GOBIERNO DE ESPAÑA

MINISTERIO DE FOMENTO

CartoCiudad

CartoCiudad: A National road-street network map provided by INSPIRE compliant web services

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- ✓ What is CartoCiudad?
- ✓ CartoCiudad data vs INSPIRE themes
- ✓ Free access data via Web Services
- ✓ New CartoCiudad visualizer and website tools
- ✓ Conclusions

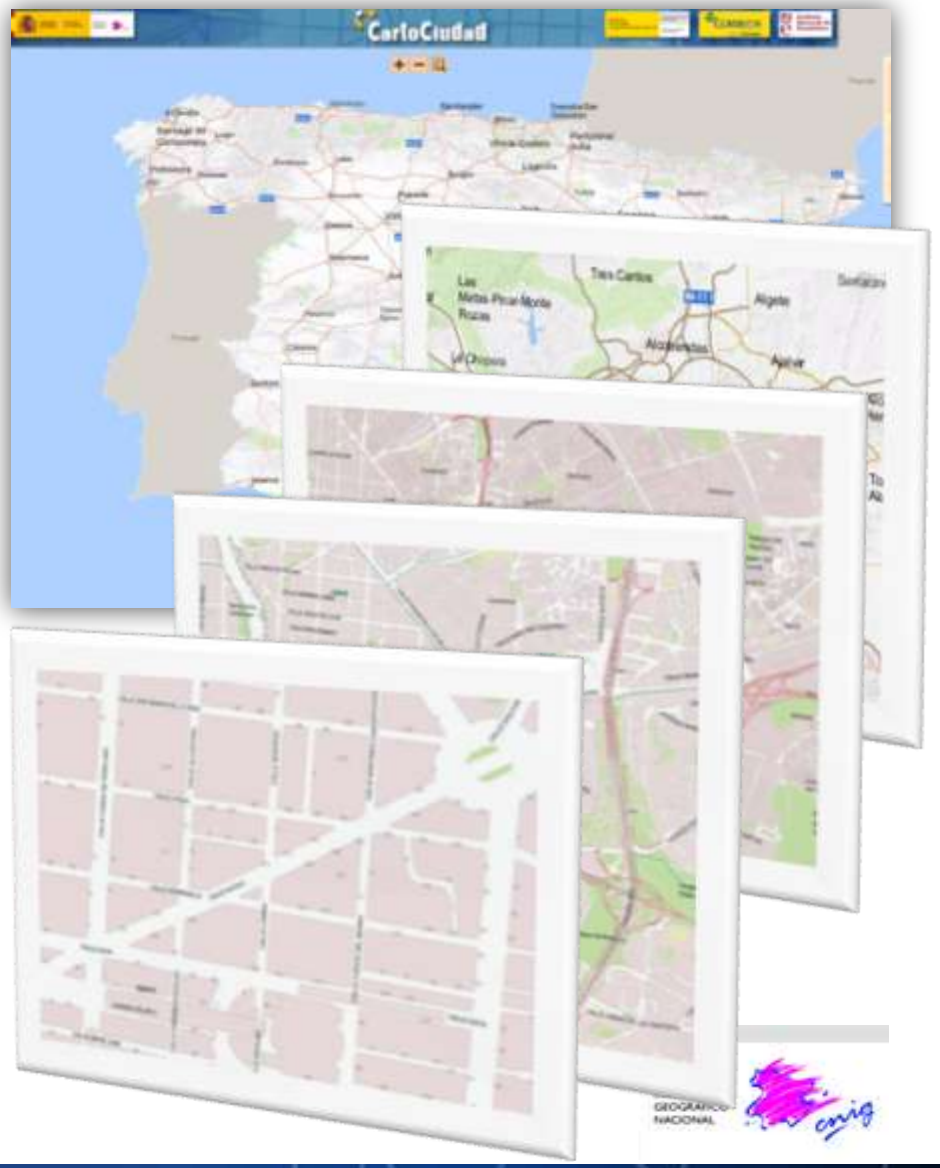
What is CartoCiudad?

What is CartoCiudad?

