Experiences for Building Turkey National GIS Compliant to INSPIRE

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Presenter

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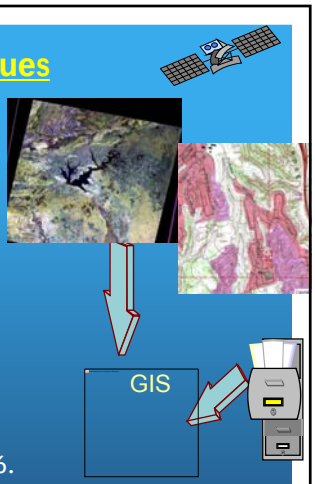
INSPIRE Conference 2014

INTRODUCTION Data Management Issues



- After 1990s, digital map production
- The General Command of Mapping produced STMs, 1:5000 and smaller.
- Land Registry & Cadastre Directorate (LRCD), Provincial Bank, and Municipalities produce large scaled maps, 1:5000 and larger…
- Large Scaled Map Production Regulation (BÖHHBUY) enclosed with feature / attribute catalog + UVDF in 2006.
- !! Geo information standards are not designed to solve application-driven requirements for various GIS projects and not designed to enable data interoperability.

National GIS projects

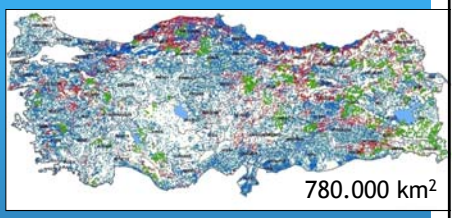
• Land Registry and Cadastre Directorates with 22 of Regional, 1018 of Land Registry, 325 of Cadastre Dir., 122 of Cadastre Office

• TAKBIS- Land Reg. & Cadastre Inf. Syst., aims to manage cadastral data for 5 million land registry processes on GIS.

• CORS-TR- Continuously Operating Reference Stations –Turkey

• %20 of 2950 municipalities declared UrbanGIS projects....

• ...



CORS_TR Stations .147

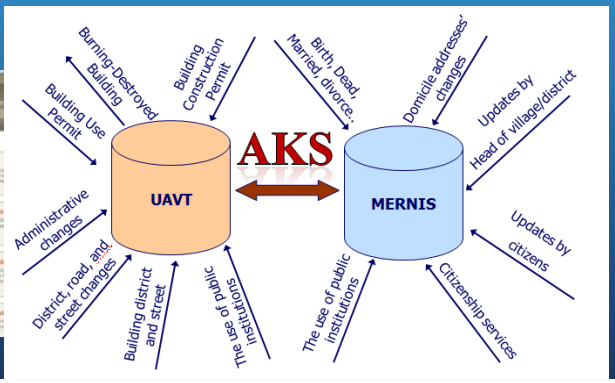
• ! Other public institutions and municipalities have produced GIS projects serving their needs.

National GIS projects

Spatial Address Registration System (MAKS) in 2011 by Interior Ministry-Gen.Dir. Of Population and Citizenship

National Address Database (UAVT) in 2006, "Numbering and Address Database Regulation" ...

Central Population Management System (MERNIS) Unique citizenship ID after 2000.



National GIS projects

- Forestry, Water GIS, Protected Sites, Land Cover, … projects by Ministry of Forestry and Water

- Geo-data Portal

TRGIS for e-transformation Turkey Project

• Geographic information requirement and data sharing needs started to increase…

• TRGIS- Building Turkey National GIS actions similar to NSDI vision.

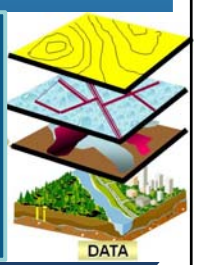
• Action-47 in 2004, current situation to build TRGIS was examined.

• Action-36 in 2005, TRGIS strategy as policy encouragement was determined with a coordination body.

under responsibility of LRCD

• KYM-75 in 2007 aims to build a geo-portal where public institutions can present their geo-information. …

? Policy encouragement
? Data standard
? Technical requirements



TRGIS with General Dir. of GIS

- Ministry of Environment And Urbanization, General Dir. of GIS was built in 2011.

- coordinating all GIS activities
- determining standards and building TRGIS
- ...

T.C.
ÇEVRE VE ŞEHİRCİLİK
BAKANLIĞI

TRGIS and **UrbanGIS** projects in 2011

- TRGIS project: for 65 general directorates

- defining national geo-data standards
- geo-portal development analysis
- determining institutional and policy requirements

- UrbanGIS project: for 2950 municipalities + 81 provincial Admin.

- determining UrbanGIS geo-data standards
- current situation analysis for UrbanGIS
- Determining legal and financial requirements

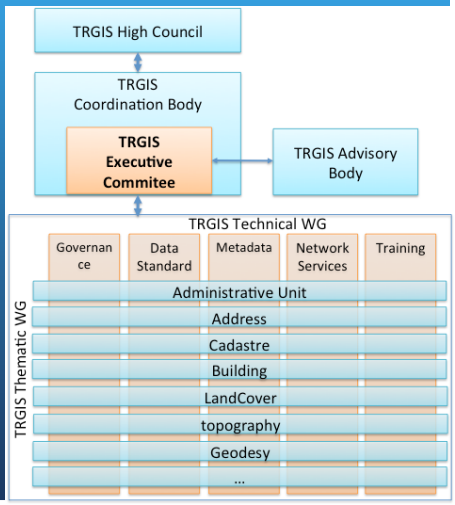
TRGIS Institutional Framework

- Draft TRGIS Legistation, similar to INSPIRE directive, prepared in 2012

- TRGIS administration structure was defined.
- TRGIS vision, strategy, and other regulation needs were determined.
- UrbanGIS building directive for local governments

- No.3194 Zoning Law authorizes Gen.Dir. of GIS for TRGIS regulations.
- However not put into practice yet.

