



**Conceptual Modelling of 3D
Cadastre and LADM**

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Outline


- Introduction
- Malaysian land policy
- Malaysian cadastral system
- Malaysian LADM country profile – the conceptual modelling
- Final remarks

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Introduction

- Current Malaysian cadastral system;
 - Parcel based and 2D
- 3D cadastral system (in the pipeline)
- The new cadastral system could be developed within LADM model with 3D elements
- LADM covers;
 - Spatial and administrative (legal) aspects
 - 2D and 3D spatial units



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Malaysian land policy

- Land matters - under the jurisdiction of state governments
- Land ownerships - governed by National Land Code (NLC)
- Based on the Torrens System
- Example of rights;
 - Strata rights
 - Underground rights
 - Customary rights



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Strata rights

- Strata rights;
 - Deal with subsidiary titles to each parcel within a building (2 or more storeys)
 - Building subdivisions
- Recent improvements;
 - *eLAS* for strata title
 - Designation of limited common property
 - The creation of one or more subsidiary Management Corporations (MC)




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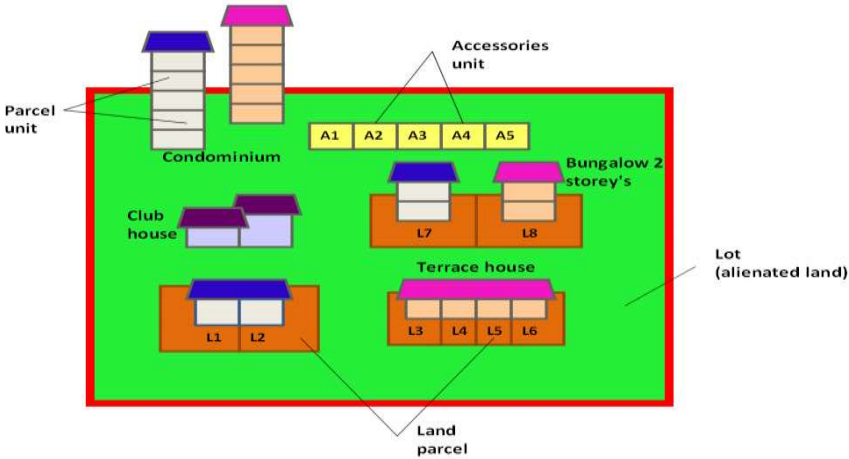
Strata rights (cont..)

- Master lot can be subdivided into smaller lots for purpose of strata scheme.
- Lot for strata scheme can be subdivided into;
 - Parcel
 - Land parcel
 - Accessory unit
 - Common property
 - Limited common property





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 **Strata rights (cont..)**





Various cadastral objects related to strata in context of one lot

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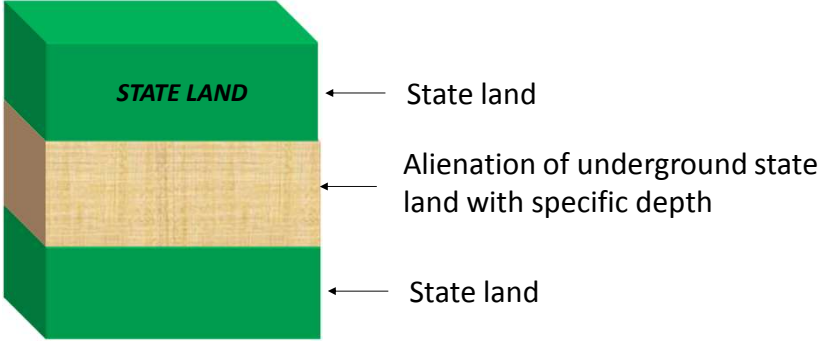
 **Underground rights**

- Stratum – a cubic layer of underground land
- Minimum depth regulations – to specify the minimum depth of underground lands from the earth's surface;
 - Agriculture land use (6 meters below)
 - Building land use (10 meters below)
 - Industrial land use (15 meters below)

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Underground rights (cont..)



