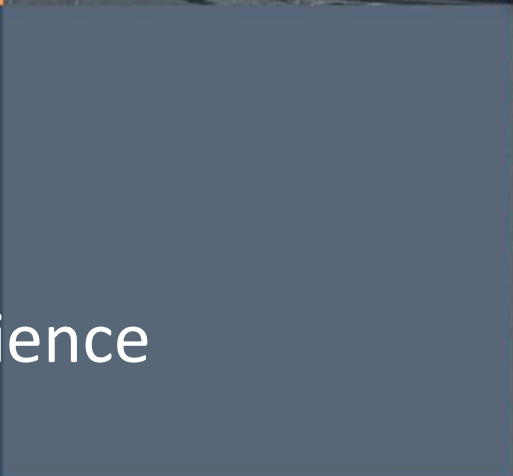Instituto **Geográfico** Nacional
CENTRO NACIONAL DE INFORMACIÓN GEOGRÁFICA

Validation experience

Paloma Abad
Head of SDI Department

www.ign.es

SDI Workshop

GOBIERNO DE ESPAÑA · MINISTERIO DE FOMENTO · INSTITUTO GEOGRÁFICO NACIONAL

INSPIRE KEN, june 2018

Points

1. Introduction
2. Interoperability
3. Geoportal Thematic Viewer
4. Conclusions

Introduction

Infrastructure for Spatial Information in Europe

Introduction

The organizational structure of the NSDI (known in Spain by its Spanish initials, IDEE) is fundamentally based on 8 national and 17 regional nodes.

Their INSPIRE datasets and services metadata are collected on the Spanish Official Catalogue of INSPIRE Data and Services (CODSI). All the metadata documents have been analyzed by the INSPIRE monitoring and the outcome is :

Conformity of spatial datasets		
conformant datasets=45	datasets total = 218	level of conformity =**20,64 %**
Conformity of network services		
conformant services = 179	services total = 233	level of conformity =**80,26 %**
Accessibility of spatial data sets through view and download services		
accessible datasets =140	datasets total = 218	level of accessibility= **64,22 %**

Introduction

But the INSPIRE monitoring process doesn't detect the lack of interoperability between SDS metadata and the network services.

- How are dataset linked to the related view and download services?
- How is a view service linked to the dataset metadata file?
- How can we know, through the URL of a view service, the description of the dataset, using the service metadata elements?
- How can we find the layers using the dataset metadata?
- How can we download features using the dataset metadata?
- ….
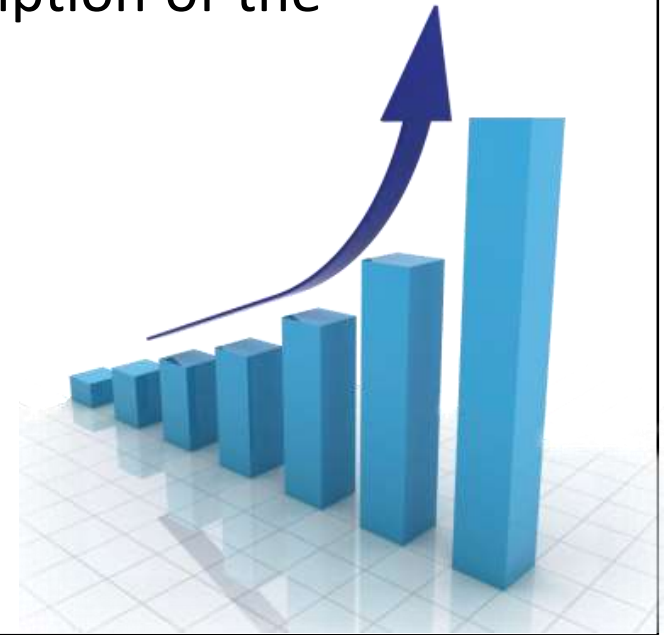
Geo-referenced spatial objects are rendered in at least one layer of a view service.

Enabling copies of complete spatial datasets, or parts of them.