- Legislative conflict with BHIKPK council for interministrial coordination



TRGIS and UrbanGIS Cooperation

Data requirement and institutional analysis

FieldWork

Updating Shareholders List

Getting Contact Informations / Prepearing of **Formal Letter**

First Visits and Starting Surveys

Second Visit For Control and Receive Back.

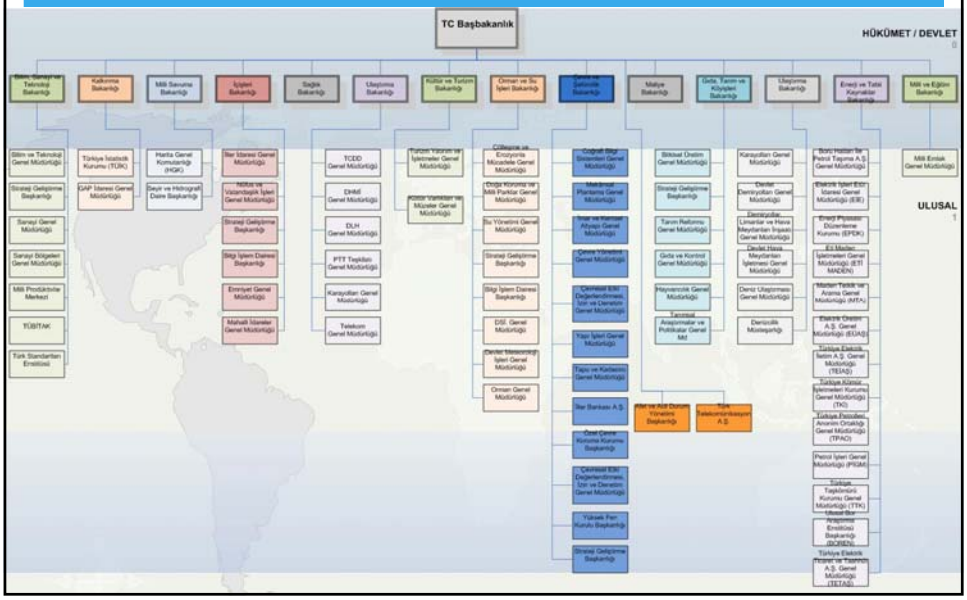
Revisits For Problem Situation

Via Telephone and E-mail Support/ Communication

Evaluation and Analysis Works

Workshop

TRGIS Cooperation



TRGIS and UrbanGIS Cooperation

Data requirement and institutional analysis

AT NATIONAL level (TRGIS);

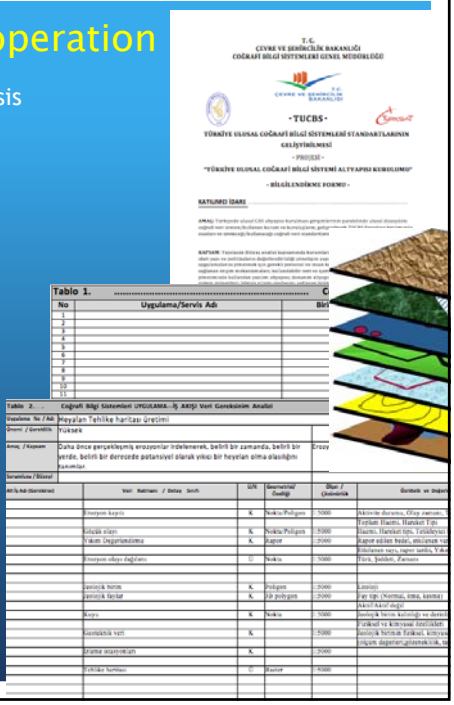
In 15 ministries;
- 86 General Directories,
- 88 Head of Deparments,
- 118 Branchs,
- 366 People (Fieldwork +Workshop)

- 254 Map/Application/Product analysis

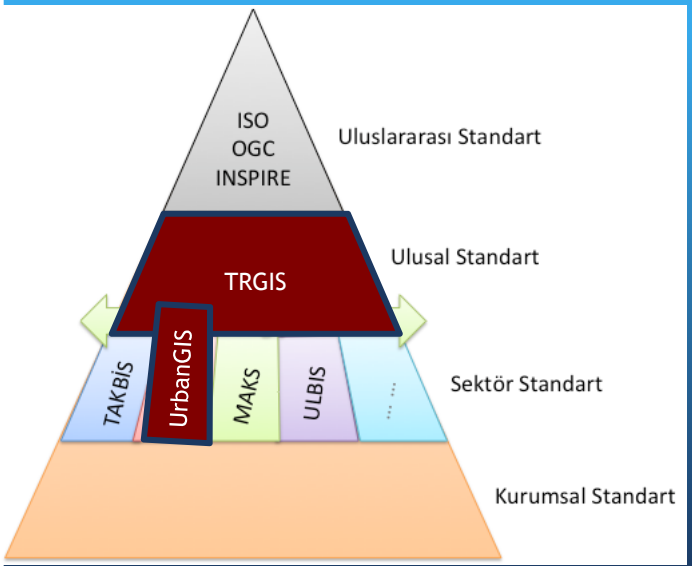
AT LOCAL level (UrbanGIS);

- the best UrbanGIS practices- 16 local Governments analysis
- 210 out of 2950 municipalities