STATE LAND ← State land

← Alienation of underground state land with specific depth

← State land

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Customary rights

- Customary rights – acquired by the native people
- Governed by the state authority




(source: national-express-malaysia.blogspot.com and www.pinterest.com)


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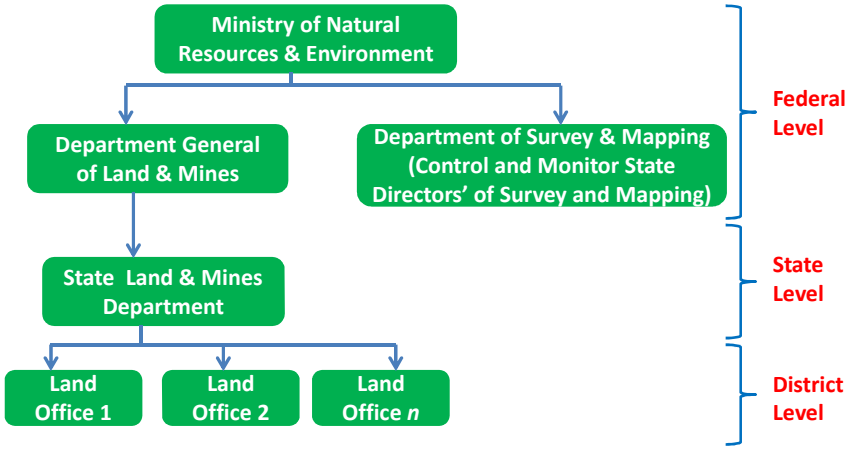
Customary rights (cont..)

- Percentage of the native people (2010 estimate);
 - Sarawak – 28 groups (71%)
 - Peninsular Malaysia – 13 groups (1%)
 - Sabah – 39 groups (61%)
- Various complaints from this groups;
 - Allegations of encroachment of land
 - Overlapping claims

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Malaysian cadastral system



```
graph TD; A[Ministry of Natural Resources & Environment] --> B[Department General of Land & Mines]; A --> C[Department of Survey & Mapping (Control and Monitor State Directors' of Survey and Mapping)]; B --> D[State Land & Mines Department]; D --> E[Land Office 1]; D --> F[Land Office 2]; D --> G[Land Office n];
```

Organizational structure of land administration in Malaysia


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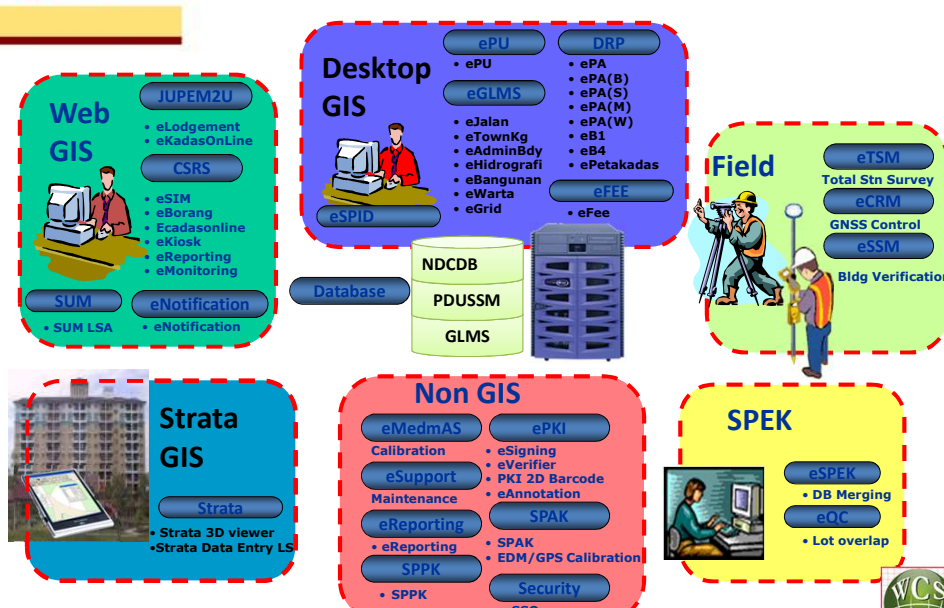
Malaysian cadastral system (cont..)