CARTOCIUDAD:

- ✓ Seamless roads network cartography all over Spain
- ✓ Connected with the street maps of all the cities and villages
- ✓ With topology to enable navigation and geoprocessing operations
- ✓ Other datasets: building numbers, kilometer points, toponyms, post codes, wards
- ✓ Information provided by official geographic information agencies
- ✓ Data accessible by Internet through standard web services: WMS, WFS, WPS and the Geoportal:

http://www.cartociudad.es



What is CartoCiudad?

Official data provided by the main public departments at the state-level:

- ✓ Cadastre
- ✓ Statistical Office
- ✓ Post Office
- ✓ National Geographic Institute

What is CartoCiudad?

Collaboration in the project

also from regional-level

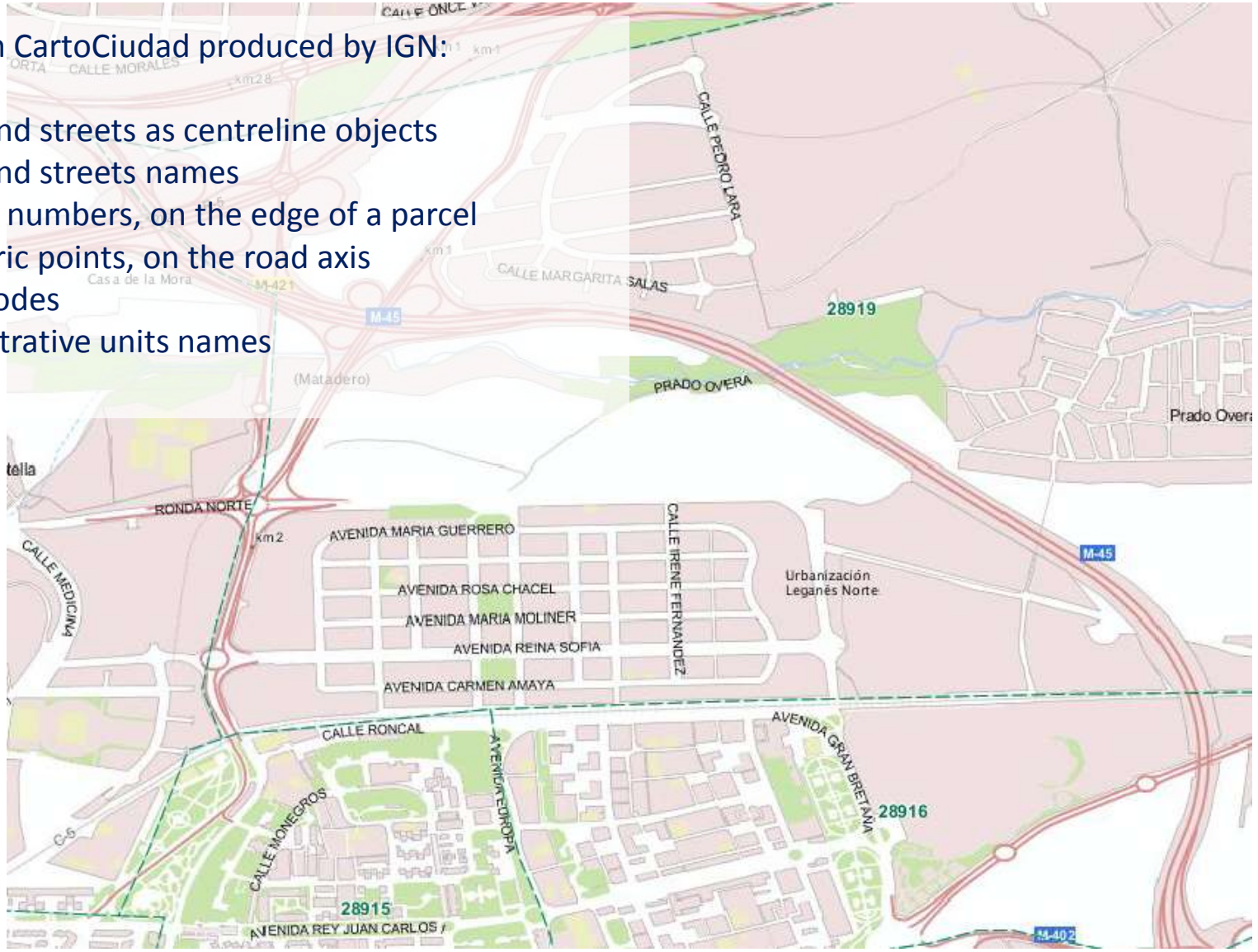
administration

INSPIRE compliant CartoCiudad data

INSPIRE compliant CartoCiudad data

Features in CartoCiudad produced by IGN:

- ✓ Roads and streets as centreline objects
- ✓ Roads and streets names
- ✓ Building numbers, on the edge of a parcel
- ✓ Kilometric points, on the road axis
- ✓ Postal codes
- ✓ Administrative units names



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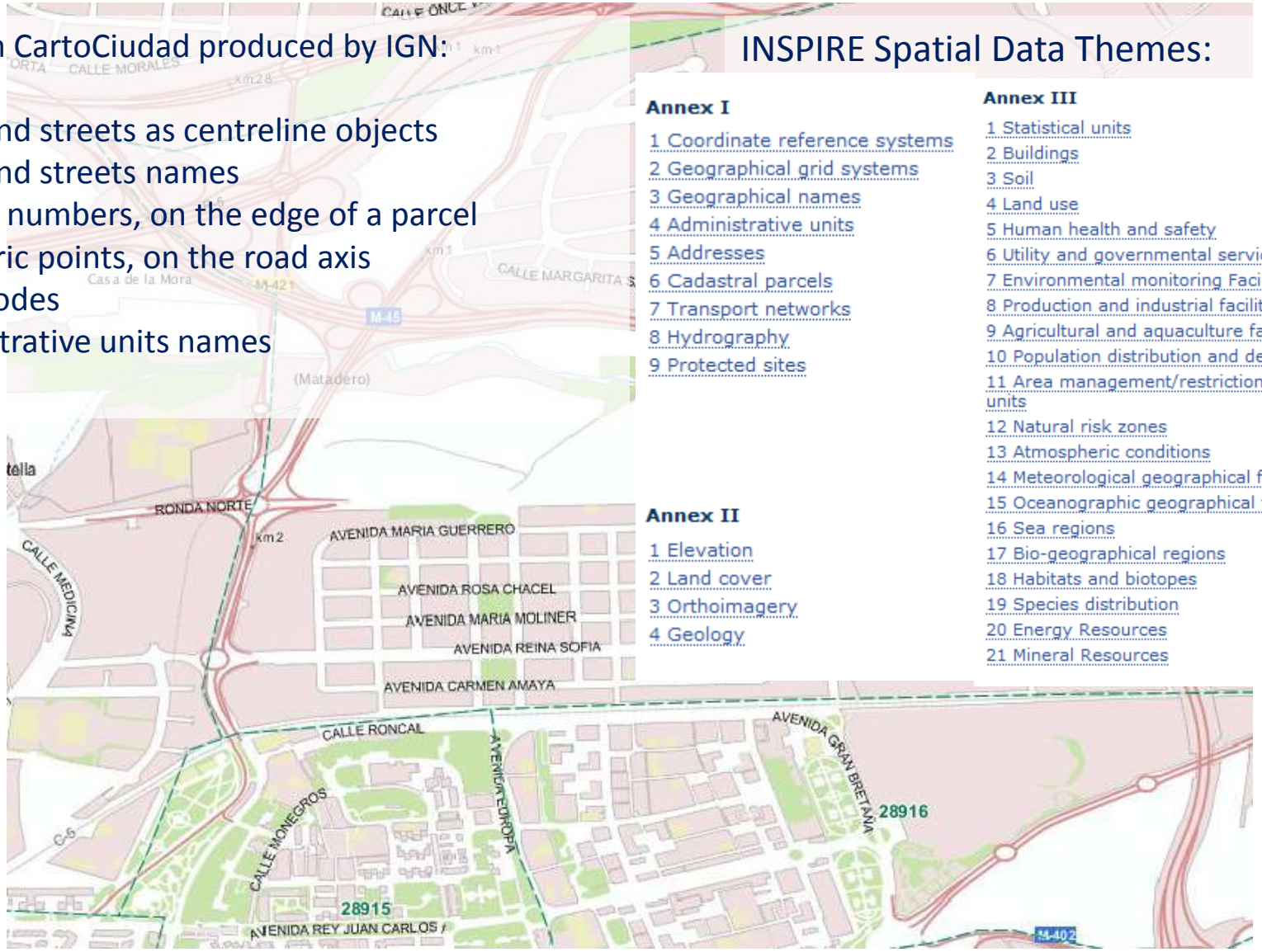