Dataset Metadata

Accessibility of spatial data sets through **view** services
• WMS/WMTS

Accessibility of spatial data sets through **download** services
• WFS/ATOM

```
<gml:Polygon id = "M-30">
  <gml:LinearRing>
          <gml:posList>15 30 20 40
</gml:posList>
  </gml:LinearRing>
</gml:Polygon>
```

WMS Metadata

WFS Metadata

Dataset

Interoperability

Infrastructure for Spatial Information in Europe

Validator Tools

INSPIRE validator

1

- Metadata encoded in EN ISO 19139
- Discovery Services: OGC CSW 2.0.2 AP ISO 1.0.1 with INSPIRE Extensions
- View Services: ISO 19128 (OGC WMS 1.3.0), OGC WMS 1.1.1, OGC WMTS 1.0.0 with INSPIRE Extensions
- Download Services: ATOM, ISO 19142 (OGC WFS 2.0.0) with INSPIRE Extensions

INSPIRE ETF validator

2

- WFS /ATOM (Technical Guidance version 3.1)
- Metadata (Technical Guidance version 1.3)
- Data:
  - Addresses (Data Specification version 3.1)
  - Administrative Units (Data Specification version 3.1)
  - Cadastral Parcels (Data Specification version 3.1)
  - Geographical Names (Data Specification version 3.1)
  - Hydrography (Data Specification version 3.1)
  - Protected Sites (Data Specification version 3.2)
  - Transport Networks (Data Specification version 3.2)

1 INSPIRE Geoportal Metadata Validator

Conformity

How complete a metadata document with respect to the INSPIRE metadata Regulation, the Network services regulation and the Technical Guideline documents.

Interoperability

How interoperable a resource or group of resources are with respect to the INSPIRE Implementing Rules and the Technical Guidance documents

This tool has two parts:
- **Conformity metadata**
- **Interoperability**

Verified	Unverified (reason)
• RESOURCE_METADATA_IS_COMPLETE	• DOWNLOAD_MATCHING_DATA_IS_AVAILABLE (ONLY_DURING_PULL_OPERATION) • ALL_LAYERS_MATCHING_DATA_HAVE_COMPLETE_METADATA (ONLY_DURING_PULL_OPERATION) • LAYER_MATCHING_DATA_IS_AVAILABLE (ONLY_DURING_PULL_OPERATION) • ALL_DOWNLOADS_MATCHING_DATA_HAVE_COMPLETE_METADATA (ONLY_DURING_PULL_OPERATION) • RESOURCE_PREVIEW_IMAGE_IS_AVAILABLE (ONLY_DURING_PULL_OPERATION) • INSPIRE_SPATIAL_OBJECT_IS_AVAILABLE (ONLY_DURING_PULL_OPERATION)

26-06

1st Case

Obtain 100% interoperability is easy when:

- **WMS has an only layer,**

- **this layer renders an only Feature Type,**

- **and WFS has an only Feature Type**

Layer Name
AU.AdministrativeUnit
AU.AdministrativeBoundary
AU.Condominium
AU.Baseline
AU.MaritimeBoundary
AU.<CodelistValue>[18] Example: AU.ContiguousZone

WMS 1
WMS 2

WMS 3
WMS 4
WMS 5

WMS 6

Spatial object type(s)
AdministrativeUnit
AdministrativeBoundary
Condominium Baseline MaritimeBoundary
MaritimeZone (zoneType : MaritimeZoneTypeValue)

WFS 1
WFS 2

WFS 3
WFS 4
WFS 5

WFS 6

How many services do we develop?

6 WMS

6 WFS

How many services do we develop?

One layer to one WMS, and one feature type to only WFS have some disadvantages
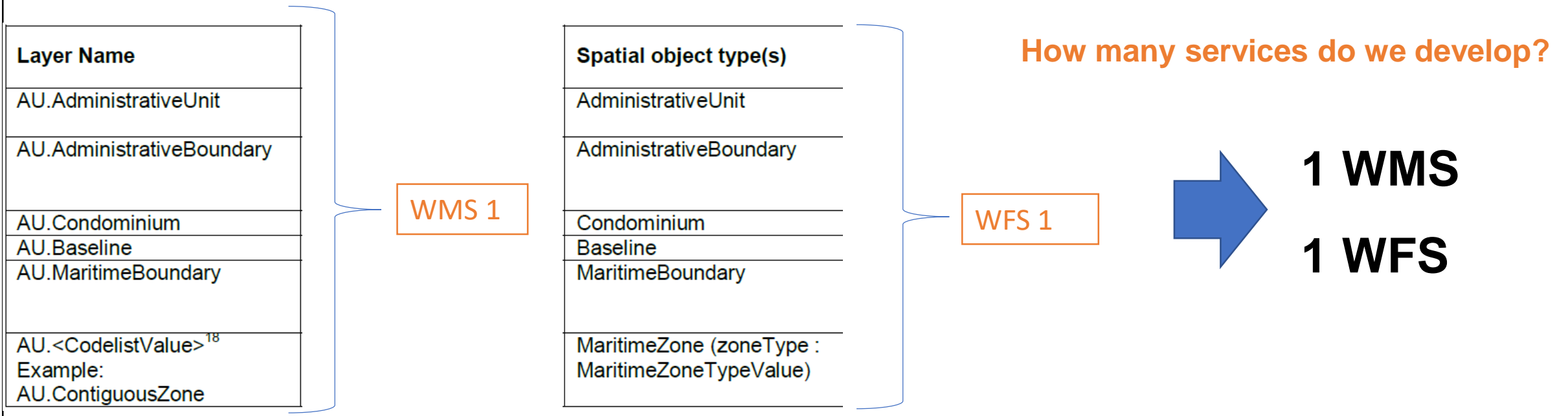
- There are a lot of metadata documents of layers and feature types. These metadata file are identical except for small differences between them.

