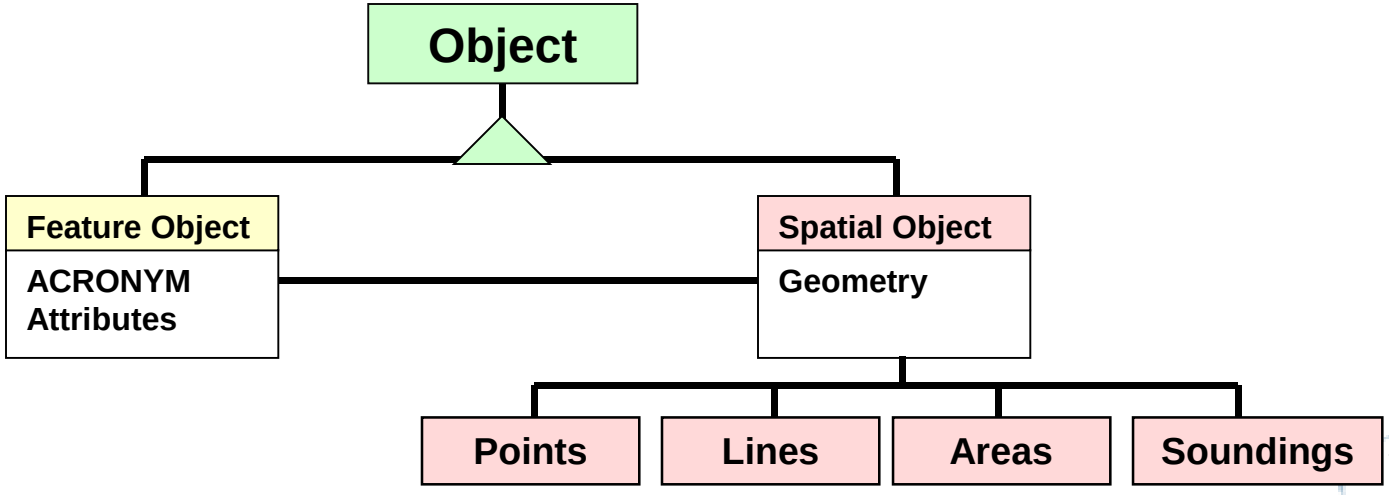
Standards

- Open Geospatial Consortium
- ISO
- FGDC (Standard for United States)
- Core Cadastre Domain Model (COST and FIG)

Working with the Standards – CARIS HPD

HPD- Data Model

- Object oriented design based on internationally adopted S-57 and DIGEST Standards
- Stores real world entities as “objects” having a
  - “Feature object” component: descriptive information
  - “Spatial object” component: positional information