INSPIRE Spatial Data Themes:

Annex I

1 Coordinate reference systems
2 Geographical grid systems
3 Geographical names
4 Administrative units
5 Addresses
6 Cadastral parcels
7 Transport networks
8 Hydrography
9 Protected sites

Annex II

1 Elevation
2 Land cover
3 Orthoimagery
4 Geology

Annex III

1 Statistical units
2 Buildings
3 Soil
4 Land use
5 Human health and safety
6 Utility and governmental services
7 Environmental monitoring Facilities
8 Production and industrial facilities
9 Agricultural and aquaculture facilities
10 Population distribution and demography
11 Area management/restriction/regulation zones & reporting units
12 Natural risk zones
13 Atmospheric conditions
14 Meteorological geographical features
15 Oceanographic geographical features
16 Sea regions
17 Bio-geographical regions
18 Habitats and biotopes
19 Species distribution
20 Energy Resources
21 Mineral Resources

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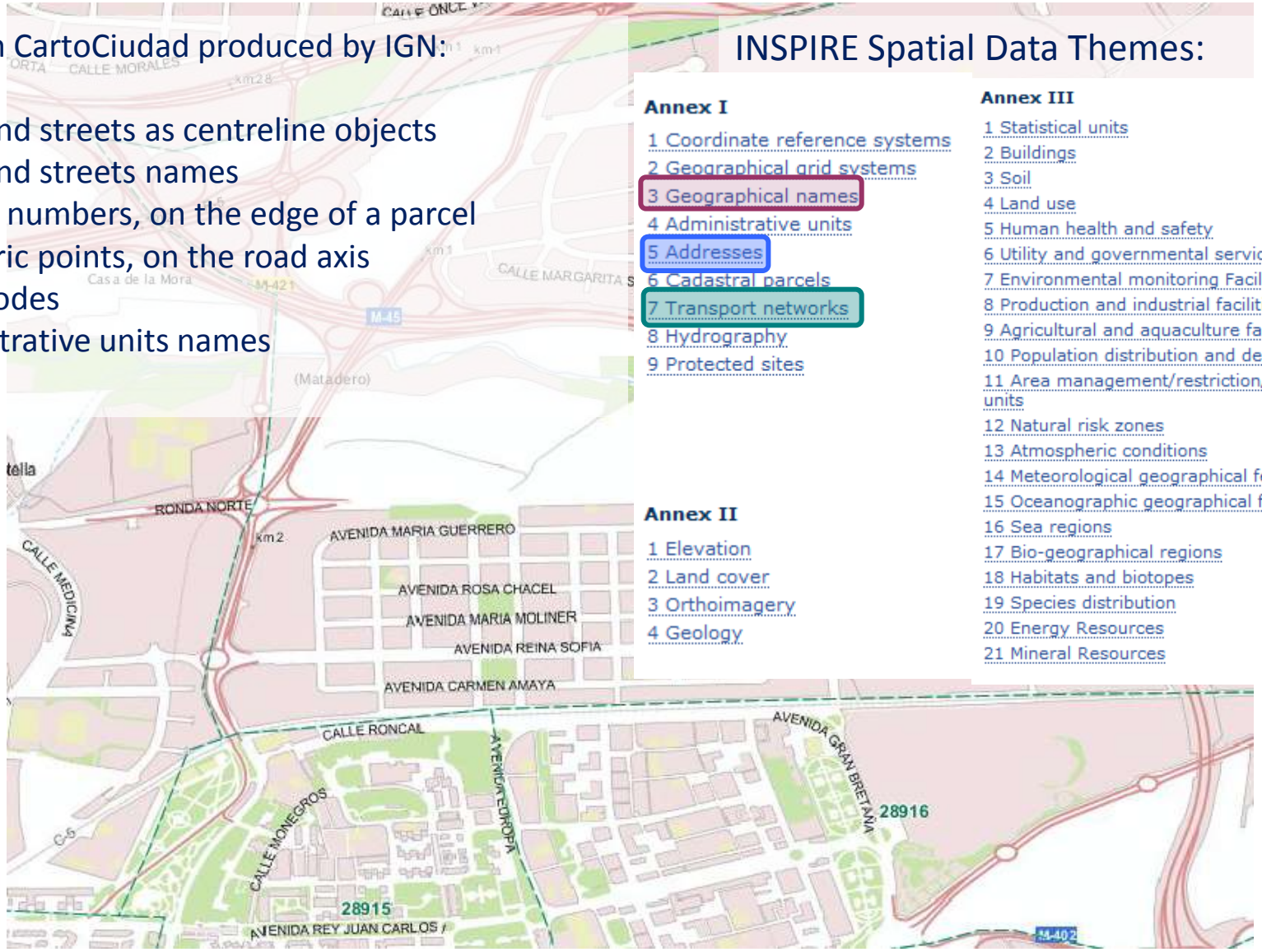