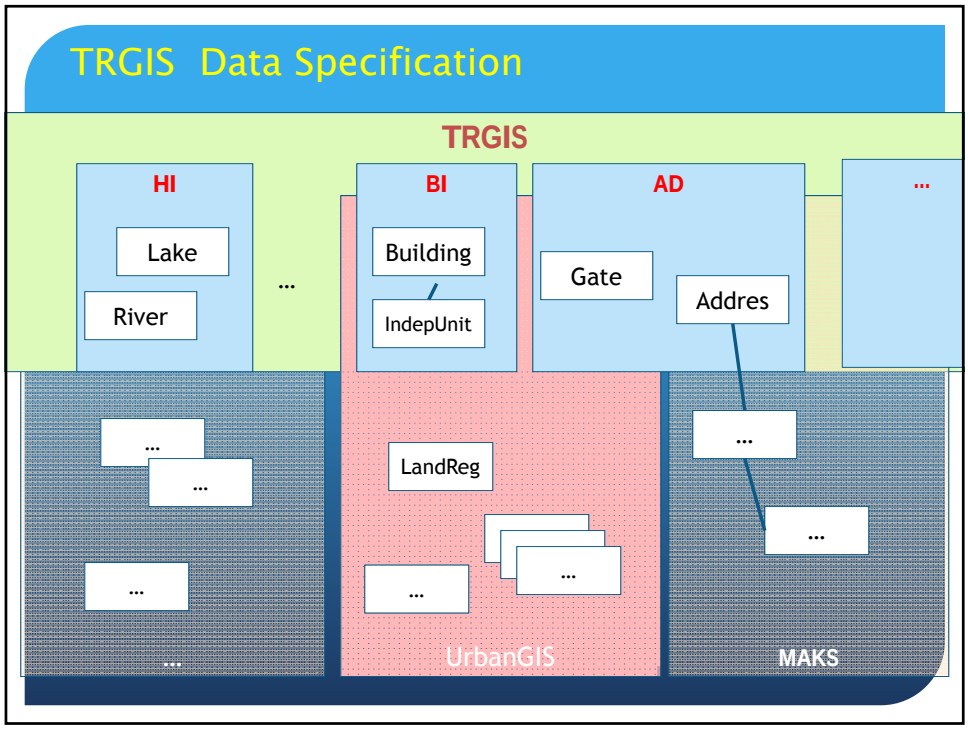
- 71 Map/Application/Product analysis

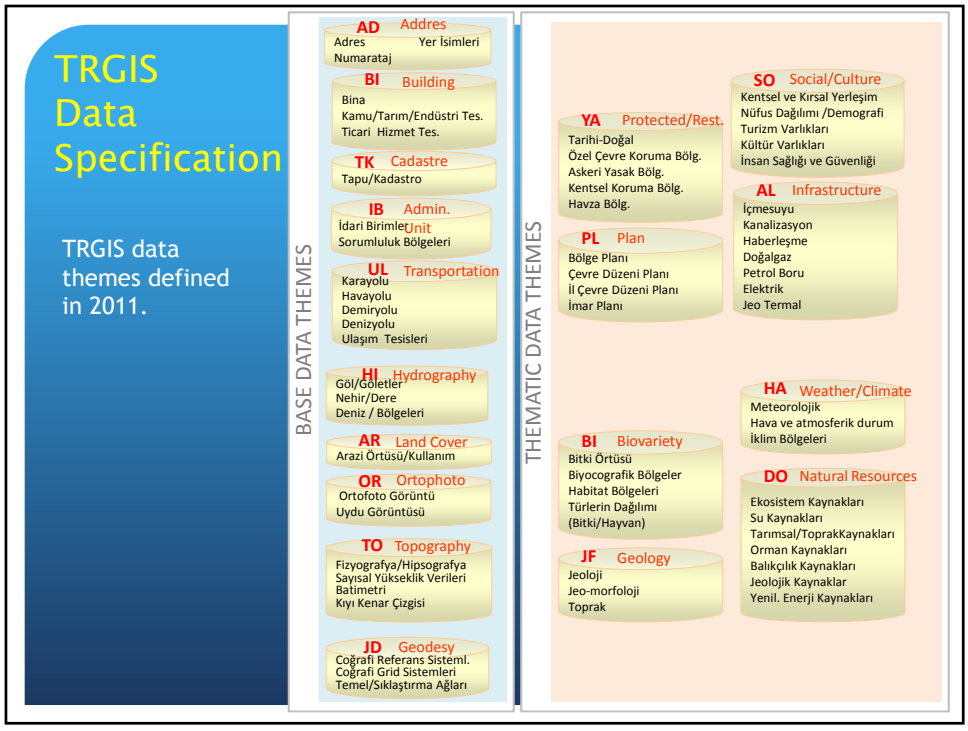


TRGIS Data Specification



- base geo-data model,
- different users/sectors need to share these data


TRGIS Data Specification
TRGIS
HI
BI
AD
...
Lake
River
Building
IndepUnit
Gate
Addres
LandReg
UrbanGIS
MAKS