- The publishment isn't thought to the requirements of users, it isn't useful to them. They need to work with many network services

2nd Case

Obtain 100% interoperability is difficult when:

- **WMS has a lot of layers**

- **WFS has a lot of Feature Types**

For example: A dataset has 6 spatial object types.

Layer Name
AU.AdministrativeUnit
AU.AdministrativeBoundary
AU.Condominium
AU.Baseline
AU.MaritimeBoundary
AU.<CodelistValue>[18] Example: AU.ContiguousZone

WMS 1

Spatial object type(s)
AdministrativeUnit
AdministrativeBoundary
Condominium
Baseline
MaritimeBoundary
MaritimeZone (zoneType : MaritimeZoneTypeValue)

WFS 1

How many services do we develop?

1 WMS

1 WFS

How many services do we develop?

Many layers to an only WMS and many feature types to an only WFS has some advantages

- The organization manages the WMS and WFS in a better way.

- The metadata documents are related to datasets and network services but there aren't metadata documents for layers and spatial objects.

- The WMS and WFS give users a lot of usable information.

- But the validation is more complex. You need a control of codes, namescode, identifier…

Interoperability validation: Administrative Units Example

A dataset has two spatial object types:

- Administrative Units

- Boundary Units

- One Dataset Metadata file

- One WMS Capabilities response

  → **WMS Metadata file**

- One WFS Capabilities response

  → **WFS Metadata file**

Example: A dataset has two spatial object types:

- **Administrative Units**
- **Administrative Boundary**

Only one metadata file to describe all resources. The elements (author, BBOX, SRS, quality) are shared and have the same value for all the resources.

```xml
<gmd:identifier>
    <gmd:RS_Identifier>
        <gmd:code>
            <gco:CharacterString>Code_DataSet</gco:CharacterString>    1
        </gmd:code>
        <gmd:codeSpace>
            <gco:CharacterString>IGN</gco:CharacterString>
        </gmd:codeSpace>
    </gmd:RS_Identifier>
</gmd:identifier>
<gmd:identifier>
    <gmd:RS_Identifier>
        <gmd:code>
            <gco:CharacterString>Code_Adminsitrative_Unit</gco:CharacterString>    2
        </gmd:code>
        <gmd:codeSpace>
            <gco:CharacterString>IGN</gco:CharacterString>
        </gmd:codeSpace>
    </gmd:RS_Identifier>
</gmd:identifier>
<gmd:identifier>
    <gmd:RS_Identifier>
        <gmd:code>
            <gco:CharacterString>Code_Administrative_Boundary</gco:CharacterString>    3
        </gmd:code>
        <gmd:codeSpace>
            <gco:CharacterString>IGN</gco:CharacterString>
        </gmd:codeSpace>
    </gmd:RS_Identifier>
</gmd:identifier>
```

URL of the **WMS** and **WFS** service to which a GetCapabilities is requested.

WMS

```
<gmd:onLine>
  <gmd:CI_OnlineResource>
    <gmd:linkage>
      <gmd:URL>http://URL WMS?REQUEST=GetCapabilities&amp;SERVICE=WMS&amp;VERSION=1.3.0</gmd:URL>
    </gmd:linkage>
    <gmd:name>
      <gco:CharacterString>View Service</gco:CharacterString>
    </gmd:name>
    <gmd:function>
      <gmd:CI_OnLineFunctionCode codeList="./resources/codeList.xml#CI_OnLineFunctionCode" codeListValue="imageDigital">View</gmd:CI_OnLineFunctionCode>
    </gmd:function>
  </gmd:CI_OnlineResource>
</gmd:onLine>
<gmd:onLine>
  <gmd:CI_OnlineResource>
    <gmd:linkage>
      <gmd:URL>http://URL WFS?REQUEST=GetCapabilities&amp;SERVICE=WFS&amp;VERSION=2.0.0</gmd:URL>
    </gmd:linkage>
    <gmd:name>
      <gco:CharacterString>Download Service</gco:CharacterString>
    </gmd:name>
    <gmd:function>
      <gmd:CI_OnLineFunctionCode codeList="./resources/codeList.xml#CI_OnLineFunctionCode" codeListValue="download">Download</gmd:CI_OnLineFunctionCode>
    </gmd:function>
  </gmd:CI_OnlineResource>
</gmd:onLine>
```