CARIS CPD –Data Model

- Object oriented design based on internationally adopted ?????????????????????? standards
- Integrated the principles of Cadastre 2014
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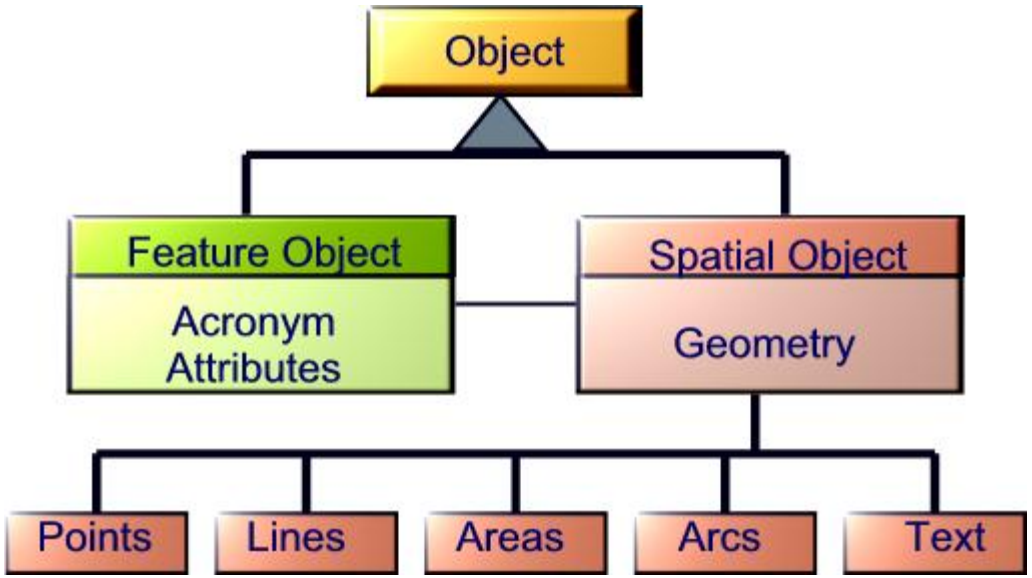
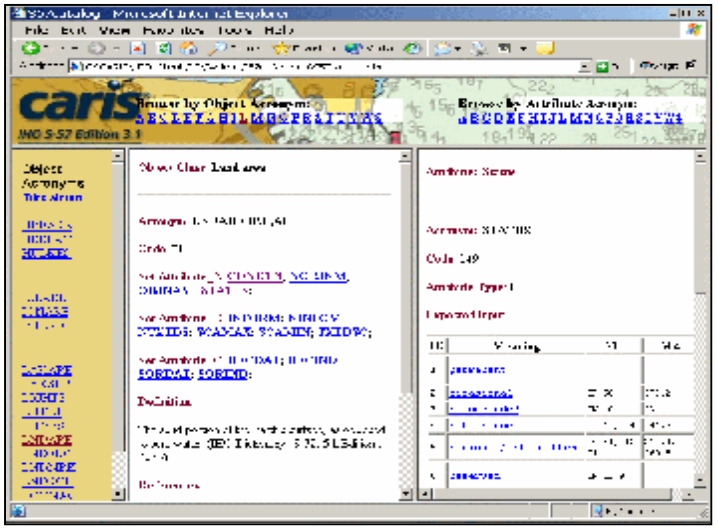
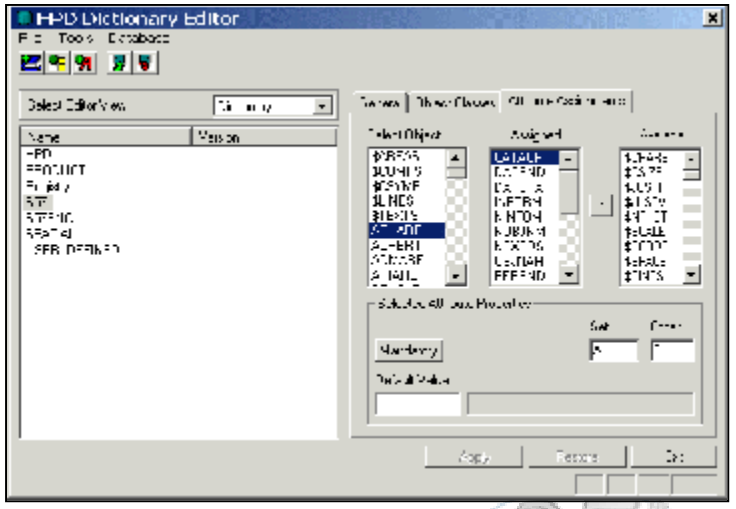


HPD Object Catalogue & Dictionary

- Includes an extensive object and attribute catalogue
  - Based on IHO S-57 Standard
  - Use the HPD S-57 Catalogue Browser for more information



- Users can customize the dictionary, including
  - create new objects, attributes
  - assign new values to attributes, and new attributes to objects



Cadastral Feature Catalogue

- Is data schema for defining the content of a cadastre system that can be in either digital and/or analogue form.
- Its primary function is to provide a means of describing real world entities. To develop a description of each object class including a definition, a list of available attributes, ect.
- Attributes define a specific instance of the object class called an object.

Example of a Class for a Parcel

Column	Description
Class	Parcel
Acronym *	CDPRCL
Data Type *	Area
Aspect *	RealEstateObject
Code *	44
Attributes	CDPID$ (M), CDPART (M), CDPARN, CDPRL1, CDPIDA
Definition	A Parcel is a single cadastral unit, which is the spatial extent of the past, present, and future rights and interests in real property.
References	FGDC Cadastral Data Content Standard – Version 1.3
Remarks *	Additional attributes may be added to support presentation of the object class and describe the administrative characteristics.