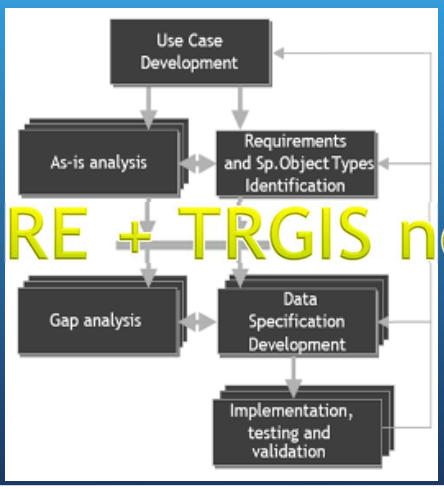

TRGIS Data Specification
TRGIS data themes defined in 2011.
BASE DATA THEMES
AD Addres
Adres
Yer İsimleri
Numarataj
BI Building
Bina
Kamu/Tarım/Endüstri Tes.
Ticari Hizmet Tes.
TK Cadastre
Tapu/Kadastro
IB Admin. Unit
İdari Birimler
Sorumluluk Bölgeleri
UL Transportation
Karayolu
Havayolu
Demiryolu
Denizyolu
Ulaşım Tesisleri
HI Hydrography
Göl/Göletler
Nehir/Dere
Deniz / Bölgeleri
AR Land Cover
Arazi Örtüsü/Kullanım
OR Ortophoto
Ortofoto Görüntü
Uydu Görüntüsü
TO Topography
Fizyografya/Hipsografya
Sayısal Yükseklik Verileri
Batimetri
Kıyı Kenar Çizgisi
JD Geodesy
Coğrafi Referans Sistemi.
Coğrafi Grid Sistemleri
Temel/Sıklaştırma Ağları
THEMATIC DATA THEMES
YA Protected/Rest.
Tarihi-Doğal
Özel Çevre Koruma Bölg.
Askeri Yasak Bölg.
Kentsel Koruma Bölg.
Havza Bölg.
PL Plan
Bölge Planı
Çevre Düzeni Planı
İl Çevre Düzeni Planı
İmar Planı
BI Biovariety
Bitki Örtüsü
Biyocografik Bölgeler
Habitat Bölgeleri
Türlerin Dağılımı
(Bitki/Hayvan)
JF Geology
Jeoloji
Jeo-morfoloji
Toprak
SO Social/Culture
Kentsel ve Kırsal Yerleşim
Nüfus Dağılımı /Demografi
Turizm Varlıkları
Kültür Varlıkları
İnsan Sağlığı ve Güvenliği
AL Infrastructure
İçmesuyu
Kanalizasyon
Haberleşme
Doğalgaz
Petrol Boru
Elektrik
Jeo Termal
HA Weather/Climate
Meteorolojik
Hava ve atmosferik durum
İklim Bölgeleri
DO Natural Resources
Ekosistem Kaynakları
Su Kaynakları
Tarımsal/ToprakKaynakları
Orman Kaynakları
Balıkçılık Kaynakları
Jeolojik Kaynaklar
Yenil. Enerji Kaynakları

TRGIS Data Specification

INSPIRE Methodology for spec. development

In Turkey, current data standards; TABİS, BÖHHBÜY, ...

TRGIS and UrbanGIS Data Requirement Analysis

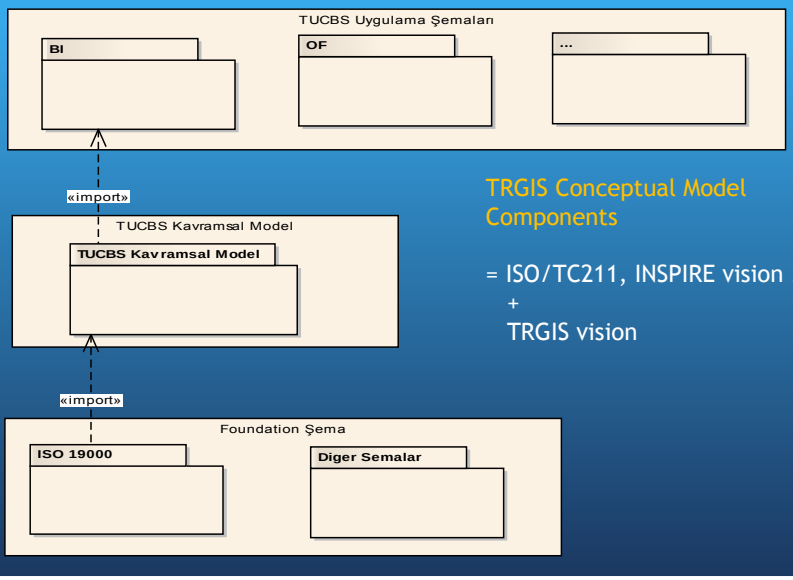


INSPIRE + TRGIS needs

International std.; INSPIRE themes Eurogeographics, ...

For TRGIS themes; AD, BI, TK, ID, UL, HI, AR, OR, TO, JD data models developed.

TRGIS Data Specification

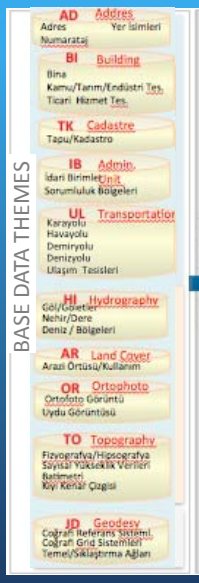


TRGIS Conceptual Model Components

= ISO/TC211, INSPIRE vision ...
+
TRGIS vision

TRGIS Data Specification

Conceptual Model Components
for
- development of data standards and
- interoperability of geo-data sets



TRGIS Conceptual Model Components

- Principles,
- Reference model,
- Scale/Resolution
- Generalization,
- General Feature Model,
- Feature Cataloguing,
- Application Schema Rules,
- Geometry,
- Topology
- Geo-data identification
- Temporal data management
- metadata
- Data quality and sharing principles

…

TRGIS Data Specification

TRGIS Conceptual Model Components
Object Identifier

Each geo- object has unique / mandatory TRGISNo attributes.