WFS

A dataset has two spatial object types:

- **Administrative Units**

- **Administrative Boundary**

Identifier whose meaning is defined by an authority attribute.

This Identifier is unique within the namespace and is the "code" on dataset metadata file.


```
<Layer queryable="1">
<Name>AU.AdministrativeBoundary</Name>
<Title>Límite administrativo</Title>
....
<Attribution>
    <Title>Instituto Geográfico Nacional</Title>
    <OnlineResource xlink:type="simple" xlink:href="http://www.ign.es"/>
</Attribution>
<Identifier authority="IGN">Code_Adminsitrative_Unit</Identifier>
<MetadataURL type="ISO19115:2003">
    <Format>text/plain</Format>
    <OnlineResource xlink:type="simple" xlink:href="GetRecodByID Request of Dataset metadata"/>
</MetadataURL>
<Style>
...
</Style>
</Layer>
<Layer queryable="1">
<Name>AU.AdministrativeUnit</Name>
<Title>Unidad administrativa</Title>
...
<Attribution>
    <Title>Instituto Geográfico Nacional</Title>
    <OnlineResource xlink:type="simple" xlink:href="http://www.ign.es"/>
</Attribution>
<Identifier authority="IGN">Code_Administrative_Boundary</Identifier>
<MetadataURL type="ISO19115:2003">
    <Format>text/plain</Format>
    <OnlineResource xlink:type="simple" xlink:href="GetRecodByID Request of Dataset metadata" />
</MetadataURL>
<Style>
...
</Style>
</Layer>
```

Identifier Layer 1

Identifier Layer 2

Implementation Requirement 38 To be able to map the concept of a responsible `body/codeSpace` and local `identifier/code` to [**ISO 19128**]), `AuthorityURL` and `Identifier` elements shall be used. The authority name and explanatory URL shall be defined in a separate AuthorityURL element, which may be defined once and inherited by subsidiary layers. Identifiers themselves are not inherited.

Implementation Requirement 13 Coupled Resource shall be mapped to the `<MetadataURL>` elements of the Layer elements of the service capabilities. If linkage to the data sets or series on which the service operates are available, then the linkage to these resources shall be provided as stated by the INSPIRE Metadata Technical Guidance [**INS MDTG**].

26-06-2018

A dataset has two spatial object types:

- **Administrative Units**

- **Administrative Boundary**

Code = Spatial DataSet Identifier
CodeSpace = Namespace

```xml
<ows:ExtendedCapabilities xmlns="http://www.deegree.org/services/metadata" xmlns:xsi="htt
  <inspire_dls:ExtendedCapabilities xmlns:inspire_common="http://inspire.ec.europa.eu/sc
    <inspire_common:MetadataUrl>
      <inspire_common:URL>"GetRecodByID Request of WFS metadata"</inspire_common:URL>
      <inspire_common:MediaType>application/vnd.iso.19139+xml</inspire_common:MediaType>
    </inspire_common:MetadataUrl>
    <inspire_common:SupportedLanguages>
      <inspire_common:DefaultLanguage>
        <inspire_common:Language>spa</inspire_common:Language>
      </inspire_common:DefaultLanguage>
    </inspire_common:SupportedLanguages>
    <inspire_common:ResponseLanguage>
      <inspire_common:Language>spa</inspire_common:Language>
    </inspire_common:ResponseLanguage>
    <inspire_dls:SpatialDataSetIdentifier>
      <inspire_common:Code>Code_DataSet</inspire_common:Code>
      <inspire_common:Namespace>IGN</inspire_common:Namespace>
    </inspire_dls:SpatialDataSetIdentifier>
  </inspire_dls:ExtendedCapabilities>
</ows:ExtendedCapabilities>
```

TG Requirement 52 A separate WFS endpoint shall be provided for each INSPIRE dataset thus providing one dataset per GetCapabilities response.