Standard for Attribute Definition

Column	Description
Attribute	Parcel ID
Acronym *	CDPID$
Attribute Type *	Integer
Code *	32
Description	The Parcel ID is the primary key, which identifies each record or occurrence in the Parcel entity. This is normally the system assigned number that manages record relationships internal to systems.
References*	FGDC – Version 1.3
Minimum Value*	1
Maximum Value*	
Indication	
Example	
Remarks *	No remarks

Attribute – Parcel ID Assigner

Column	Description
Attribute	Parcel ID Assigner
Acronym *	CDPIDA
Attribute Type *	Enumerated
Code *	33
Description	This is a designation for the agency, organization or jurisdiction that assigns and maintains the primary key. If possible, this designation should follow known naming standards, such as the Federal Information Processing System (FIPS) codes for jurisdictions. 0 – Unknown 1 – State Agency
References*	FGDC – Version 1.3
Minimum Value*	
Maximum Value*	
Indication	
Example	
Remarks *	No remarks

Attribute- Parcel Name

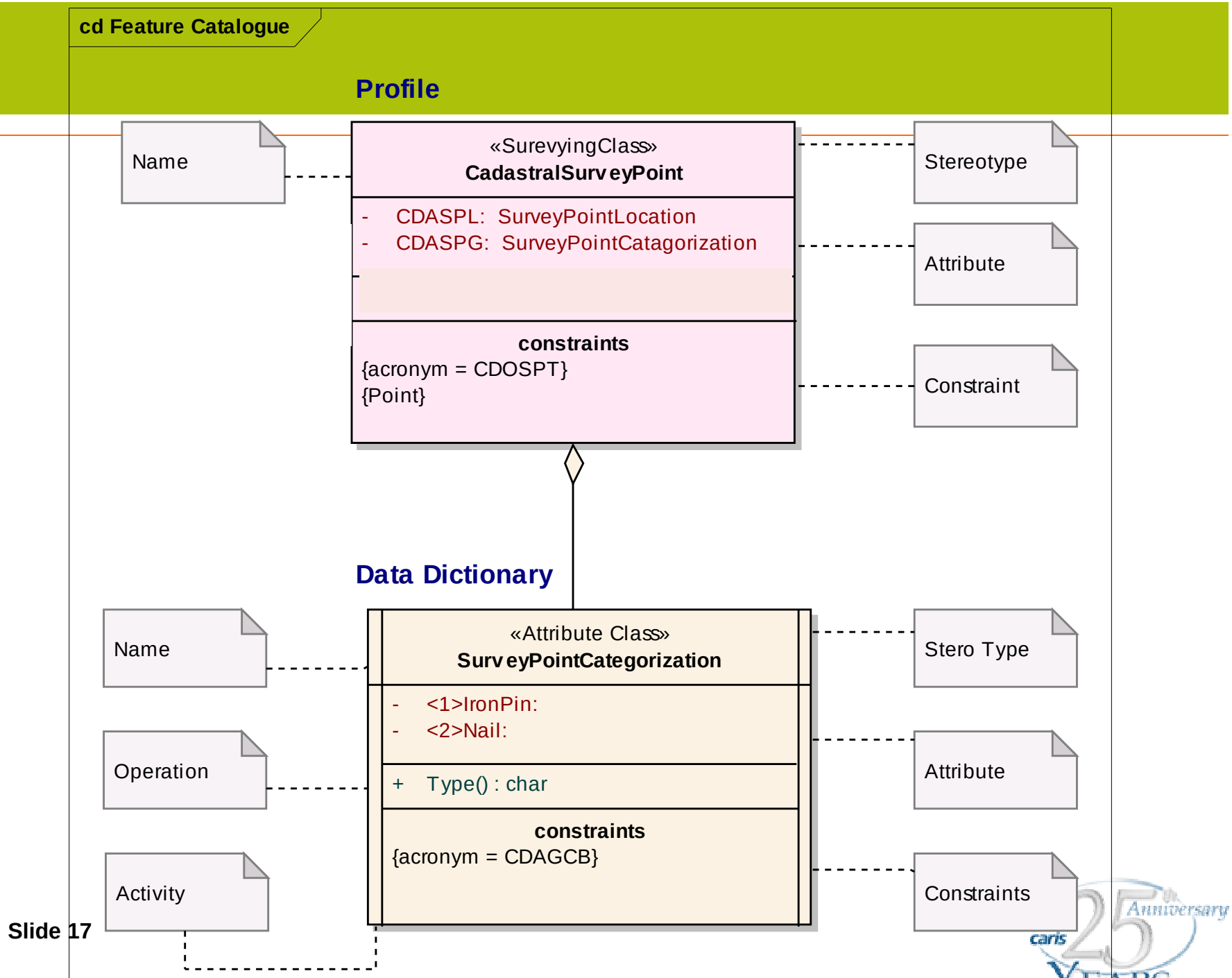
Column	Description
Attribute	Parcel Name
Acronym *	CDPARN
Attribute Type *	Character
Code *	35
Description	The Parcel Name is an identifying name or number for a Parcel. It may also be a project number or any other label for a parcel such as park name.
References*	FGDC – Version 1.3
Minimum Value*	
Maximum Value*	
Indication	
Example	
Remarks *	No remarks