- eCadastre
- eLand

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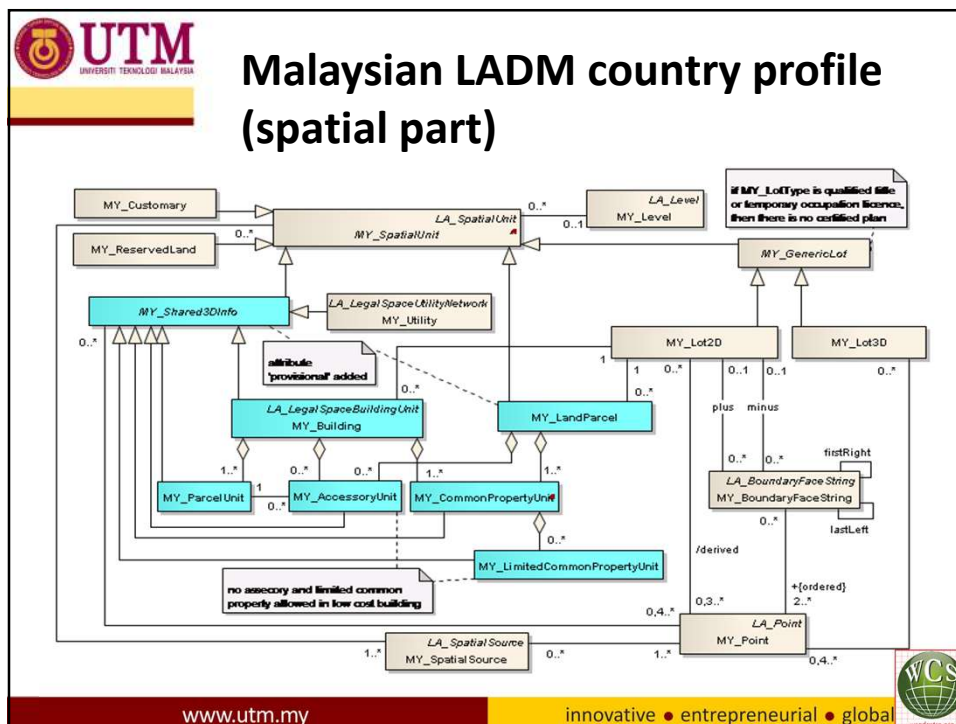
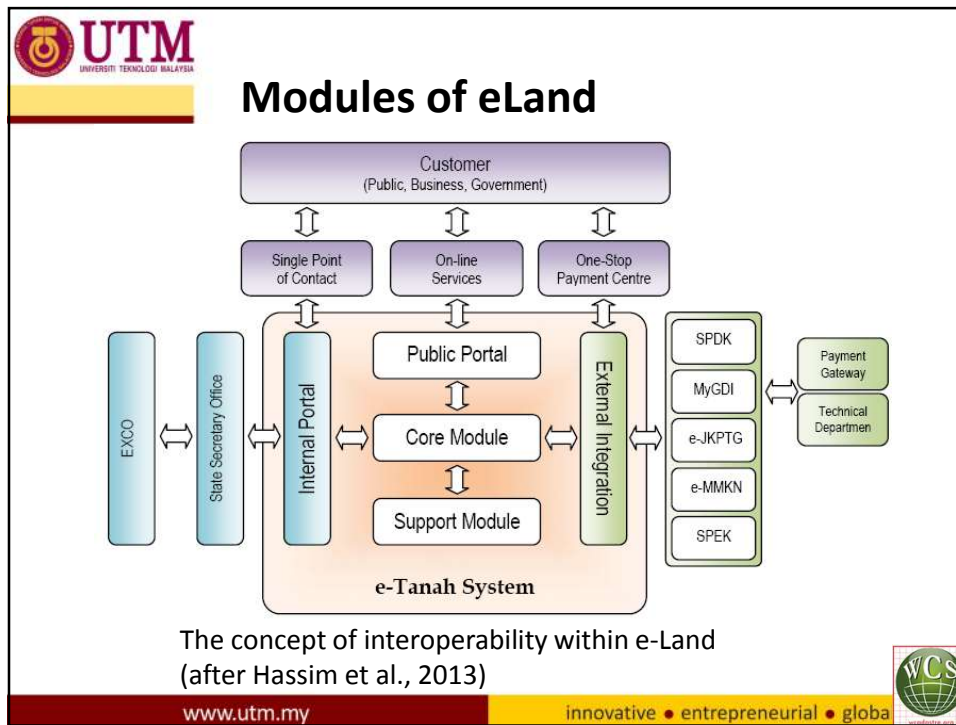
Modules of eCadastre




The diagram illustrates the modules of the eCadastre system, all connected to a central Database (NDCDB, PDUSSM, GLMS).

