

## Developing Land Registry and Cadastral Base Data Model for Land Management Applications

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### Related Developments in Turkey TAKBIS (Land Registry and Cadasre Information System)

- Duration 2000 – 2009
- Software development (completed)
- Pilot application in Ankara (completed)
- Application within all provincial (+county) directorates throughout Turkey (!?)
  - Land Registry Records (title registries) (completed)
    - 25 million land parcels
  - Cadastral Map Sheets (**incomplete** – basically due to **spatial data quality issues** with different types of map sheets produced with different surveying and mapping techniques, and also the **rigidity of TAKBIS spatial data model** )
    - 3.5 million land parcels only
- As a remedy for spatial inconsistencies, a **more flexible spatial information system MEKSIS** has emerged in 2009.

# Related Developments in Turkey

## TRGIS (Turkish National SDI)

- Within e-transformation Turkey project, it was previously (in 2004) **initiated** in the leadership of **the General Directorate of Land Registry and Cadastre**,
- As of 2011, development stage has been supervised by **the General Directorate of GIS**,
- In 2012, in close relation with INSPIRE (European SDI initiative), **conceptual modelling** stage (**geo-data specifications and exchange standards**) for **10 basic data themes** has been completed and published,

# TRGIS (Turkish National SDI)

## Basic Data Themes

- BI – Building
- AD – Address
- TK – Land Registry & Cadastre
- IB – Administrative Unit
- UL – Transportation
- HI – Hydrography
- AO – Land Cover
- OR – Ortho Photo
- TO – Topography
- JD – Geodesy&Surveying

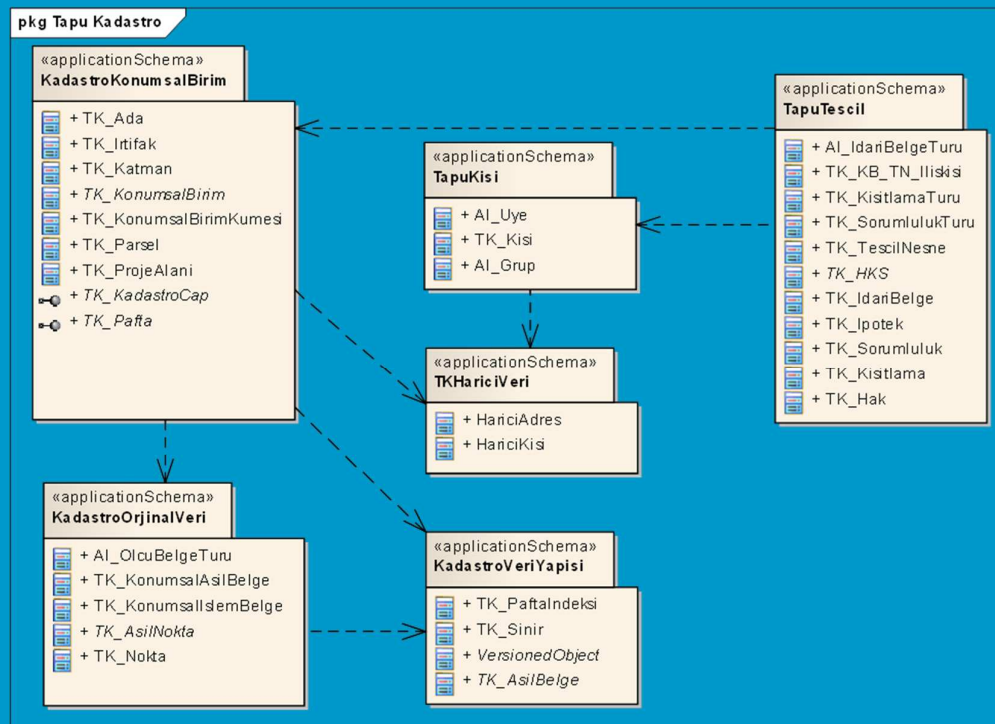
# TRGIS:TK – Land Registry and Cadastre Analysis Stage