Attribute- Parcel Label

Column	Description
Attribute	Parcel Labels
Acronym *	CDPAL1
Attribute Type *	Character
Code *	36
Description	Formerly Parcel Local Label. Local governments or other organizations may have a method or system for identifying and then applying a number for parcels. These numbers are often used for local administrative purposes.
References*	FGDC – Version 1.3
Minimum Value*	
Maximum Value*	
Indication	
Example	
Remarks *	CDPRL1 is considered the primary parcel identifier. If additional labels are required than extend the attribute list by adding CDPRL2, CDPRL3, etc.

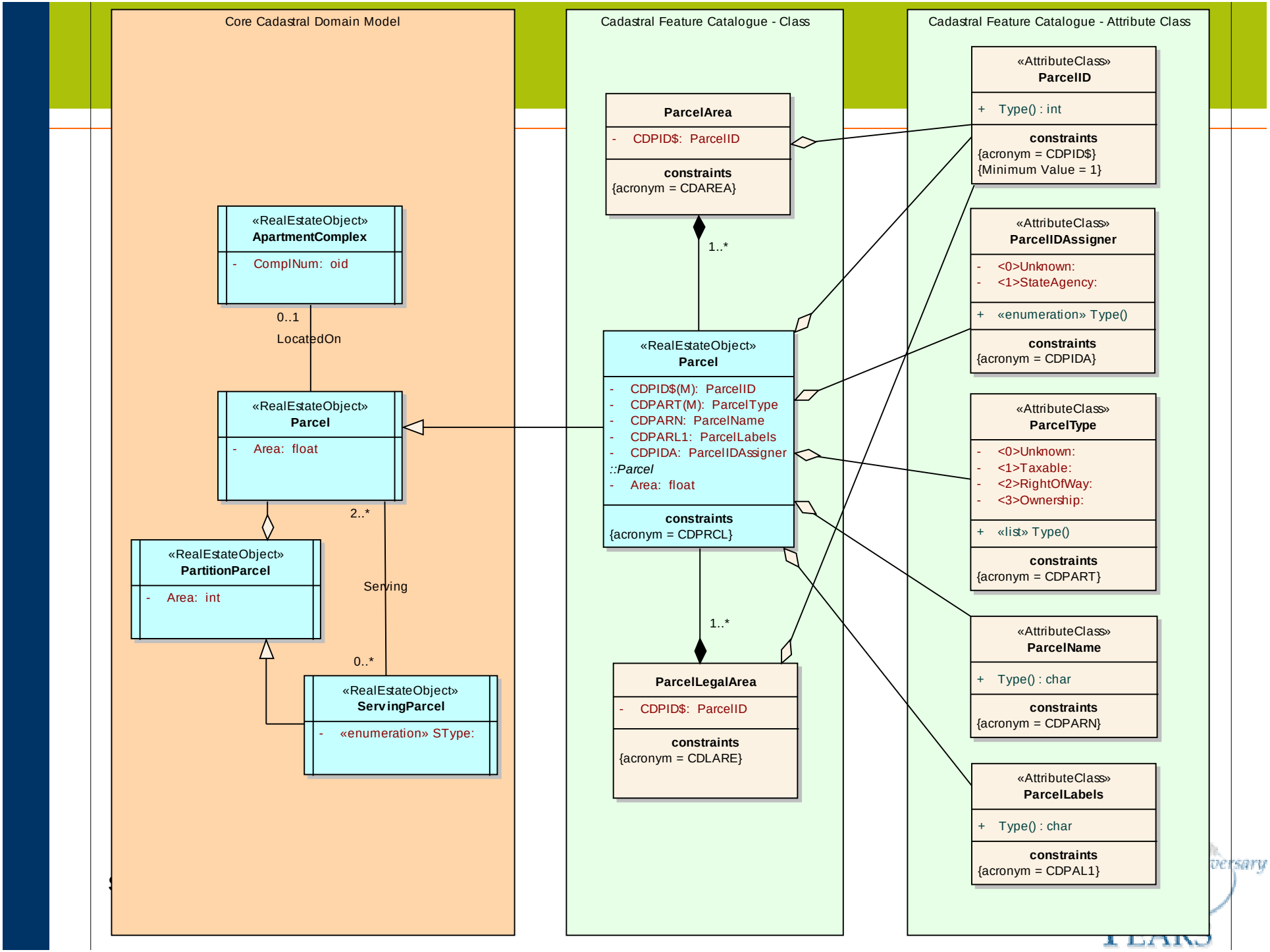
Unified Modeling Language (UML)

