

# LADM Implementation Prototype for 3D Cadastre Information System of Multi-Level Apartment in Indonesia

International FIG workshop on  
the Land Administration Domain  
Model (LADM2013)

[www.isoladm.org](http://www.isoladm.org)

24 – 25 September 2013  
(in conjunction with ISG2013)  
Kuala Lumpur, Malaysia

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# IDEA



Limitations of land supply for infrastructure developments in urban areas



led to the development of multi-level and vertical buildings





Figure : Apartemen “Thamrin Residence”  
Source : <http://jakartacity.olx.co.id/>



Figure : Flats units (Strata Tittle) at  
Tanahabang, Jakarta Pusat  
Source : <http://www.beritajakarta.com/>

Massive developments and uses of high rise buildings and constructions such as multi-level apartments and overpass structures in big cities in Indonesia indicated that the demand for space above the ground surface is rapidly increasing in recent years.



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Land Administration Domain Model (LADM) is an international standard that provides basic classes including 2D Spatial Unit and 3D Spatial Unit as well as RRR which are applicable to facilitate 3D property objects registration and visualization for land and space registration (Lemmen et al., 2010)

**ISO TC 211/SC**

Date: 2010-10-10

**ISO/DIS 19152**

ISO TC 211/SC /WG 7

Secretariat: SN

## **Geographic information — Land Administration Domain Model (LADM)**

*Information géographique — Modèle du domaine de l'administration des terres (LADM)*

### **Warning**

This document is not an ISO International Standard. It is distributed for review and comment. It is subject to change without notice and may not be referred to as an International Standard.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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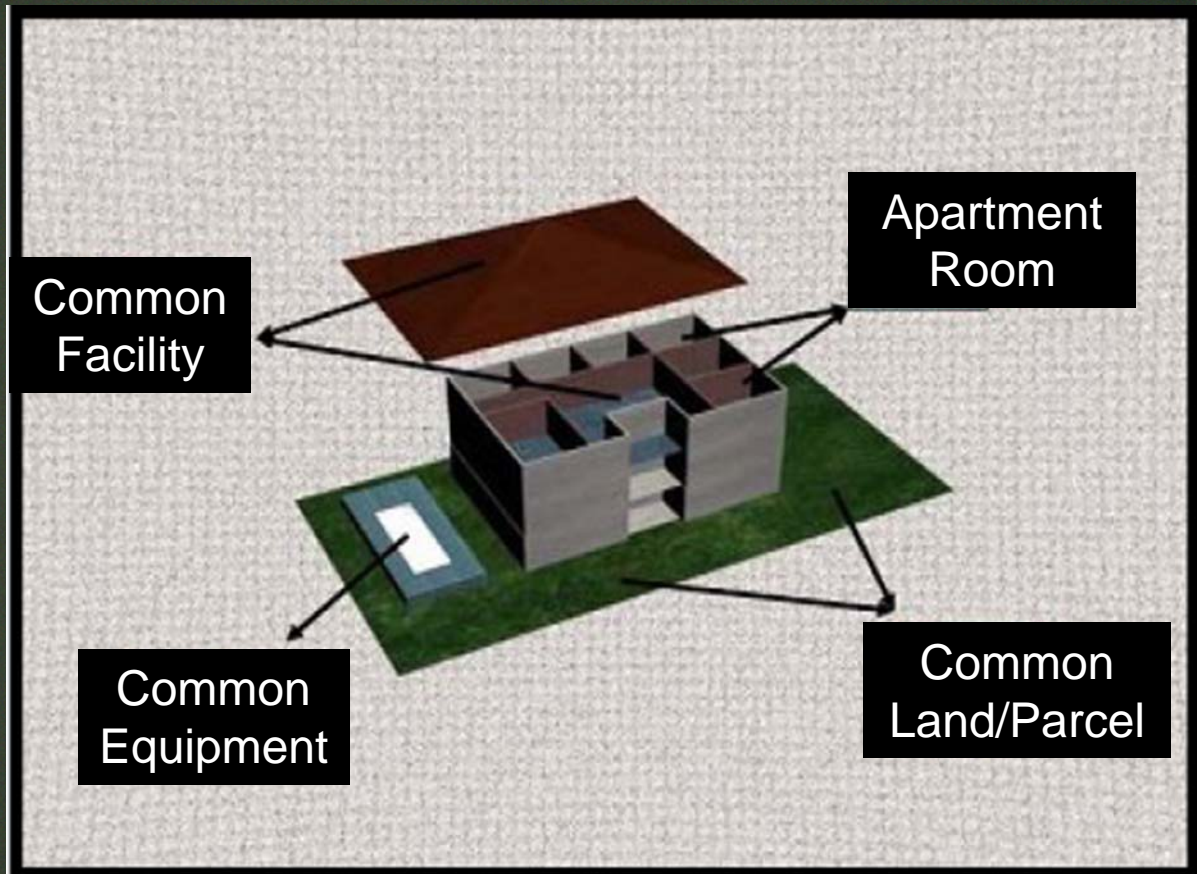
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Basic classes of LADM components are used as conceptual references for enhancing good land governance principles in 3D cadastre system prevailing in Indonesia.