- Existing Data Analysis
  - TAKBIS
  - MEKSIS
- International Standards Analysis
  - ISO 19152 LADM
  - INSPIRE cadastral parcel data theme
- Data Requirement Analysis (excluding TKGM – the basic producer)
  - Land Registry and Cadastre Data is produced or used by;
    - 10 Ministries,
    - 24 General Directorates,
    - 25 Departments and 77 sub-departments.
  - Related Mapping Applications
    - Existing ones (59)
    - Needed ones for the future (18)

# TRGIS:TK – Land Registry and Cadastre Relation with LADM

- Specialisation and extension of LADM, based on analysis stage
- Basic Packages and Classes are similar
  - Packages
    - KadastroKonumsalBirim – **SpatialUnit**
    - KadastroOrjinal Veri – **OriginalData**
    - KadastroVeriYapısı – **DataStructure**
    - TapuTescil – **RegisteredObject** (in Land Registry)
    - TapuKişi – **Party** (Person or Object)
    - HariciVeri – **ExternalData**
  - Classes
    - TK\_KonumsalBirim – **LA\_SpatialUnit**
    - TK\_Parcel – **LA\_Parcel**
    - TK\_KonumsalBirimKümesi – **LA\_SpatialUnitGroup**
    - TK\_Latman – **LA\_Layer**
    - ...

# TRGIS:TK – Land Registry and Cadastre Application Schema Overview (UML Packages)



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18 June

# TRGIS:TK – Land Registry and Cadastre Specialisations or extensions to LADM

- Irtifak (konumsal) – Easement (spatial)
- Parsel Turu – Cadastral Parcel Type
- Ada – Cadastral Island
- Proje Alani – Cadastral Project Region
- Proje Turu – Cadastral Project Type
- Kadastro Cap – Cadastral Map Excerpt for a single cadastral parcel
- Pafta – Cadastral Map Sheet (subdivided maps by spatial indexes)
- Pafta Indeksi – Spatial Map Index
- Nokta Turu – Point Type
- Detay Isaret Turu – Point Manumentation Type

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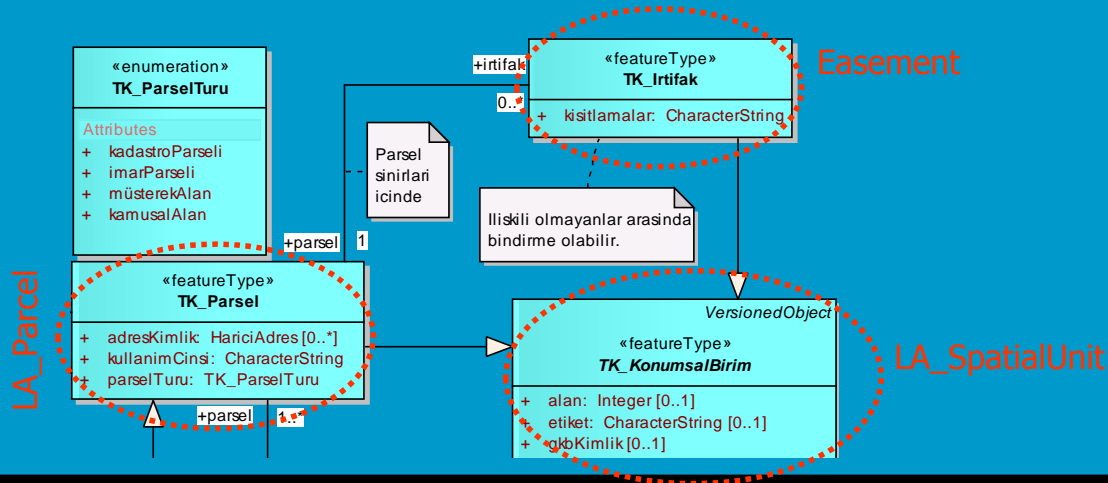
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# Specialisations or extensions to LADM