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INSPIRE compliant CartoCiudad data: **Addresses**

ADDRESSES THEME:

Mapping CartoCiudad and INSPIRE data models:

Features:

- Building numbers as *LocatorDesignator*
- Road and street names as *ThoroughfareName* (GeographicalName)
- Post codes as *PostalDescriptor*
- Administrative unit names as *AdminUnitName* (GeographicalName)

Relationships:

- withinScopeOf: between *LocatorDesignator* and *AddressLocator*
- component: between *Address* and *AdminUnitName, PostalDescriptor y ThoroughfareName.*
- situatedWithin:
  - for hierarchical relationship among Administrative Units (names)
  - between the rest of address components (*PostalDescriptor,* and *ThoroughfareName* and *AdminUnitName*.

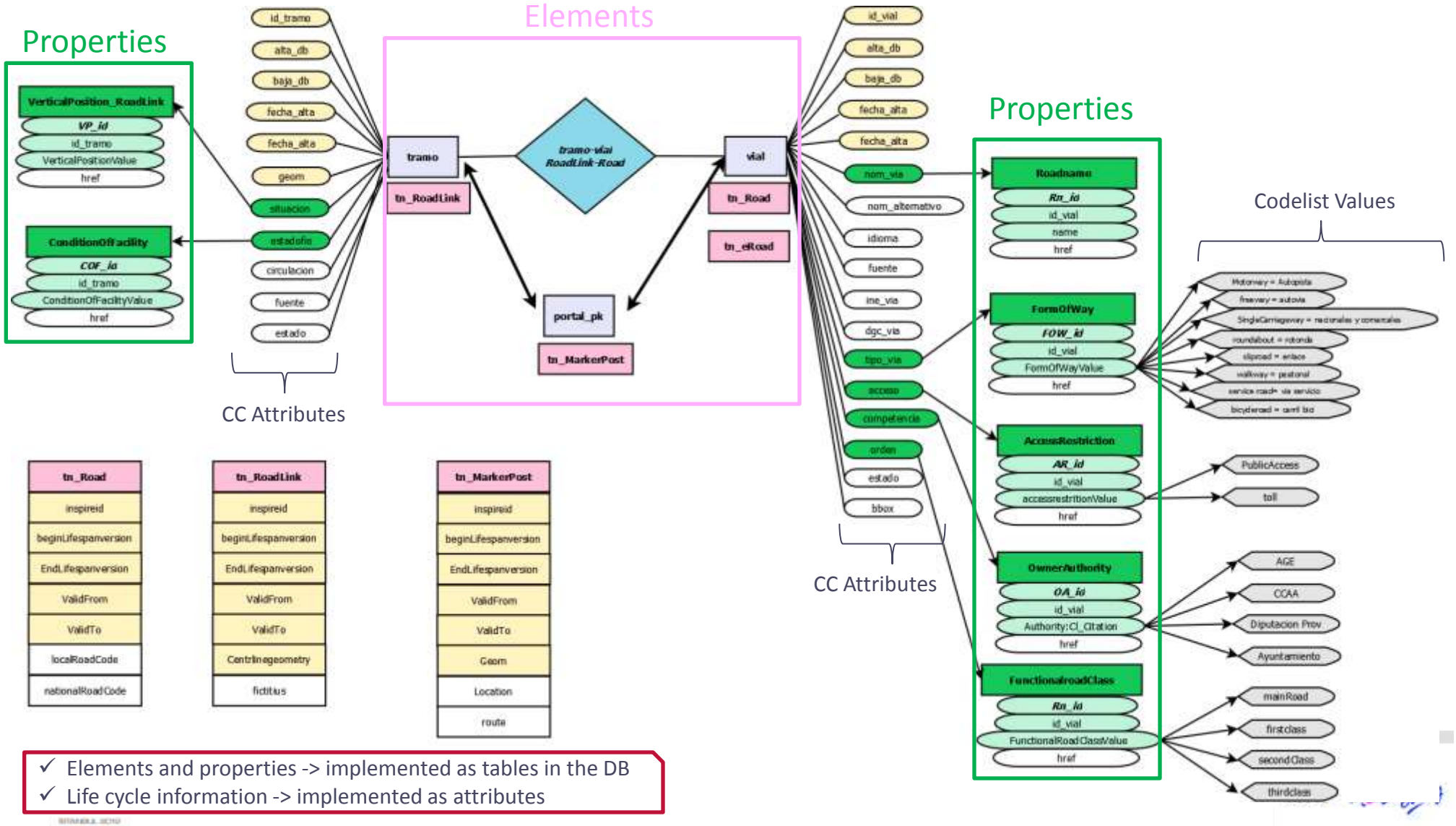
INSPIRE compliant CartoCiudad data: **Transport Networks**