- Development Perspective
- It helps a development team visualize specify, construct and document the structure and behavior of a system's architecture.
- Basis for UML is the Rational Unified Process
  - Development is iterative
  - Requirements are managed
  - Use component based architectures
  - Continuously verify software and system architectures.
  - Control Change
  - **Visually model software and system architectures**

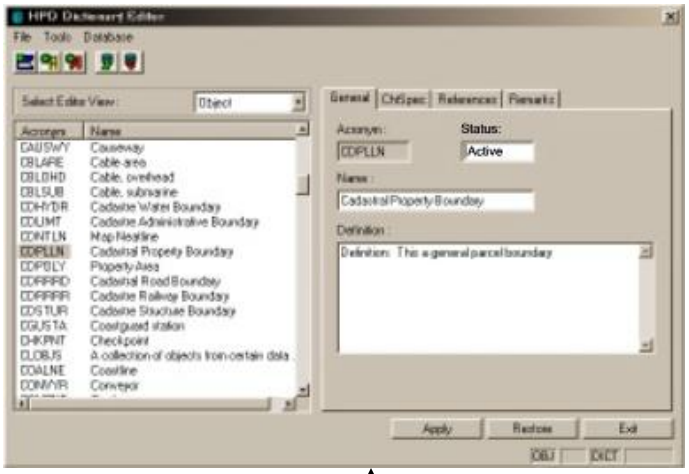

cd Feature Catalogue
Profile
Name
«SurevyingClass»
CadastralSurveyPoint
- CDASPL: SurveyPointLocation
- CDASPG: SurveyPointCatagorization
constraints
{acronym = CDOSPT}
{Point}
Stereotype
Attribute
Constraint
Data Dictionary
Name
«Attribute Class»
SurveyPointCategorization
- <1>IronPin:
- <2>Nail:
+ Type() : char
constraints
{acronym = CDAGCB}
Stero Type
Attribute
Constraints
Operation
Activity