For this purposes, Law on Multi-level Apartments and Strata Title (Act No. 20/2011) and standard services on land registration systems (Land Office Executive Order No. 1/2010) are used as technical references.



Law on (multi-level) apartment regulates the opportunity to build, manage, and use of apartment buildings. It defines that an apartment building consists of : common objects, common room, common land/parcel and apartment room that can be owned by individuals or parties. It regulates the principles on the acquisition and registration of ownership rights of apartment rooms.



# GOAL

- This paper deals with the development of a prototype of 3D cadastre information system that is capable to facilitate the registration of multi-level property spaces using LADM principles and according to national law and services standards.
- The paper will explore the use of LADM basic units and use of Delphi, PostGIS to manage spatial data and attributes for supporting registration and visualization of multi-level apartment by implementing the principles depicted in the current law and executive order related to strata title registration of property objects.



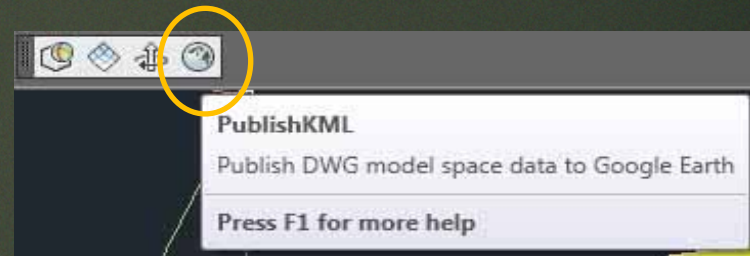
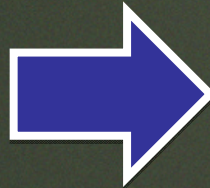
# Case Study

The data used in this study consist of spatial data of 3D geometries of Simpanglima Plasa Building, Semarang, Middle Java in digital format.

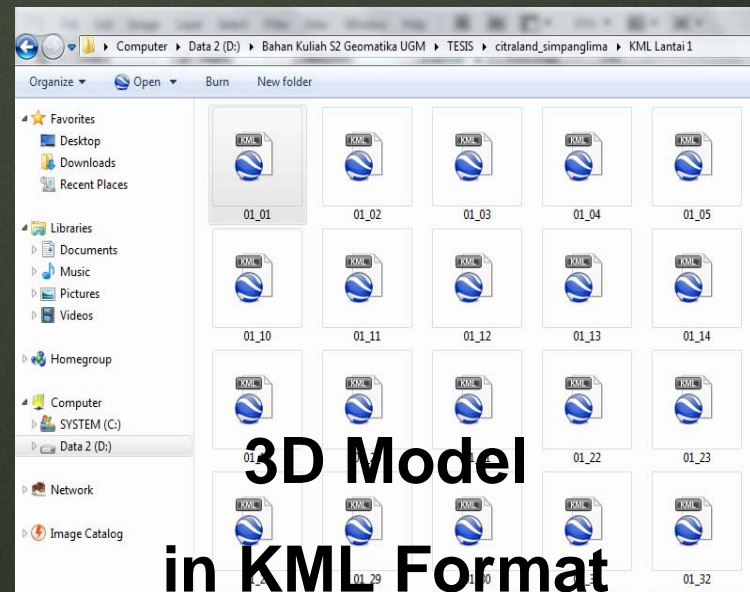
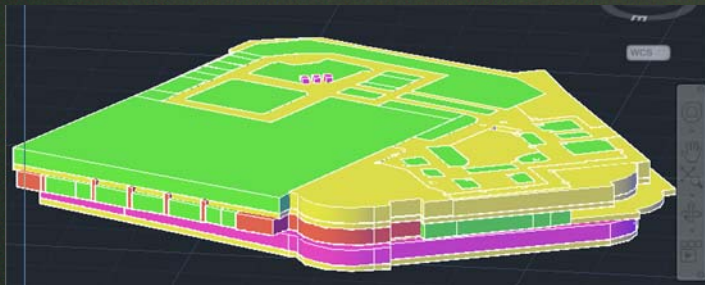