TRANSPORT NETWORKS THEME

- ✓ Elements:
  - ✓ CartoCiudad roads and streets centrelines as *TransportLink* → *RoadLink*
  - ✓ Road features as a collection of individual links: *Road -> (LinkSet) Road or Eroad (European routes)*
  - ✓ Kilometric points as *MarkerPost*
- ✓ Properties:
  - ✓ Associated to Road (LinkSet):
    - ✓ *RoadName* (GeographicalName)
    - ✓ FormOfWay,AccessRestriction,OwnerAuthority FunctionalRoadClass
  - ✓ Associated to Roadlink: ConditionOfFacility, VerticalPosition

INSPIRE compliant CartoCiudad data: **Transport Networks**

Mapping between CartoCiudad and INSPIRE, implemented as tables of a PostgreSQL-PostGIS DB



- ✓ Elements and properties -> implemented as tables in the DB
- ✓ Life cycle information -> implemented as attributes

Free access CartoCiudad data via Web Services:

- Web Map Services
- Web Feature Services
- Geoprocessing Services

CartoCiudad Services Web are described in:

http://www.cartociudad.es/recursos/Documentacion_tecnica/CARTOCIUDAD_ServiciosWeb.pdf

CartoCiudad

Web Map Services

CartoCiudad Web Map Services

Web Map Service: Standard Web Services OGC and INSPIRE Services to visualize data

- ✓ WMS 1.3.0 – SLD 1.1 (GeoServer 2.2.2)
  http://www.cartociudad.es/wms/CARTOCIUDAD/CARTOCIUDAD
- ✓ WMTS 1.0.0 (GeoWebCache)
  http://www.ign.es/wmts/ign-base
- ✓ WMS-**INSPIRE** 1.3.0 (Geoserver 2.2) + Technical guidance for implementation of INSPIRE view services

http://www.cartociudad.es/wms-inspire

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Web Feature Services

CartoCiudad Web Feature Services

Web Feature Services: Standard Web Services OGC and INSPIRE Services to locate/download (GML) data

- ✓ 8 WFS (Degree 2.4) compliant:
  - ✓ Compliant with OGC WFS 1.1.0 standard
  - ✓ 1 per CartoCiudad component: roads, building numbers-KP, wards, post codes, administrative units

→ ✓ 2 WFS (Degree. 3.3.3) compliant with:

- ✓ OGC WFS 2.0.0 standard
- ✓ INSPIRE Data
  - ✓ Addresses
  - ✓ Transport Networks (Roads)
- ✓ Technical guidance for implementation of INSPIRE Download services

