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## Cadastral Modeling

*Grasping the objectives*

Stubkjær, Erik

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# Cadastral Modeling – Grasping the Objectives

*Erik Stubkjær*

**Department of Development and Planning  
Aalborg University, Denmark**

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# Overview

1. Modeling what? and for what purpose?
2. Modeling on behalf of whom? and what is really the need?
3. Requirements and basic assumptions
4. Problem domain modeling and solution domain modeling
5. Problem domain modeling: Another way of rendering the  
Person-Right-Land relation
6. Requirements derived from use cases
7. Conclusion

## Modeling what?

- Information system of a specific company (NMA of country N)
- Information systems of an industrial sector (all ((North)European) NMAs)
- Information systems of the *segment* of society concerned with real estate
  - 'Sector' is defined by standards of national accounting;
  - 'Segment' comprises parts of financial, construction and other sectors
- Information systems of real estate segment of European jurisdictions (countries)
- Information systems of real estate segment world-wide

# Modeling what - A template

|                          |  |
|--------------------------|--|
| Needs                    | Problem domain<br>(Cad.Core Model; COST G9)  |
| Features<br>-----        | Solution domain<br>(EULIS; Hess,deVries: Query)  |
| Software<br>requirements | <div>Country1<br/>ICSystem1</div> <div>Country2<br/>ICSystem2</div> <div>CountryN<br/>ICSystemN</div> <div>...</div> |

## Modeling the problem domain - For what purpose?

|                             |  |
|-----------------------------|--|
| The problem of              | partial success of introducing Land Administration Systems in developing countries           |
| Affects                     | donors; target groups and the property segment, as well as consultancies                     |
| The impact of which is      | disappointments, lost resources, and lack of incentives for foreign investment/ stimulation. |
| A successful solution would | be supported by a comprehensive modeling of the 'Western' way of doing the business.         |

Content: de Soto: Mystery of Capital; Format: Bittner, Spencer: Use Case Modeling

## Modeling for what purpose, 2

|                             |  |
|-----------------------------|--|
| The problem of              | cadastral studies of national scope performed by isolated university staff   |
| Affects                     | teaching, the profession, and society  |
| The impact of which is      | a muddy property market with high transaction costs, and marginalized cadastral staff                                |
| A successful solution would | be supported by a modeling effort that relates the cadastral domain with economics and other established disciplines |

## Modeling on behalf of whom?

|                                    |  |
|------------------------------------|--|
| Customers<br>(who pay)             | <ul style="list-style-type: none"><li>• Owners, holders of rights in land</li><li>• Asset holders (mortgagees, foreign investors,..)</li><li>• Government (taxation, ..), ? Utilities (fees)</li></ul>   |
| Users of the<br>ICSsystem          | <ul style="list-style-type: none"><li>• Cadastre, Land Registry <b>NB: Primarily, others, who access ICS as agreed:</b></li><li>• Financial institutions (banks, mortgage banks)</li><li>• Professions (Legal advisers, REA, geo.surveyors)</li><li>• Developers, Construction companies</li></ul> |
| Stakeholders of<br>modeling effort | <ul style="list-style-type: none"><li>• Academia (Knowledge eng., cadastral law, economics)</li><li>• [Sponsors]</li><li>• [Users]</li></ul>   |
| Sponsors of<br>development         | <ul style="list-style-type: none"><li>• EU Commission (EULIS, COST G9)</li><li>• National mapping/cadastral agencies</li><li>• Software industry</li></ul>   |



## **The need for modeling the domain**

A Cadastral System potentially enables an efficient market in real property units

by reducing information asymmetries and reducing transaction costs through the presence of skillful, impartial transaction officers, and the recording of spatial and legal attributes of property units

To realize this potential,

there is a need of a better understanding of the cadastral system and its operating conditions

that is: a need of (problem and solution) domain modeling

## **Functional requirements of a model Cadastral System**

- Property units are identified and located, and physical attributes are recorded
- Rights in property units are classified and recorded
- The recording of rights depends on check of the powers of the disposer, the priority of liabilities, and further rule compliances
- Involved agencies and professions offer compensation in case of occasional errors

# Assumptions regarding the operation of Cadastral SystemN

In country N:

- People commit themselves in writing
- Behavior (dispositions of assets, political decisions) is reflected in economic terms
- Opportunism is moderated by law and order (CPI ~European level)
- Professionals with vocational attitude are available
- Government and professions improve CS where economically justified