# Spatial/Geometry Data Process



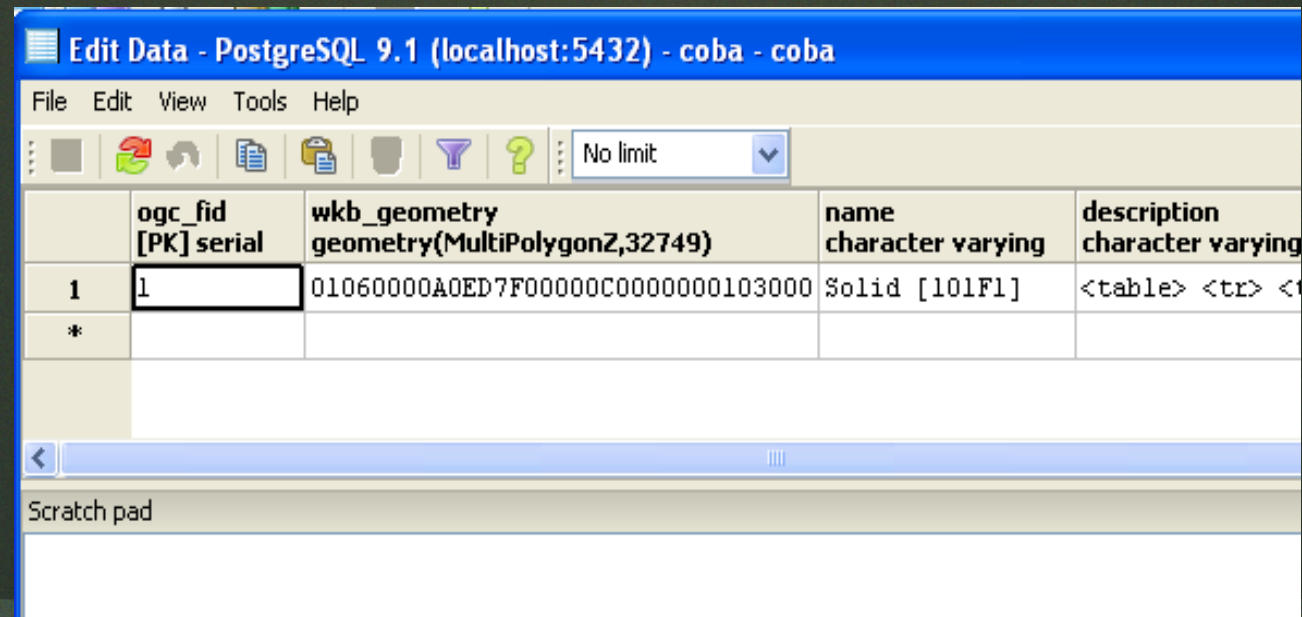
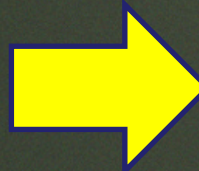
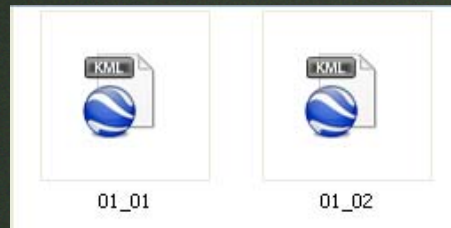
## 3D Solid Model