CartoCiudad INSPIRE Web Feature Services

WFS 2.0.0 – INSPIRE on Addresses

http://www.cartociudad.es/wfs-inspire/direcciones

- ✓ Published in 2013
- ✓ Features that can be requested:
  - Address
  - ThoroughfareName
  - PostalDescriptor
  - AdminUnitName
- ✓ Stored queries have been implemented to make easier the service use (simplifying the "filter encoding" part of the request)
  - ✓ List of stored queries: http://www.cartociudad.es/wfs-inspire/direcciones?Request=ListStoredQueries&service=WFS&version=2.0.0
  - ✓ Stored queries description: http://www.cartociudad.es/wfs-inspire/direcciones?Request=DescribeStoredQueries&service=WFS&version=2.0.0

CartoCiudad INSPIRE Web Feature Services

WFS 2.0.0 – INSPIRE on Transport Network (Road)

http://www.ign.es/wfs-inspire/services/transportes

- ✓ Published in December 2014
- ✓ Data provided by the service: **elements** and **properties** from Road TN

Elements

- Common Transport Network:
  - tn:MarkerPost

Road Transport Network:
- tn-ro:RoadLink,
- tn-ro:ERoad,
- tn-ro:Road

Properties

- Common Transport Network:
  - tn:AccessRestriction,
  - tn:ConditionOfFacility,
  - tn:VerticalPosition,

Road Transport Network:
- tn-ro:RoadName,
- tn-ro:FormOfWay,
- tn-ro:FunctionalRoadClass

- ✓ Stored queries have not been implemented yet (but there will be in the next phase)

CartoCiudad geoprocessing services

CartoCiudad Web Processing Services

Web Processing Service: Standard Web Services OGC and REST Services to calculate routes, influence areas, geocoding

- ✓ WPS 1.0 (52North): http://www.cartociudad.es/wps/WebProcessingService
  - ✓ Provides geoprocessing functionalities on CartoCiudad data: Routefinder, etc.
  - ✓ Service access: HTTP POST request or via CartoCiudad web site

- ✓ REST Services:
  - ✓ Geoprocessing functionalities: Routing, Influence area and
    - ✓ Direct Geocoding and Reverse Geocoding, from functions defined on the DB
  - ✓ Service access:
    - ✓ HTTP GET request or via CartoCiudad web site -> JSON/JSONP answer

CartoCiudad Web Processing Services: REST services

DIRECT Geocoding: address -> long, lat

"**Cartogeocoder**" application web**,** which implements 2 methods:

1. **GeocodeAddress:** for structured addresses, specifying the address components:

   province – municipality – (road type) – thoroughfare name – building number

GET → http://www.cartociudad.es/CartoGeocoder/**GeocodeAddress**?province=Sevilla&municipality=Camas&road_type=Calle&road_name=Esporlas&road_number=30&max_results=20

Ejemplo de respuesta:

JSON ←


```
{
   success:true,
   result:[
      {
         priority:1,
         status:1,
         comments:"Portal/Pk encontrado.",
         province:"Sevilla",
         municipality:"Camas",
         road_type:"CALLE",
         road_name:"ESPORLAS",
         road_fid:"410210000206",
         numpk_name:"30",
         zip:"41900",
         numpk_fid:"410210002476",
         longitude:-6.03362600108327,
         latitude:37.4051117809886
      }
   ],
```


Indicator of the answer accurate

EPSG 4258

CartoCiudad Web Processing Services: REST services

DIRECT Geocoding: address -> long, lat

"Cartogeocoder" application web, which implements 2 methods:

2. **Geocode:** for non structured addresses

GET → http://www.cartociudad.es/CartoGeocoder/**Geocode**?address=av de móstoles 3 alcorcón madrid

JSON ←


```
{
    success:true,
    result:[
        {
            priority:1,
            status:1,
            comments:"Portal/Pk encontrado.",
            province:"Madrid",
            municipality:"Alcorcón",
            road_type:"AVENIDA",
            road_name:"MOSTOLES",
            road_fid: "280070000055",
            numpk_name:"3",
            zip:"28922",
            numpk_fid:" 280070005497",
            longitude: -3.82995568087937999,
            latitude: 40.3509926200161004
        },
        {
```

CartoCiudad Web Processing Services: REST services

REVERSE Geocoding: long, lat -> address

"Services" application web, using **"ReverseGeocode"** method

GET → http://www.cartociudad.es/services/api/geocoder/reverseGeocode?lon=-0.3719472885131836&lat=39.48668753230887