- Identify by Thematic Structure of Data

AdminUnit Code (IDBK)	IB	Aksular Köyü	**TR9011205012**
Numbering Code(NUKO)	AD	Aksular Köyü A Sok. (T.N.:32) No:14	**TR9011205012**A032/014
LandOwnership Code(MUKO)	MB	Aksular Köyü 150 Ada 9 parsel	**TR9011205012**M150/009
…			

- Identify by Data Provider

{TR.BBBBBB.CC.DDDDDDDD}

identifier of Data Provider	Thematic group of data	Identifier in data providers own database

- UUID / GUID: Universal Unique Identifier (ISO 11156)

{6a54f172-6483-11dc-8314-0800200c9a66}

A.C. AYDINOGLU, SDI Days 2012- 8th Cartography and Geoinformation Conference, 28 September 2012, Zagrep

TRGIS Data Specification

TRGIS Conceptual Model Components
Metadata;

Identifies information about geographical data sets/services

(1) Geographic data services

(2) Geographic datasets

(3) Feature (Object Identifier, Version)

In scope of TRGIS-Metadata,
39 metadata elements defined, 23 of which is mandatory

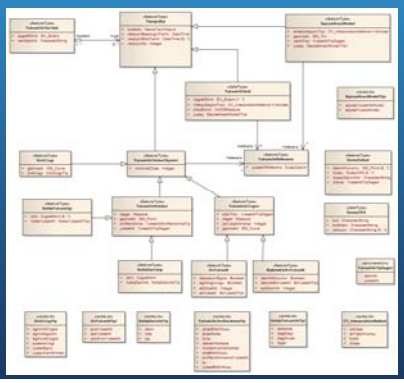
(1) Data Identity
(2) Classification
(3) Keyword
(4) Geographical Position
(5) Data Standard and Reference Informations
(6) Lineage
(7) Geographic Data Quality and Validity
(8) Data Right of Usage/ Distribution
(9) Metadata Reference Informations

TRGIS Data Specification

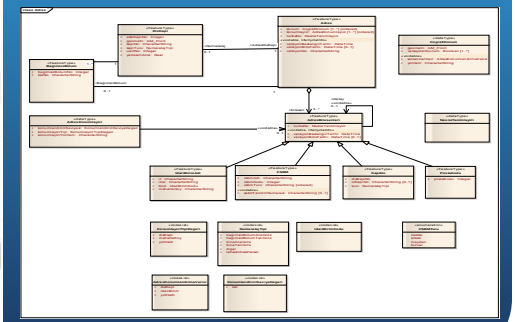
UML data models for TRGIS (10 base geo-data themes and UrbanGIS)

- considering ISO/TC 211 and INSPIRE standards,
- compatible with TRGIS expectations and
- including TRGIS data requirement analyses