# Non-functional requirements of a model Cadastral System

The CS shall grow more

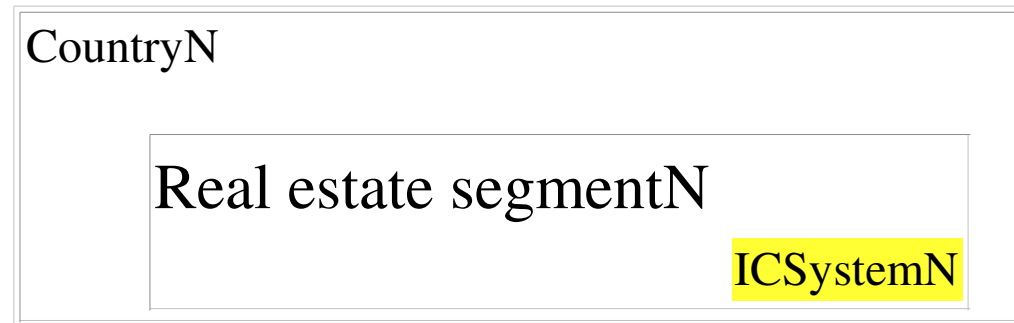
- correct (mirror principle),
- consistent,
- cost effective
- transparent and understandable to the customer (end-user)

The following procedures shall be completed within a few months:

- Purchase of a property unit
- Mortgage
- Subdivision and other cadastral cases
- Compulsory sale in case of defect

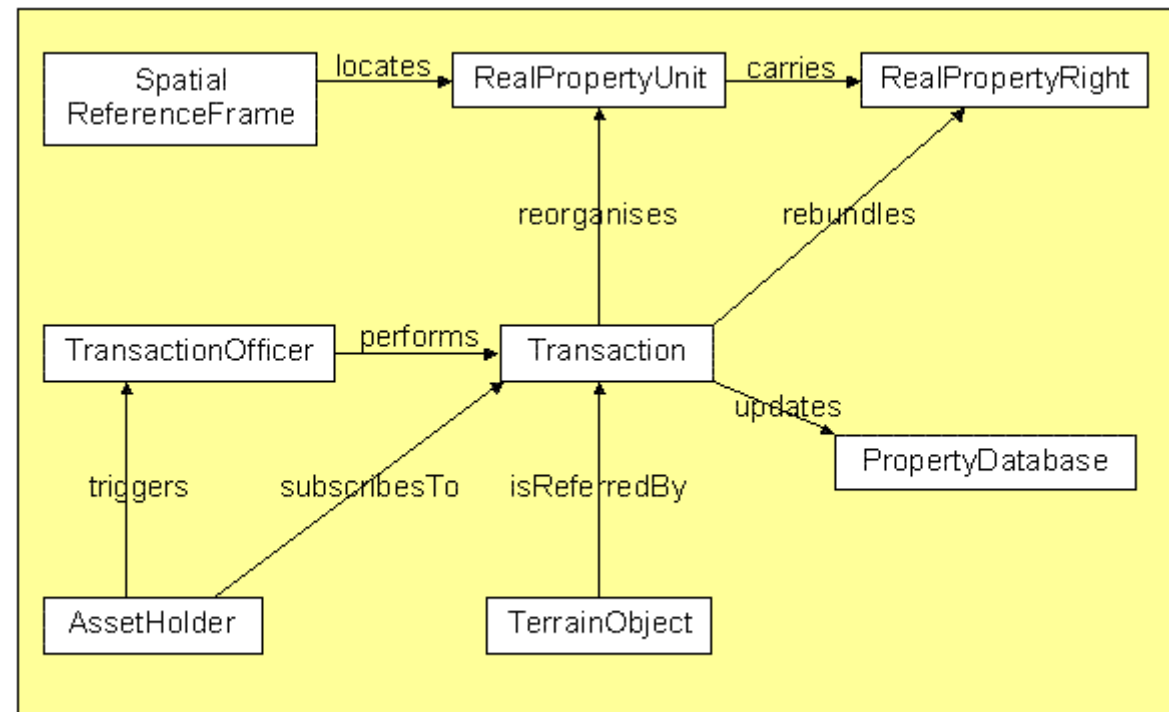
## System boundaries once more

The latter requirements goes beyond the Cadastral System proper, as it depends on professions, etc. as well



Modeling the problem domain has Real Estate Segment as its scope.  
This scope is apparently wider than the scope of the solution domain.

# The Person-Right-Land relation in a dynamic setting



## **Examples of Use Case derived requirements**

The seller requires from the Purchaser an appropriate payment for the sold property unit.

The seller (and/or Purchaser) requires from the Legal Adviser to provide a written evidence of the transaction, have it recorded in the Land Registry, and monitor the related cash flow.

The seller requires from the Financial Institute (or the Legal Adviser) the handling of the cash-flow of the transaction in a secure way, and assistance in the possible termination of existing mortgages.

## Summary

1. Suggested what might be the 'system' that we are all referring to
2. Suggested a frame for relating the diverse activities presently going on
3. Specified some requirements: Top-down in presentation. Bottom-up in paper
4. Wondered: The scope of problem domain modeling and of solution domain modeling seems to be different

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Thank you !

est@land.aau.dk