## Irtifak – Easement (spatial)

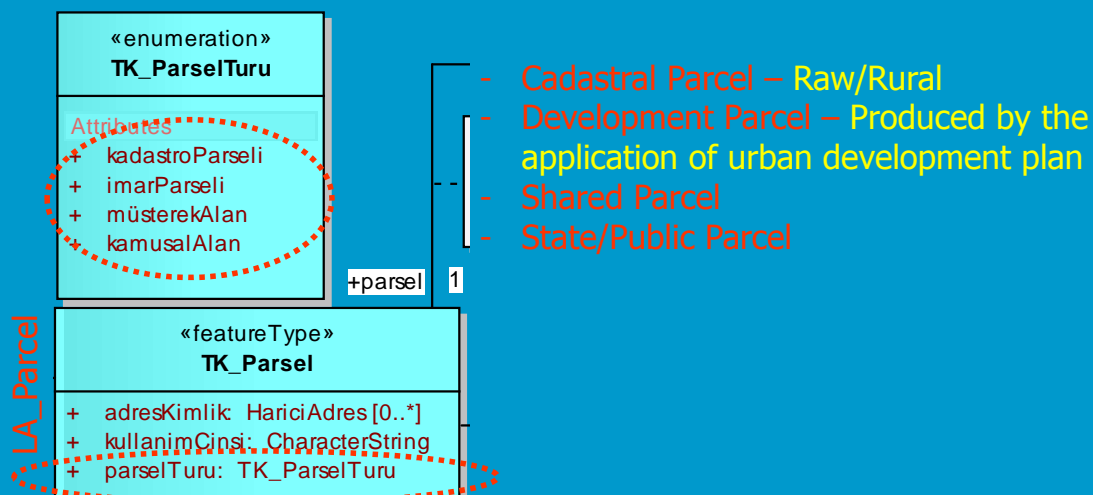
- A corridor in a cadastral land parcel or covering the whole parcel
- A specialisation of LA\_SpatialUnit in relation with related cadastral parcel
- Commonly used for the identification of state rights through linear engineering structures (e.g. major power lines, underground pipelines)



# Specialisations or extensions to LADM

## Parsel Turu – Cadastral Parcel Type

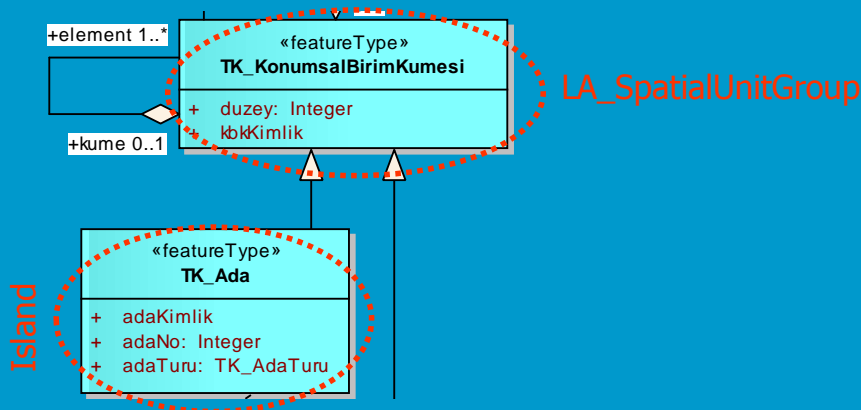
- Data type of parcel type attribute of LA\_Parcel class
- Four basic parcel types in Turkey



# Specialisations or extensions to LADM

## Ada – Cadastral Island

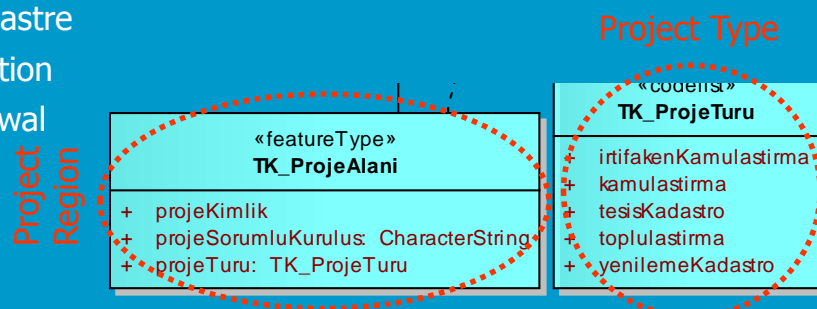
- A group of spatially adjacent cadastral parcels
- As a specialisation of LA\_SpatialUnitGroup



# Specialisations or extensions to LADM

## Proje Alani – Cadastral Project Region & Proje Turu – Cadastral Project Type

- A group of cadastral parcels involved in the same cadastral project
- Similar to island concept, it is designed as a specialisation of LA\_SpatialUnitGroup
- **Cadastral Project Types** (extensible): Data type of the project type (projeTuru) attribute of project region class
  - Easement Expropriation
  - Expropriation
  - Initial/First Cadastre
  - Land Consolidation
  - Cadastral Renewal
  - ...