A dataset has two spatial object types:

- **Administrative Units**

- **Administrative Boundary**

Coupled resource
If the resource is a spatial data service, this metadata element identifies, where relevant, the target spatial data sets of the service through their unique resource identifiers (URI).

WMS metadata document

```
<srv:operatesOn uuidref="METADATA_IDENTIFIER" xlink:href="http://./discovery?Service=CSW&Request=GetRecordById&...&id=[METADATA_IDENTIFIER]"/>
```

WFS metadata document

```
<srv:operatesOn uuidref="METADATA_IDENTIFIER" xlink:href="http://./discovery?Service=CSW&Request=GetRecordById&...&id=[METADATA_IDENTIFIER]"/>
```

TG Requirement 3.6: metadata/2.0/req/sds/coupled-resource

Links pointing to the online metadata descriptions of data sets provided by the described service shall be given using *srv:operatesOn* element.

The multiplicity of this element is 0..n.

This property shall be implemented by reference. The *xlink:href* attribute of each of the *srv:operatesOn* elements shall contain a URI pointing to the *gmd:MD_DataIdentification* element of the metadata record of the provided the data set or data set series.
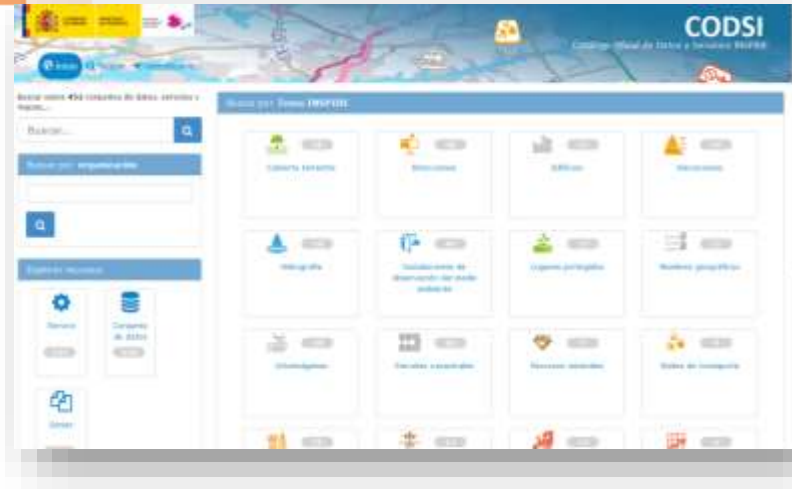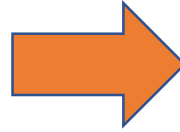
Geoportal Thematic Viewer

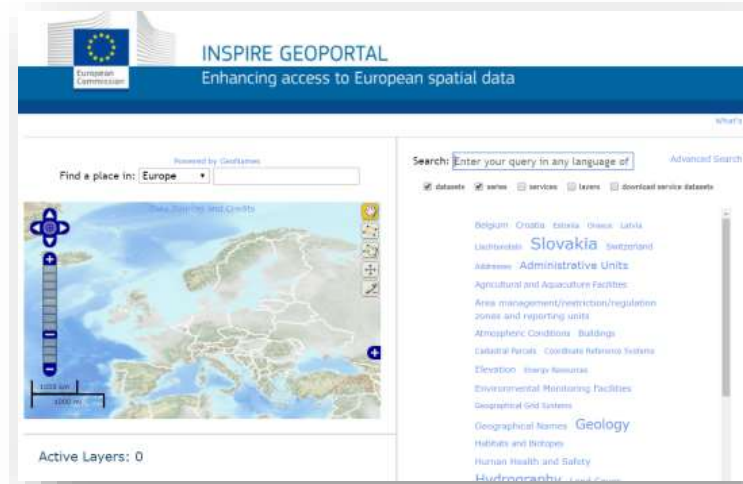Infrastructure for Spatial Information in Europe

Spanish Catalogue

Geoportal INSPIRE

Harvesting

Geoportal Thematic Viewer

Code, identifier, URL WMS, URL WFS,...