TRGIS.TO Topography UML Data Model

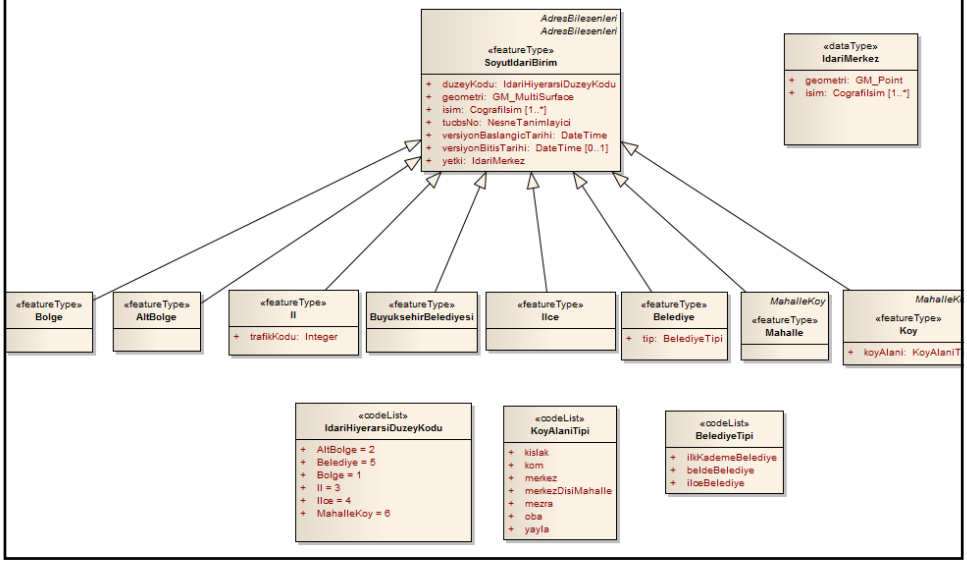


TRGIS.AD Address UML Data Model



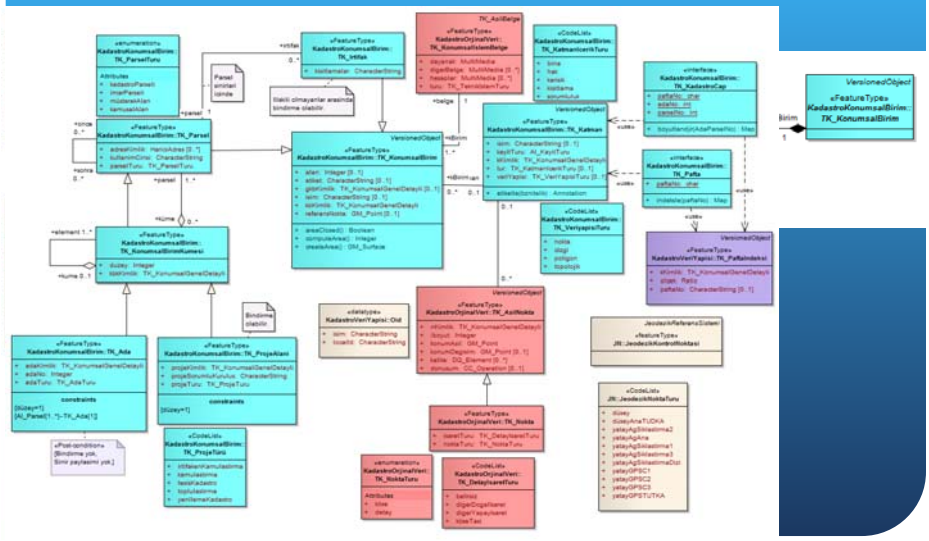
TRGIS.IB Administrative Unit Data Theme

Depending on administrative hierarchy, administrative and institutional units



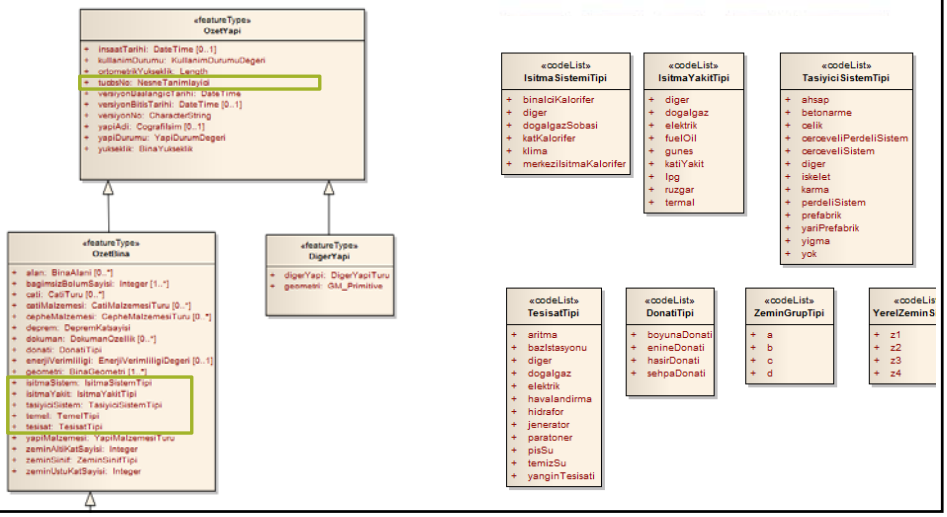
TRGIS.TK Land Registry & Cadastre Data Theme

Including INSPIRE Cadastre classes + based on LADM + TRGIS requirements



TRGIS.BI Building Data Theme

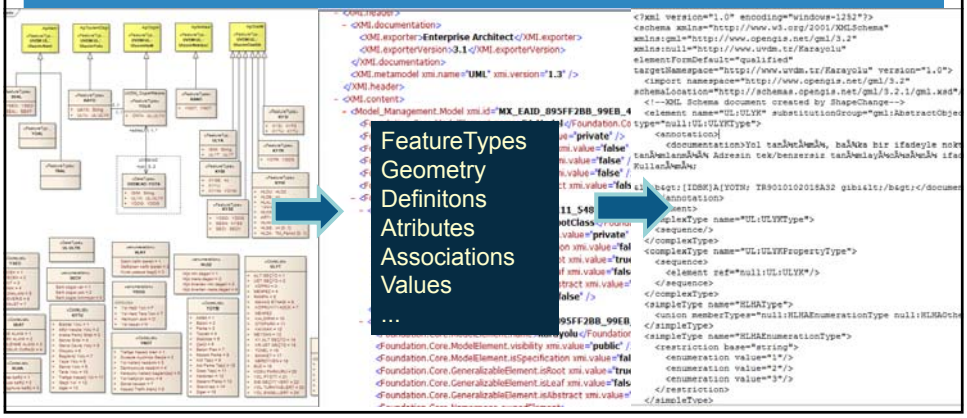
INSPIRE Building theme concept + TRGIS data requirements



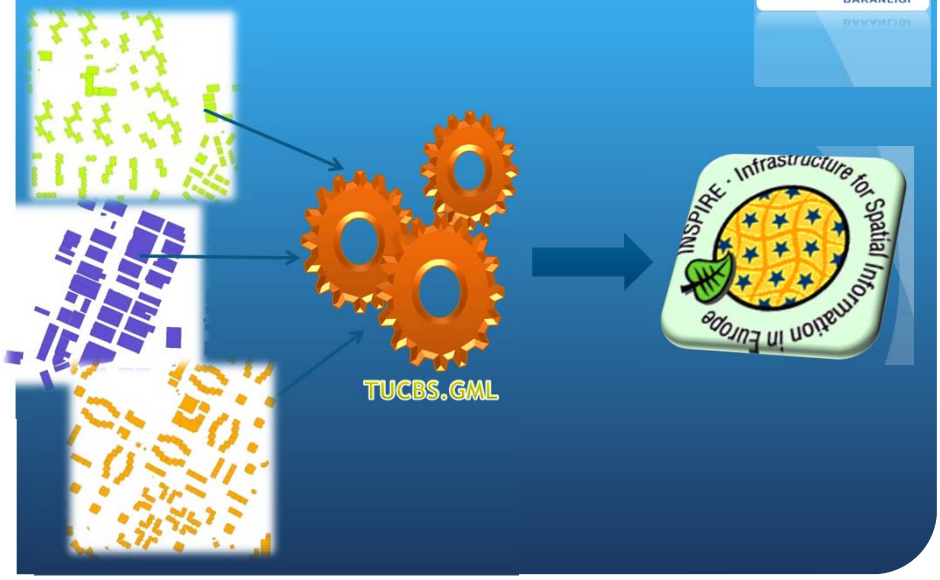
TRGIS Data Specification

TRGIS.GML ;
- software/hardware independent open access supplier,
- compatible with GML3.X data transformation format should produce.