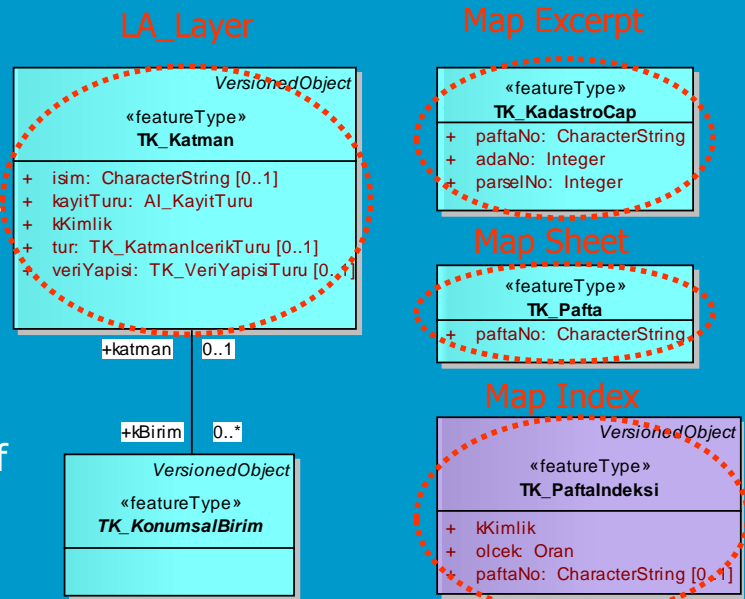
# Specialisations or extensions to LADM

## Kadastro Cap – Cadastral Map Excerpt

## Pafta – Cadastral Map Sheet

## Pafta Indeksi – Spatial Map Index

- Only **Spatial relation** with LA\_Layer (may be represented by **dependency** relation)
- Cadastral **Map Excerpt** for a single cadastral parcel
- Cadastral **Map Sheets** as spatially indexed excerpts
- **Spatial Map Index** as subdivision and naming of mapping space in a standardised way

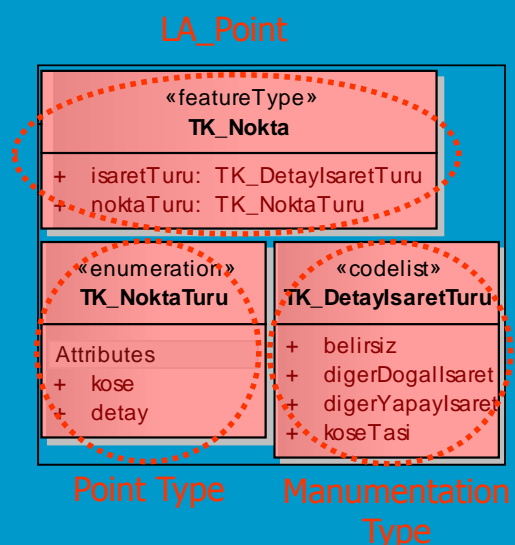


# Specialisations or extensions to LADM

## Inokta Turu – Point Type

## Detay Isaret Turu – Point Manumentatin Type

- As **data types** of the two basic attributes of LA\_Point class
- Two basic types of points:
  - Parcel boundary **corner points**
  - Other surveying&mapping **points inside cadastral parcel**
- Four basic types of Manumentation:
  - No manumentation (for ponints inside cadastral parcels)
  - Corner Stone
  - Other (Natural, e.g. topography features)
  - Other (Man Made, e.g. road intersection, fences, walls)



## Discussion / Conclusion

- LADM is a **good template** for further model development to meet national needs.
- It is not a LADM country profile. Extensions/specialisations are only for **TRGIS stakeholders who only uses cadastral data**.
- The majority of extensions/specialisations are **specific to Turkey**.
- The concepts of **Spatial Easement** and **Cadastral Island** may be considered as **international contributions**.



Thanks...