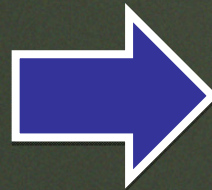
# Spatial/Geometry Data Process

*open source GIS binaries*  
by Frank Waemerdam





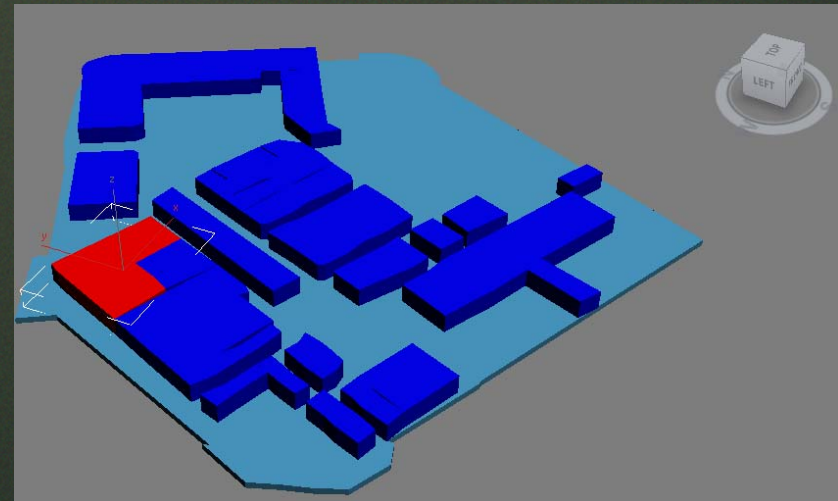
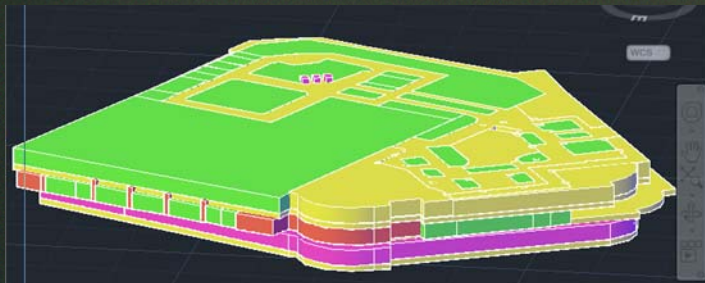
# Spatial/Geometry Data Process



\*.3ds file format will be stored in PostgreSQL+PostGIS

3ds max will export to → \*.3ds

## 3D Solid Model



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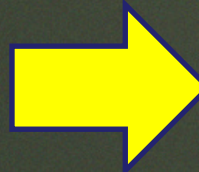
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# Spatial/Geometry Data Process