- Web GIS:**
 - JUPEM2U
 - eLodgement
 - eKadasOnLine
 - CSRS
 - eSIM
 - eBorang
 - Ecadasonline
 - eKiosk
 - eReporting
 - eMonitoring
 - SUM
 - eNotification
 - SUM LSA
 - eNotification
- Desktop GIS:**
 - ePU
 - DRP
 - ePU
 - ePA
 - ePA(B)
 - ePA(S)
 - ePA(M)
 - ePA(W)
 - eB1
 - eB4
 - ePetakadas
 - eJalan
 - eTownKg
 - eAdminBdy
 - eHidrografi
 - eBangunan
 - eWarta
 - eGrid
 - eGLMS
 - eFEE
 - eFee
 - eSPID
- Field:**
 - eTSM
 - Total Stn Survey
 - eCRM
 - GNSS Control
 - eSSM
 - Bldg Verification
- Strata GIS:**
 - Strata
 - Strata 3D viewer
 - Strata Data Entry LS
- Non GIS:**
 - eMedMAS
 - ePKI
 - Calibration
 - eSigning
 - eVerifier
 - PKI 2D Barcode
 - eAnnotation
 - Maintenance
 - SPAK
 - eReporting
 - SPAK
 - EDM/GPS Calibration
 - SPPK
 - Security
 - SPPK
 - SSO
- SPEK:**
 - eSPEK
 - DB Merging
 - eQC
 - Lot overlap


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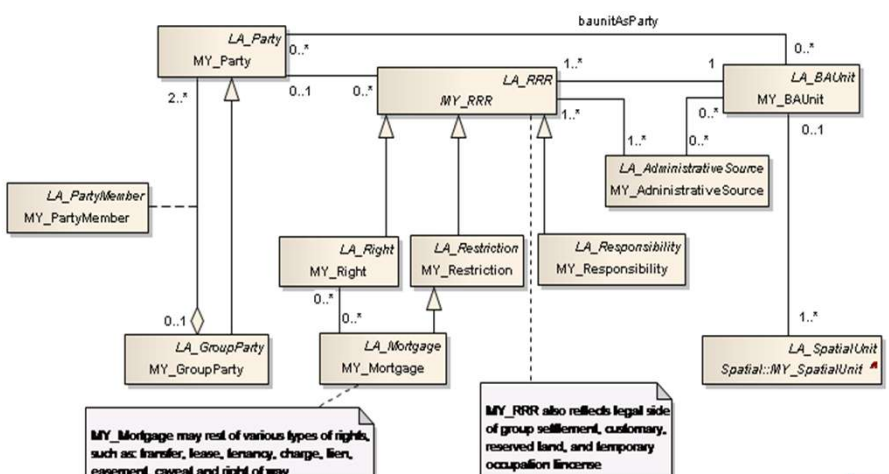
Malaysian LADM country profile (cont..)

- All information - originate from source documents.
- Spatial source documents (i.e certified plans), links with spatial unit and point tables.
- Administrative source documents (i.e titles), links with RRRs (incl. mortgage) and BAUnit tables.
- suID - based on UPI.
- sID;
 - spatial source - certified plan number
 - administrative source - title number

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Malaysian LADM country profile (administrative part)



MY_Mortgage may rest of various types of rights, such as: transfer, lease, tenancy, charge, lien, easement, caveat and right of way

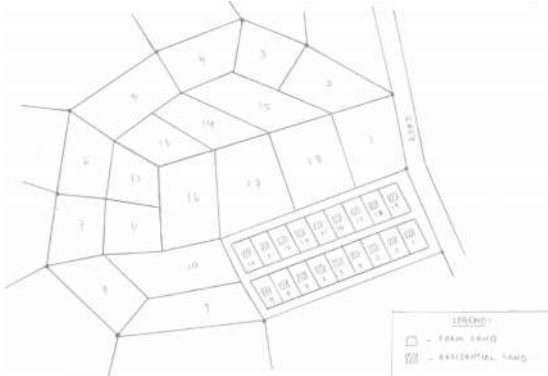
MY_RRR also reflects legal side of group settlement, customary, reserved land, and temporary occupation license


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Malaysian LADM country profile (cont..)

- BAUnit - multiple spatial units with same RRRs attached





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Malaysian LADM country profile (cont..)


