

A New Vision on Cadastral Data Models

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Outline

- Importance of land administration systems
- Evolution of land administration systems
- Current cadastral data models
- The issues associated with the current models
- An alternative model
- How to implement the new model
- Conclusions



Importance of land administration

- Delivering sustainable development requires effective management of social, environmental and economic aspects of land.
- Historically land administration systems have contributed to organising interests in land.
- Land administration systems are therefore key tools in the service of sustainable development



Evolution of land administration systems

	Traditional	Modern
Objectives	Land market Security of tenure	Good governance (tenure security, ...) Sustainable development (wealth creation, use regularity, ...) Enhancing quality of life Civic participation Service to businesses
Functions	Tenure Value	Tenure Value Use Development Land information management
Characteristics	Limited number of interests Paper based Parcel based indexing Private interests Isolated subsystems	Broader range of interests e-Land administration system Spatially enabled land administration Public and private interests Interoperable land administration system



Can current cadastral data models address the modern requirements?

- Can they accommodate the growing number of interests?
- Are they spatially enabled?
- Can they offer enough interoperability for an e-land administration system?



Current cadastral data models

- Land parcels constitute the basic building block in land administration systems. Parcels were employed to identify the areas related to interests in land.
- Besides that, land parcels have been used as indices for organising land information in various land administration subsystems or within other related agencies.



Current cadastral data models

- Interests recorded in land administration systems are traditionally those associated with private ownership.
- The most important interest in land is the ownership of land.
- Ownership is usually recorded along with restrictions, most commonly caveats, mortgages and rights of way.

Ownership
Right

Current cadastral data models

- Land administration systems have so far focused on private interests rather than public interests.
- Although, some government agencies are responsible for management of public lands, their systems are usually not as mature as those used for managing records of private land, and are usually separately maintained.

Private
Claimant

Current cadastral data models

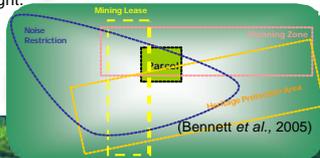


The issues associated with the current model

- How new interests and RRRs might be incorporated into a cadastral fabric?
- How to facilitate interoperability ?

The issues associated with the current model

- Spatial dimension of the interests does not necessarily fit to a land parcel
- A biota right exists as an interest that often appears to be attached to land parcels, but the commercial exploitation of the opportunities arising from biota may not neatly align to individual land parcels.
- A water catchments right.
- A noise restriction.



The issues associated with the current model

- Current cadastral data models are not really spatially-enabled and accordingly do not support interoperability
 - Grantor/Grantee (Deed based)
 - Title numbers (Title based system)
 - Block and-plot numbering system
 - Street address
 - Spatial identifiers????????????????

An alternative model - principle

- Land is not a legal entity until an interest is attached to it
- Land parcel is registered when an ownership is attached it.
- Right of way is registered when there is a restriction in a specific dimension of a land parcel.

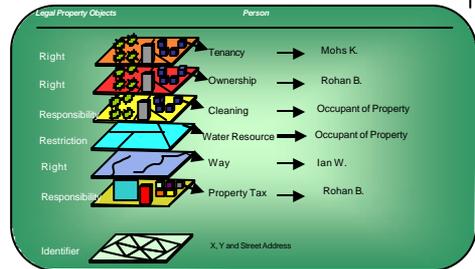
An alternative model - principle

- The very close relationship between each interest and its spatial dimension in the real world should be also recognised in information systems.
- They should be maintained together as a unique entity in a cadastral information system.
- This unique entity must define both the interest and its spatial dimension.

An alternative model – core model



An alternative model – conceptual model



An alternative model- challenges

- The conversion of RRRs into their respective spatial dimensions;
- The relationships among legal property object layers.

Topological relationship

- The topological relationship can quickly find neighbouring legal property objects.
- Object sharing makes maintenance for consistency and updates easier.

Spatial relationship

- To determine whether one legal property object touches, coincides with, overlaps, is inside or is out side of another legal property object
- One might want to determine which car space footprints fall inside a particular land parcel.

General relationship

- The general relationship is not physically explicit; for example, the relationship between the owner(s) with an apartment
- For instance the same position may involve complex relationships among persons, each interested in a different way, for example as a car space, a water catchment, or as owner of the parcel.

Vertical relationship

- Vertical integrity is the ability to relate legal property objects from one data set with legal property objects from another.
- For example, automatic realignment of the gas line through its topological link to the property boundary is possible.

Conclusion

Two changes :

- One involves using legal property objects, not physical land parcels as the means of organising interests. This facilitates the incorporation of a wide range of rights, restrictions and responsibilities into the cadastral information system.
- The second is to make the spatial referencing system the centre of the cadastral information system by using it to identify legal property objects. This change promotes interoperability and simplicity in data exchange processes, particularly upgrading and updating cadastral databases.

Thank you