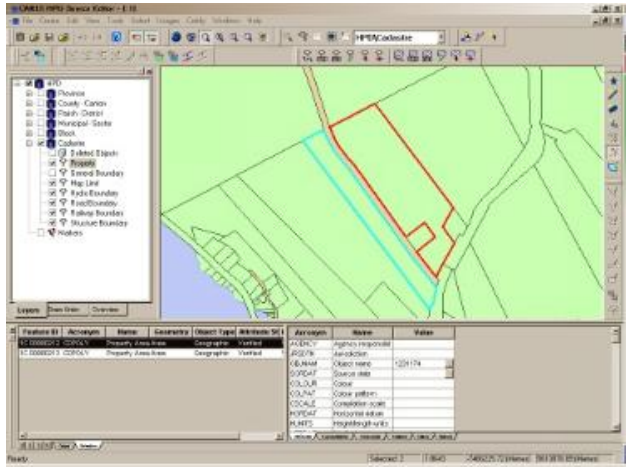
UML for Gap Analysis

- UML offers advantages in performing gap analysis
  - UML is a standardized process that helps remove ambiguities
  - UML lends itself towards an iterative process
  - Domain experts have a visual presentation of their existing ‘model’, which is much better than leafing through a document
  - Modeling tools allow multi-models to coexist (cross-referencing power).


Core Cadastral Domain Model
Cadastral Feature Catalogue - Class
Cadastral Feature Catalogue - Attribute Class
«RealEstateObject»
ApartmentComplex
- ComplNum: oid
0..1
LocatedOn
«RealEstateObject»
Parcel
- Area: float
2..*
«RealEstateObject»
PartitionParcel
- Area: int
Serving
0..*
«RealEstateObject»
ServingParcel
- «enumeration» SType:
ParcelArea
- CDPID$: ParcelID
constraints
{acronym = CDAREA}
1..*
«RealEstateObject»
Parcel
- CDPID$(M): ParcelID
- CDPART(M): ParcelType
- CDPARN: ParcelName
- CDPARL1: ParcelLabels
- CDPIDA: ParcelIDAssigner
::Parcel
- Area: float
constraints
{acronym = CDPRCL}
1..*
ParcelLegalArea
- CDPID$: ParcelID
constraints
{acronym = CDLARE}
«AttributeClass»
ParcelID
+ Type() : int
constraints
{acronym = CDPID$}
{Minimum Value = 1}
«AttributeClass»
ParcelIDAssigner
- <0>Unknown:
- <1>StateAgency:
+ «enumeration» Type()
constraints
{acronym = CDPIDA}
«AttributeClass»
ParcelType
- <0>Unknown:
- <1>Taxable:
- <2>RightOfWay:
- <3>Ownership:
+ «list» Type()
constraints
{acronym = CDPART}
«AttributeClass»
ParcelName
+ Type() : char
constraints
{acronym = CDPARN}
«AttributeClass»
ParcelLabels
+ Type() : char
constraints
{acronym = CDPAL1}