3D Model in \*.3ds format

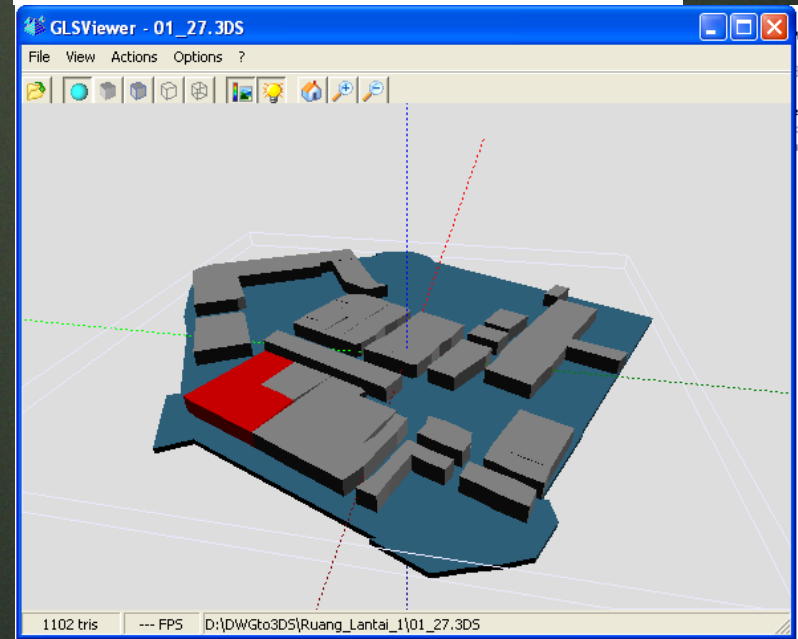
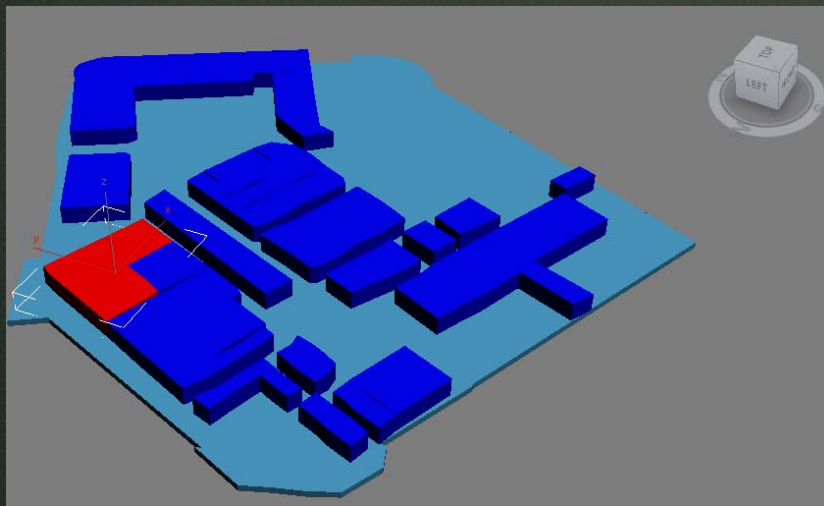
Visualization by GLScene