JSON ←


```
{
   address:"Fray Pedro Vives",
   geom:"POINT (-0.372024397981367 39.486756291645506)",
   id:"462500009634",
   lat:"39.48668753230887",
   lng:"-0.3719472885131836",
   muni:"Valencia",
   portalNumber:"35",
   postalCode:"46009",
   priority:"0",
   province:"Valencia/València",
   tip_via:"Calle",
   type":"portal"
}
```

New CartoCiudad visualizer and website tools

CartoCiudad visualizer

www.cartociudad.es

CartoCiudad Web Site

www.cartociudad.es/portal


Bienvenido | Benvingut | Ongi etorri | Benvido | Bienvenu | Welcome
FAQ | Mapa Web
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CartoCiudad
Inicio → Cálculos
Coordenadas geográficas
Direcciones
Distancias
Cliente WPS
Esta herramienta permite obtener las coordenadas geográficas (ETRS89) correspondientes a una dirección.
Si la dirección no encuentra la coincidencia exacta en CartoCiudad se devolverán los resultados más próximos.
Cálculo individual
Introducir la dirección del siguiente modo: tipo de vía (opcional), nombre de vía, número, municipio y provincia separados por comas o espacios.
Ejemplo: Prado 14 Avilés Asturias
Introducir dirección
Cálculo masivo
Subir las direcciones conforme a la plantilla que se facilita para obtener las coordenadas geográficas.
Descargar plantilla para introducir direcciones (100 como máximo)
Subir archivo de direcciones
Obtener coordenadas


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Cálculo individual
Introducir la dirección del siguiente modo: tipo de vía (opcional), nombre de vía, número, municipio y provincia separados por comas o espacios.
Ejemplo: Prado 14 Avilés Asturias
embajadores 7 madrid
Resultado 1: Portal/Pk encontrado.
Dirección: CALLE EMBAJADORES 7, Madrid, Madrid.
Coordenadas: 40.410311,-3.706469 (40.0° 24.0' 0.37", -3.0° 42.0' 0.23")
Resultado 2: Portal/Pk encontrado.
Dirección: GLORIETA EMBAJADORES 7, Madrid, Madrid.
Coordenadas: 40.404507,-3.70281 (40.0° 24.0' 0.16", -3.0° 42.0' 0.1")

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CartoCiudad

Coordenadas geográficas | **Direcciones** | Distancias | Cliente WPS

Esta herramienta permite obtener la dirección correspondiente a unas coordenadas geográficas (ETRS89) dadas.

Si no se encuentra la coincidencia exacta en CartoCiudad se devolverá la dirección más próxima.

Cálculo individual

Introducir las coordenadas en formato decimal (utilizar punto como separador).
La longitud Oeste se introducirá con signo negativo.

Ejemplo: Latitud: 40.7864
Longitud: -1.3591

Latitud 40.428416

Longitud -3.624769

Cálculo masivo

Subir las coordenadas conforme a la plantilla que se facilita para obtener las direcciones correspondientes.

Descargar plantilla para introducir coordenadas (100 como máximo)

Subir archivo de coordenadas

Obtener direcciones


Bienvenido | Benvingut | Ongi etorri | Benvido | Bienvenu | Welcome
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Cálculo individual
Introducir las coordenadas en formato decimal (utilizar punto como separador).
La longitud Oeste se introducirá con signo negativo.
Ejemplo: Latitud: 40.7864
Longitud: -1.3591
Latitud
40.424648
Longitud
-1.449747
Resultado: Calle Valdevecar 62 , Albarracín , Teruel (40.424648,-1.449747)

Conclusions

Conclusions

EXPERIENCES:

✓A collaborative project allows its improvement in different lines at the same time

✓Everything achieved using open source software

✓Data and Services should be developed to satisfy the user requirements

NEXT STEPS in relation to CartoCiudad Web Services:

✓ Join WMS and WMS-INSPIRE in one service supporting two symbologyies

✓WFS-INSPIRE TN

- ✓Define “stored queries” to make easier its use
- ✓Improve the service including other TN (railway, etc.)

CartoCiudad

Thank you

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