- Malaysian LA could consider more grouping of spatial units with same RRRs attached via a single BAUnit.
- A wide range of spatial units is also supported in the model.
- The various types of spatial units are organized in levels.
- MY_Level class - used to organize the various types of spatial units.

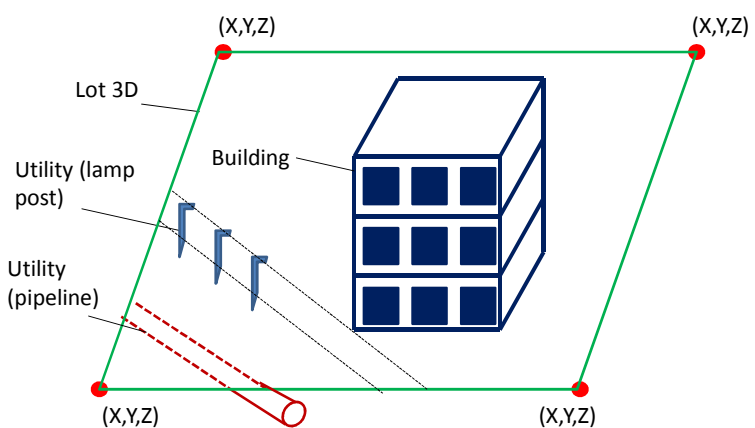
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 **Malaysian LADM country profile
– 3D Modelling**


- Classes represent 3D spatial unit;
 - MY_Building
 - MY_Utility
 - MY_Lot3D
- MY_Building and MY_Utility – subclasses of MY_Shared3DInfo.
- MY_Lot3D – subclass of MY_GenericLot.
- MY_Shared3DInfo and MY_GenericLot – abstract classes.
- Topology not available in the 3D spatial unit.

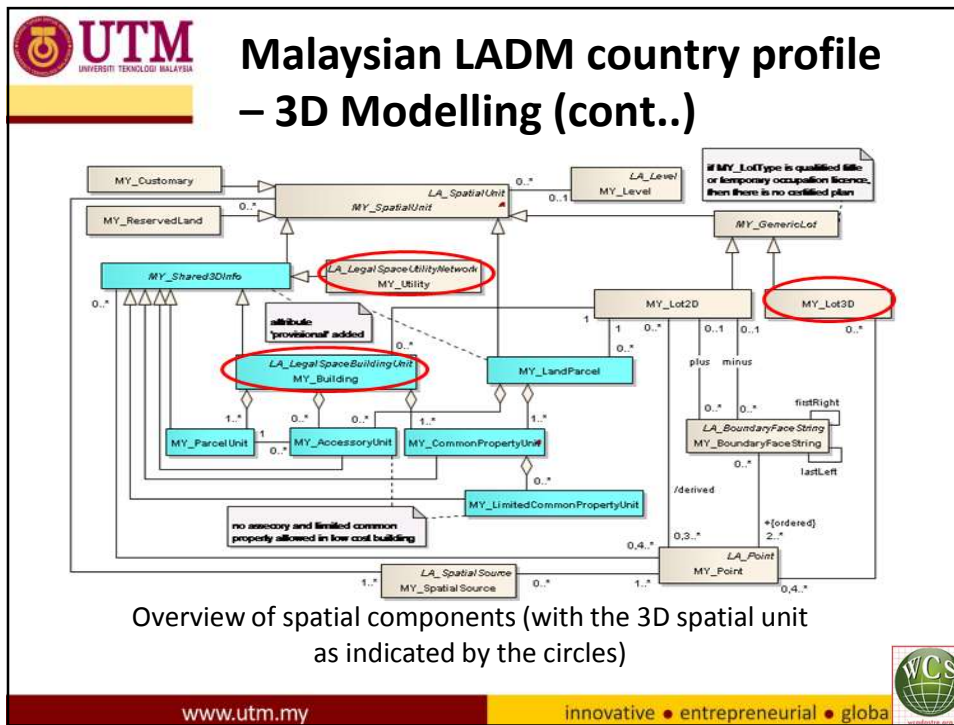
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 **Malaysian LADM country profile
– 3D Modelling (cont..)**



3D spatial components


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Final remarks


- We have developed 3D cadastre model based on LADM.
- However, without topology.
- The 3D topology per building needs further investigation.
- The Malaysian LADM country profile could be extended for 3D cadastre prototype and maintain the topology with other geometric elements.

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Thank you for your attention!

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