*OpenGL (Open Graphic Library)  
based 3D library for delphi*

**GLScene**  
OpenGL Solution for Delphi

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# System Design

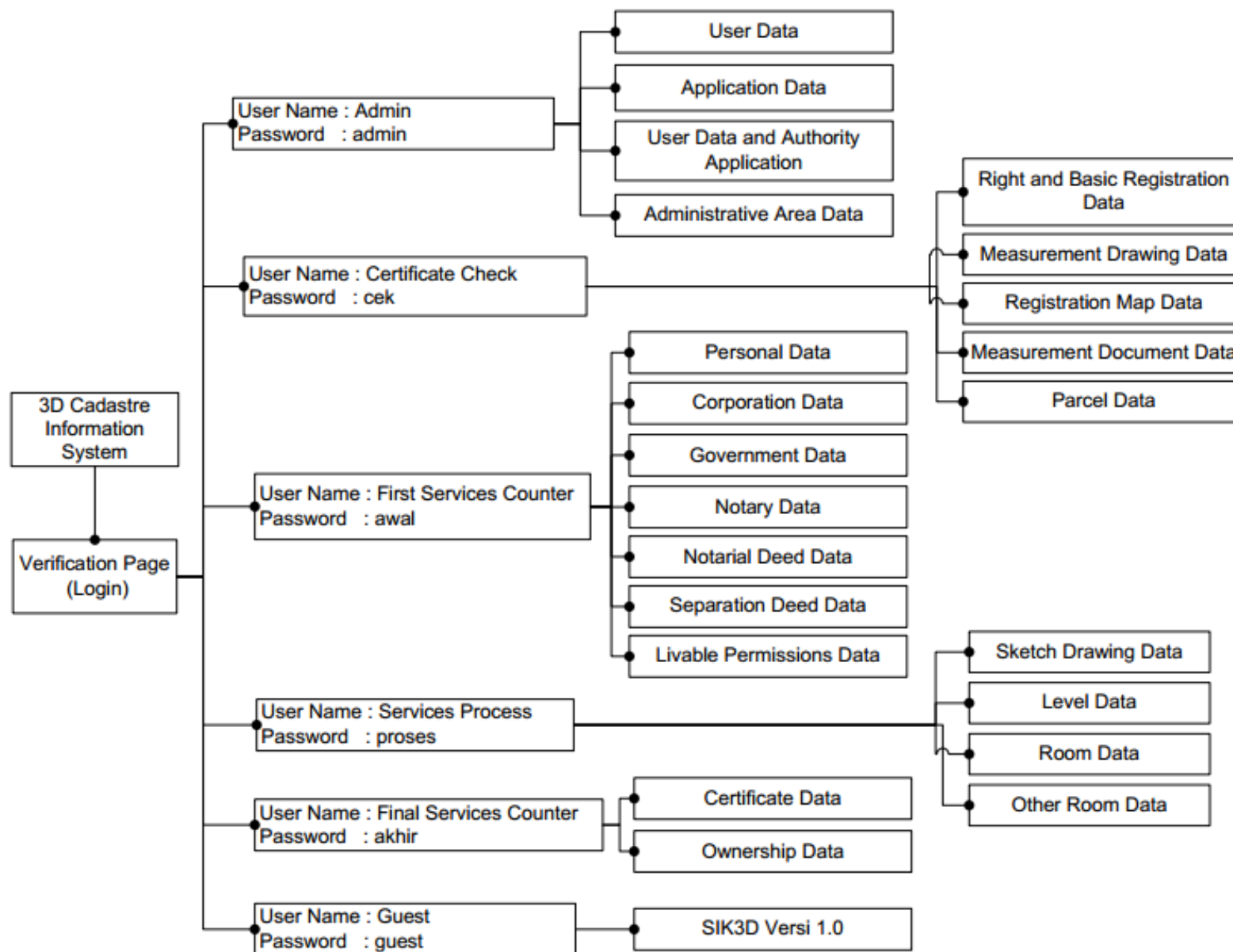


Figure 1. Structure of interface design of 3D Cadastre Information System

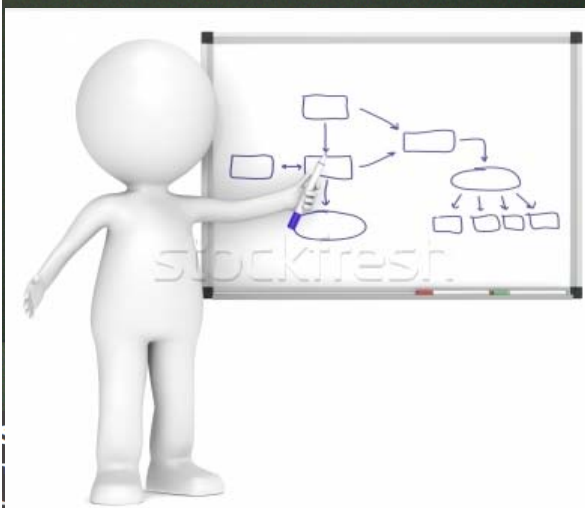


# Data Models

The basic classes of LADM development model to the Law No 20/2011 on Apartment



Figure 2. Basic classes of LADM development diagram





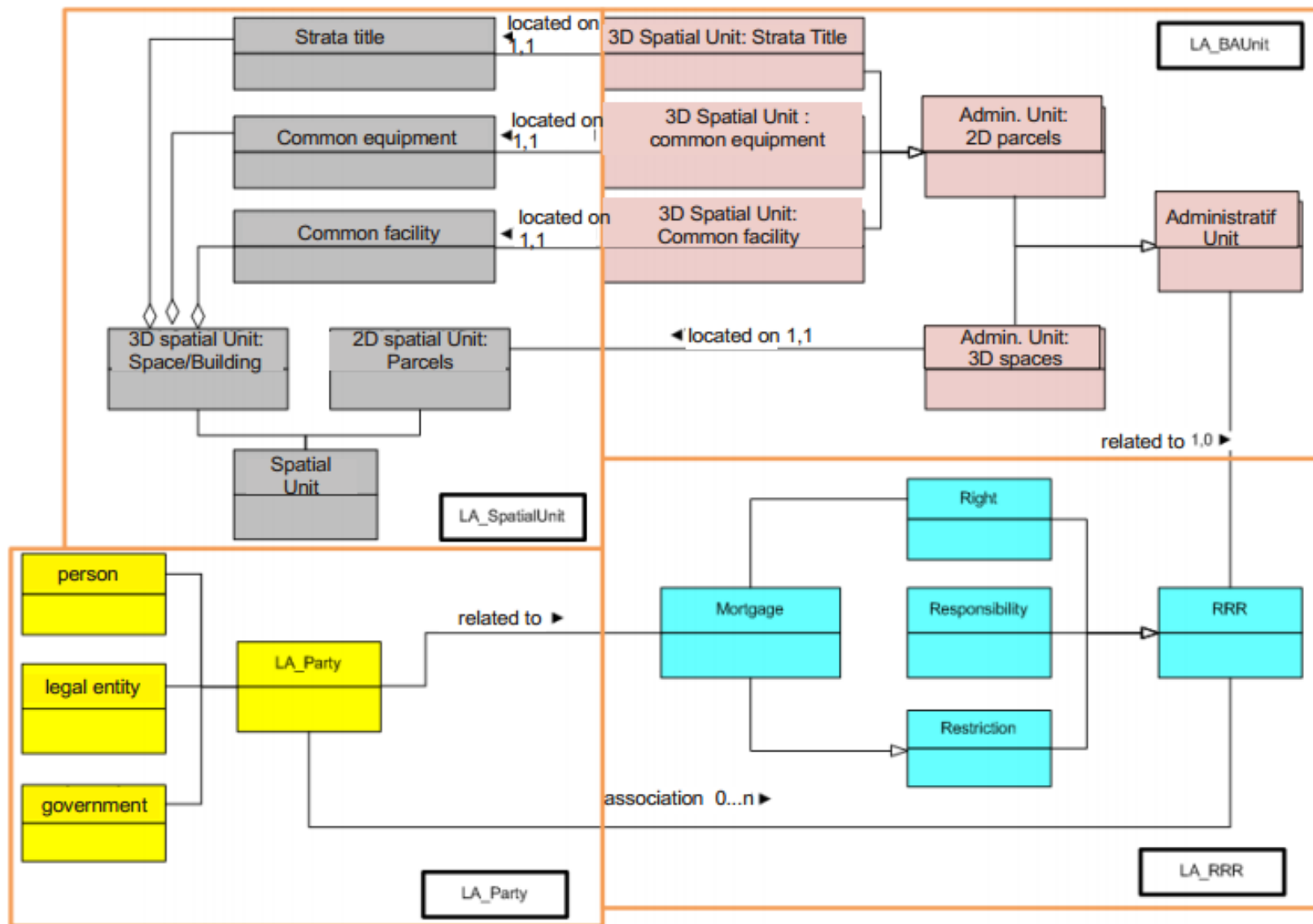


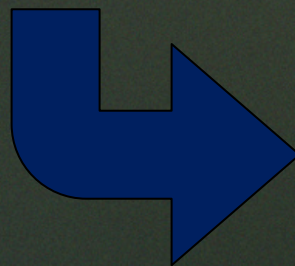
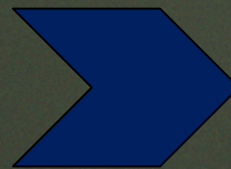
Figure3. Conceptual model of spatial database for 3D Cadastre Information System







# Execute the DDL to Physical Model in Database System







**Figure 4. A screen capture of the SIK3D as the LADM implementation prototype**



# CONCLUSION

The basic classes of **LADM** (Land Administration Domain Model) can be accommodated for a rights registration system of the space (3D cadastre) applicable in accordance to **the Law. No. 20/2011** on Apartment and **Executive Order of Chief of National Land Office No. 01/2010 on service standards on land registration.**

- **LA\_Party class** comprises of Individual person, Legal Entity and Government Agencies as a right holder.
- **LA\_RRR class** is implemented as a type of space rights referring to the deed and related documents specifying the status of the rights of ownership.
- **LA\_BAUnit class** refers to the procedures and rights registration system.
- **LA\_SpatialUnit class** refers to a 3-dimensional object (apartment/flats units)



# CONCLUSION

This study successfully implement a prototype of a desktop-based 3D cadastral information system by using the Delphi Programming utilising PostGIS spatial databases that are created based on adoption of LADM basic classes



The prototype, called SIK3D, has met the terms of service standards for strata title registration processing and visualization as well as to effectively link between the subjects and the property objects



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# END



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