1 Dataset metadata	2 WMS GetCapabilities	3 WMS Metadata	4 WFS GetCapabilities	5 WFS Metadata
	Extend Capabilites URL CSW GetRecordbyID WMS Metadata			
Code1 DataSet			Extend Capabilites URL CSW GetRecordbyID WFS Metadata	OperatesOn: GetRecordbyID Dataset Metadata
Code2 of Layer 1	Layer 1: identifier equals code 1	OperatesOn: GetRecordbyID Dataset Metadata		
Code3 of Layer2	Layer 2: identifier equals code 2	OperatesOn: GetRecordbyID Dataset Metadata		
....Code of parte SDS				
WMS endpoint				
WFS endpont				

Data Set Metadata

Metadata information DS				
DS metadata fileIdentifier/uuid	spaignLLM2013			
	DS CodeSpace	**Layer 1**	**Layer 2**	
Layer Code	**BDLJE**	bdlje_limites_adm	bdlje_unidades_adm	
Layer CodeSpace	**IGN**	IGN	IGN	
DS Metadata URL (catálogo IGN)	http://www.ign.es/csw-inspire/srv/spa/csw?SERVICE=CSW&VERSION=2.0.2&REQUEST=GetRecordById&ou			
URL WFS	http://www.ign.es/wfs-inspire/unidades-administrativas?REQUEST=GetCapabilities&SERVICE=WFS&VERS			
URL WMS	http://www.ign.es/wms-inspire/unidades-administrativas?REQUEST=GetCapabilities&SERVICE=WMS&VER			
URL WMTS	NO HAY			
URL ATOM	http://www.ign.es/atom/dataset_feeds/lin_lim_mun.es.xml			
CdD	http://centrodedescargas.cnig.es/CentroDescargas/busquedaSerie.do?codSerie=LILIM#			

Download service - WFS

Service information WFS	Service			
Service URL	http://www.ign.es/wfs-inspire/unidades-administrativas?REQUEST=GetCapabilities&SERVICE=WFS&VERS			
inspire_dls:ExtendedCapabilities				
inspire_common:Code	BDLJE			
<inspire_common:Namespace	IGN			
WFS Featuretype information		**Featuretype 1**	**Featuretype 2**	
Technical name		au:AdministrativeBoundar	au:AdministrativeUnit	
Feature type name in English		Administrative Boundary	Administrative Unit	
ISO data metadata fileIdentifier/uuid		spaignLLM2013	spaignLLM2013	
Metadata information WFS				
WFS Metadata URL	http://www.ign.es/csw-inspire/srv/spa/csw?Service=CSW&Request=GetRecordById&Version=2.0.2&outputSch			
ISO service metadata fileIdentifier/uuid	spaignwfs_unidades-administrativas_2014			
operatesOn (CDE)	http://www.ign.es/csw-inspire/srv/spa/csw?SERVICE=CSW&VERSION=2.0.2&REQUEST=GetRecordById&ou			

View Service - WMS

Service information WMS/WMTS				
Service URL	http://www.ign.es/wms-inspire/unidades-administrativas?REQUEST=GetCapabilities&SERVICE=WMS&VER			
WMS/WMTS Layer information	**Layer**	**Layer 1**	**Layer 2**	
Technical name		AU.AdministrativeBoundar	AU.AdministrativeUnit	
Layer name in English		Administrative Boundary	Administrative Unit	
Code	BDLJE	bdlje_limites_adm	bdlje_unidades_adm	
CodeSpace	IGN	IGN	IGN	
Style		19 AU.AdministrativeUnit.Default 2)UnidadesAdministrativas		
ISO data metadata fileIdentifier/uuid	spaignLLM2013	spaignLLM2013	spaignLLM2013	
Metadata information WMS				
WMS Metadata URL	http://www.ign.es/csw-inspire/srv/spa/csw?SERVICE=CSW&VERSION=2.0.2&REQUEST=GetRecordById&ou			
ISO service metadata fileIdentifier/uuid	spaignwms_unidades_administrativas_2013			
operatesOn (CDE)	http://www.ign.es/csw-inspire/srv/spa/csw?SERVICE=CSW&VERSION=2.0.2&REQUEST=GetRecordById&ou			

Download service - ATOM

Service information ATOM				
URL	http://www.ign.es/atom/dataset_feeds/lin_lim_mun.es.xml			
Metadata URL	http://www.ign.es/csw-inspire/srv/spa/csw?Service=CSW&Request=GetRecordById&Version=2.0.2&id=spaign			

Conclusions

- The regulations must be implemented at a time
  - Metadata
  - Network service
  - Interoperability of spatial data sets and services

- It's a very great benefit
  - Data set metadata
  - WMS Getcapabilities
  - WMS metadata
  - WFS GetCapabilites
  - WFS metadata

All components must
be strongly linked

- There aren't any example dataset metadata for EU Commission
  - It should facilitate work

- INSPIRE ETF validator (new tool) should validate the interoperability