CARIS CPD



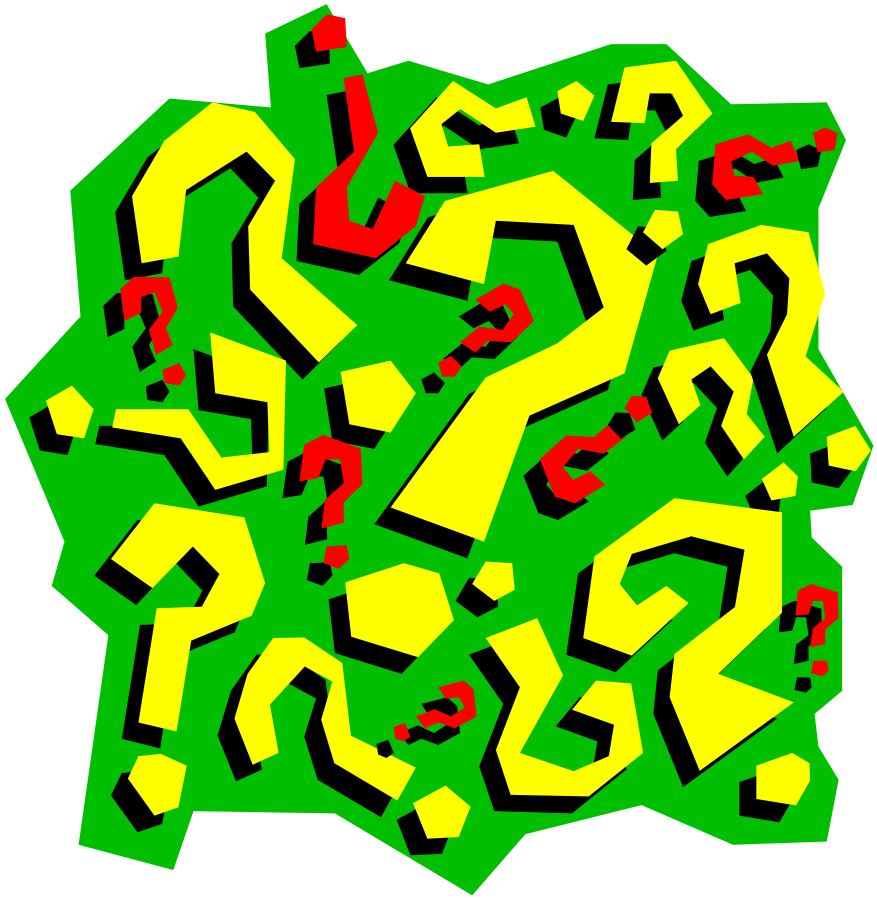


Slide 20

caris 25th Anniversary YEARS

Summary

- UML provides a means for domain experts to contribute to discussions involving the development of a Core Cadastral Domain Model.
- Offers an effective methodology for comparing existing cadastres with the Core Cadastre Domain Model.
- Established early model, a significant contribution.



Cadastre 2014

- Will show the complete legal situation of land, including public rights and restrictions.
- The separation between ‘maps’ and ‘registers’ will be abolished
- Cadastral Mapping will be dead. Long live modeling
- ‘Paper and pencil’- Cadastre will be gone.
- Cadastre 2014 will be highly privatized.
- Cadastre 2014 will be cost recovering

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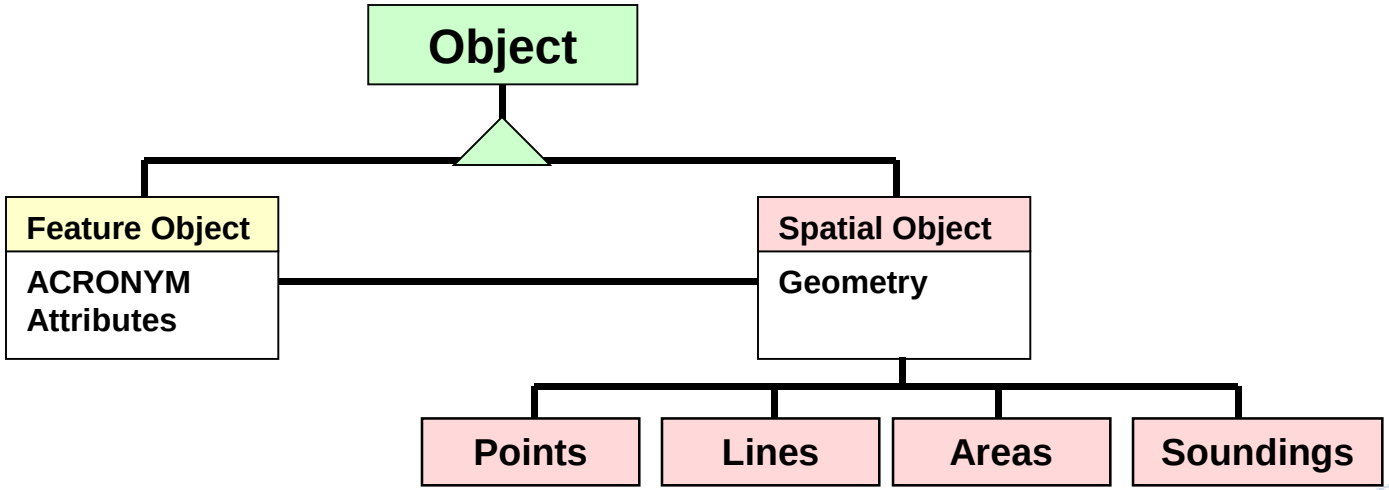

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