UML XMI XSD schema

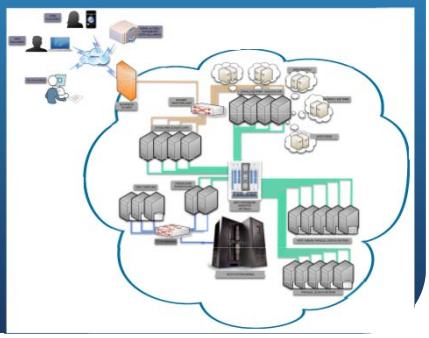


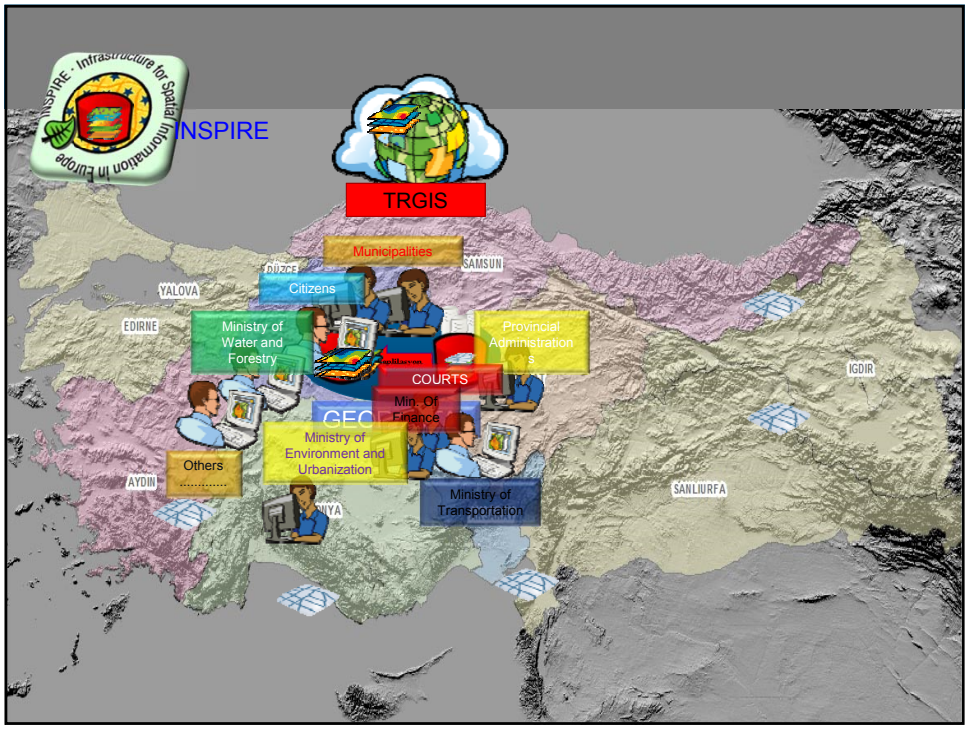
TRGIS Data Specification



TRGIS Portal

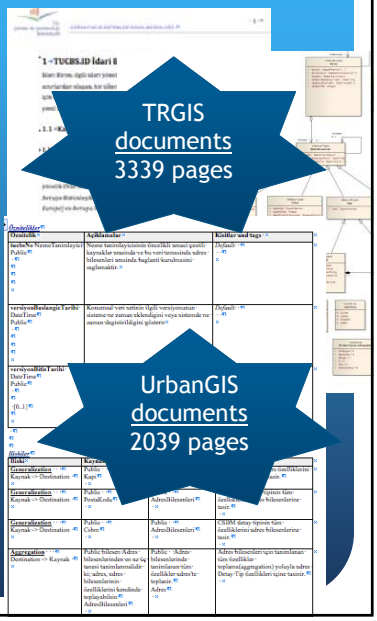
- TRGIS Portal was built and tested.
- ! TRGIS metadata and validation process.
- Cloud TRGIS opportunities depending on technology criterias on research





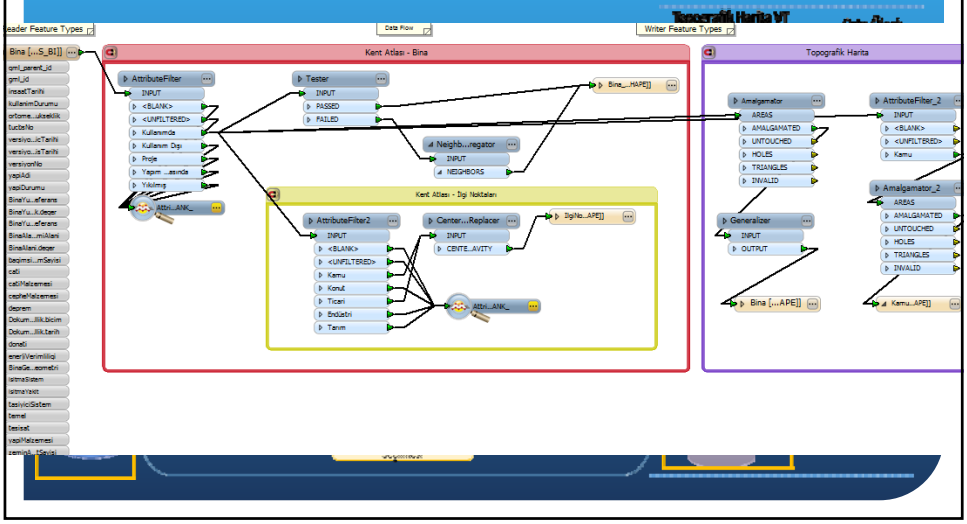
TRGIS and UrbanGIS Documentation

- TRGIS Conceptual Model Components
- TRGIS/UrbanGIS Base Data Themes Identifier
- TRGIS/UrbanGIS Base Data Themes Requirement Analysis
- TRGIS Metadata Policy and Essentials Determination
- TRGIS/UrbanGIS Data Themes Application Schemes, Feature Catal., and GML
- TRGIS/UrbanGIS Legal Requirements Analysis
- TRGIS Portal Implementation Rules
- TRGIS Strategy of Dissemination and Training
- TRGIS/UrbanGIS Poster and Flyers
- TRGIS/UrbanGIS Introduction Slides

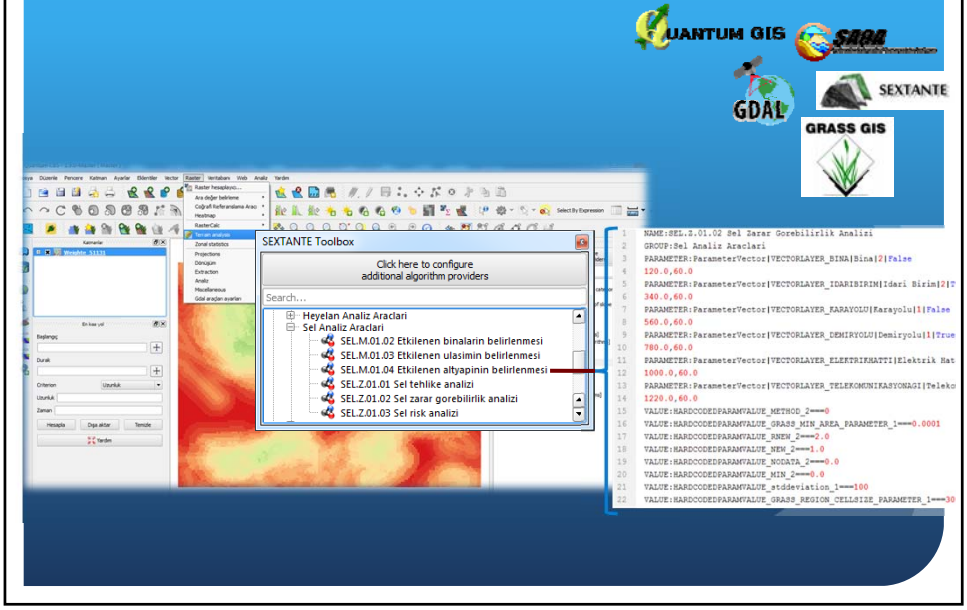


Case Study: ... → TUCBS.GML → app.database

Building



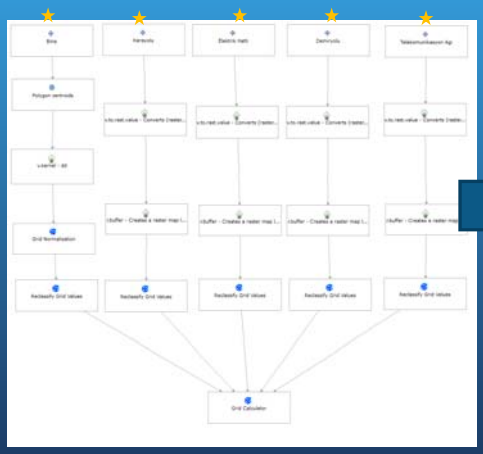
Case Study: Disaster Management with TUCBS



Case Study: Disaster Management with TUCBS

SEL.Z.01.02 Landslide Vulnerability Map

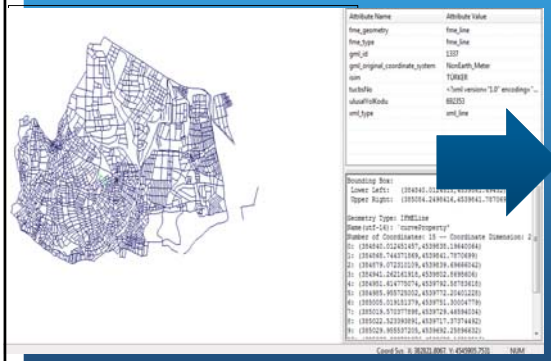
★ GML Girdi verisi

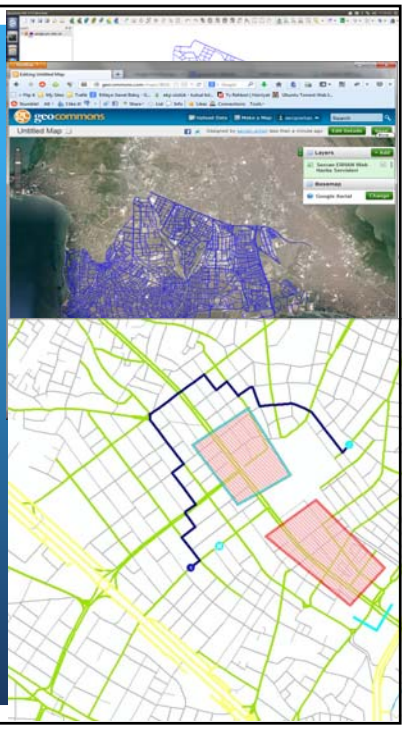


Case Study: TUCBS Transportation

TUCBS Trans. UML

Ulasim.GML





CONCLUSION

- Changes in bureaucracy constantly hamper the sustainability of TRGIS progress.
- TRGIS and INSPIRE require process-based approach in the long term instead of product-based approach in short term.
- TRGIS regulation and instutional framework put into practice a.s.a.p.
- For data specifications until 2015;
  - "TRGIS base data themes" should be put into practice after plot study.
  - TRGIS thematic data themes" should be designed.
- TRGIS portal service tests and metadata validation in progress !!
- Data quality is not at required level. Investment and requirements should be optimized for geo-data production and sharing…

CONCLUSION

According to the result of our fieldwork and meetings in Turkey;

- Public institutions, academicians, and private sectors in GIS industry have deficiencies about SDI vision, understanding ISO/TC211 standards, INSPIRE and TRGIS geo-data specifications.
- Problems for managing open geo-data !
  UML: object-relational ; GML: hierarchical ; GIS software: relational …
- GIS workers are used to develop applications with traditional approaches that they learned from commercial GIS software.
- Capacity building and SDI education activities should be arranged for all TUCBS stakeholders.
- Strategy should be developed for public awareness
- …


Thanks...
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T.C.
ÇEVRE VE ŞEHİRCİLİK
BAKANLIĞI
GYTE