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►**B**   **COMMISSION REGULATION (EC) No 976/2009**

of 19 October 2009

implementing Directive 2007/2/EC of the European Parliament and of the Council as regards the Network Services

(OJ L 274, 20.10.2009, p. 9)

Amended by:

		Official Journal		
		No	page	date
►**M1**	Commission Regulation (EU) No 1088/2010 of 23 November 2010	L 323	1	8.12.2010

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COMMISSION REGULATION (EC) No 976/2009

of 19 October 2009

implementing Directive 2007/2/EC of the European Parliament and of the Council as regards the Network Services

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) (1), and in particular Article 16 thereof,

Whereas:

(1) Directive 2007/2/EC lays down general rules for the establishment of the Infrastructure for Spatial Information in the European Community. Member States are required to establish and operate a network of services for the spatial data sets and services for which metadata have been created in accordance with that Directive.

(2) In order to ensure the compatibility and usability of such services on the Community level, it is necessary to lay down the technical specifications and minimum performance criteria for those services with regard to the themes listed in Annexes I, II and III to Directive 2007/2/EC.

(3) In order to ensure that public authorities and the third parties are given the technical possibility to link their spatial data sets and services to the Network Services, it is necessary to lay down the appropriate requirements for those services.

(4) The measures provided for in this Regulation are in accordance with the opinion of the Committee established by Article 22 of Directive 2007/2/EC,

HAS ADOPTED THIS REGULATION:

Article 1

Subject matter

This Regulation sets out the requirements for the establishment and maintenance of the Network Services provided for in Article 11(1) of Directive 2007/2/EC (hereinafter 'the Network Services') and obligations related to the availability of those services to the public authorities of the Member States and third parties pursuant to Article 12 of that Directive.

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(1) OJ L 108, 25.4.2007, p. 1.

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Article 2

Definitions

For the purposes of this Regulation, the definitions set out in Part A of the Annex to Commission Regulation (EC) No 1205/2008 (¹) shall apply.

The following definitions shall also apply:

1. 'initial operating capability' means the ability of a Network Service to provide full functionality without guaranteeing quality of service in conformity with the rules set out in Annex I to this Regulation or access to the service for all users through the INSPIRE geo-portal;

2. 'performance' means the minimal level by which an objective is considered to be attained representing the fact how fast a request can be completed within an INSPIRE Network Service;

3. 'capacity' means limit of the number of simultaneous service requests provided with guaranteed performance;

4. 'availability' means probability that the Network Service is available;

5. 'response time' means the time measured at the Member State service location, in which the service operation returned the first byte of the result;

6. 'service request' means a single request to a single operation of an INSPIRE Network Service;

7. 'INSPIRE metadata element' means a metadata element set out in Part B of the Annex to Regulation (EC) No 1205/2008;

8. 'publish' means the operation to insert, delete or update INSPIRE metadata elements of resources in the Discovery Service

9. 'natural language' means a language that is spoken, written, or signed by humans for general-purpose communication;

10. 'collect' means an operation to pull INSPIRE metadata elements of resources from a source Discovery Service and to allow to create, delete or update the metadata of these resources in the target Discovery Service;

11. 'layer' means a basic unit of geographic information that may be requested as a map from a server in accordance with EN ISO 19128;

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12. 'Direct Access Download' means a Download Service which provides access to the Spatial Objects in Spatial Data Sets based upon a query.

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(¹) OJ L 326, 4.12.2008, p. 12.

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Article 3

Requirements for Network Services

The Network Services shall be in conformity with the requirements concerning the quality of services set out in Annex I.

In addition, each type of the Network Services shall be in conformity with the following:

(a) as concerns the Discovery Services, the specific requirements and characteristics set out in Annex II;

(b) as concerns the View Services, the specific requirements and characteristics set out in Annex III;

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(c) as concerns the Download Services, the applicable specific requirements and characteristics set out in Annexes I and IV;

(d) as concerns the Transformation Services, the applicable specific requirements and characteristics set out in Annexes I and V.

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Article 4

Access to the Network Services

1.   Not later than 9 May 2011, Member States shall provide the Discovery and View Services with initial operating capability.

2.   Not later than 9 November 2011, Member States shall provide the Discovery and View Services in conformity with this Regulation.

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3.   Not later than 28 June 2012, Member States shall provide the Download Services with initial operating capability.

4.   Not later than 28 December 2012, Member States shall provide the Download Services in conformity with this Regulation.

5.   Not later than 28 June 2012, Member States shall provide the Transformation Services with initial operating capability.

6.   Not later than 28 December 2012, Member States shall provide the Transformation Services in conformity with this Regulation.

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Article 5

Entry into force

This Regulation shall enter into force on the 20th day following its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

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ANNEX I

QUALITY OF SERVICE

Third party network services linked pursuant to Article 12 of Directive 2007/2/EC shall not be taken into account in the quality of service appraisal to avoid any deterioration which may result from cascading effects.

The following Quality of Service criteria relating to performance, capacity and availability shall apply.

1. PERFORMANCE

   The normal situation represents periods out of peak load. It is set at 90 % of the time.

   The response time for sending the initial response to a discovery service request shall be maximum 3 seconds in normal situation.

   For a 470 Kilobytes image (e.g. 800 × 600 pixels with a colour depth of 8 bits), the response time for sending the initial response to a Get Map Request to a view service shall be maximum 5 seconds in normal situation.

   For the Get Download Service Metadata operation, the response time for sending the initial response shall be maximum 10 seconds in normal situation.

   For the Get Spatial Data Set operation and for the Get Spatial Object operation, and for a query consisting exclusively of a bounding box, the response time for sending the initial response shall be maximum 30 seconds in normal situation then, and still in normal situation, the download service shall maintain a sustained response greater than 0,5 Megabytes per second or greater than 500 Spatial Objects per second.

   For the Describe Spatial Data Set operation and for the Describe Spatial Object Type operation, the response time for sending the initial response shall be maximum 10 seconds in normal situation then, and still in normal situation, the download service shall maintain a sustained response greater than 0,5 Megabytes per second or greater than 500 descriptions of Spatial Objects per second.

2. CAPACITY

   The minimum number of simultaneous requests to a discovery service to be served in accordance with the quality of service performance criteria shall be 30 per second.

   The minimum number of simultaneous service requests to a view service to be served in accordance with the quality of service performance criteria shall be 20 per second.

   The minimum number of simultaneous requests to a download service to be served in accordance with the quality of service performance criteria shall be 10 requests per second. The number of requests processed in parallel may be limited to 50.

   The minimum number of simultaneous requests to a transformation service to be served in accordance with the quality of service performance criteria shall be 5 requests per second.

3. AVAILABILITY

   The probability of a network service to be available shall be 99 % of the time.

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ANNEX II

DISCOVERY SERVICES

PART A

Search criteria

In order to be in conformity with the minimum set of search criteria set out in Article 11(2) of Directive 2007/2/EC, the Discovery Service shall support searching with the INSPIRE metadata elements listed in Table 1 of this Annex.

Table 1

Minimum search criteria	INSPIRE metadata elements
Keywords	Keyword
Classification of spatial data and services (For spatial data sets and spatial data set series)	Topic category
Classification of spatial data and services (For spatial data services)	Spatial data service type
The quality and validity of spatial data sets	Lineage
The quality and validity of spatial data sets	Spatial resolution
Degree of conformity with the implementing rules provided for in Article 7(1) of Directive 2007/2/EC	Specification
Degree of conformity with the implementing rules provided for in Article 7(1) of Directive 2007/2/EC	Degree
Geographical location	Geographic bounding box
Conditions applying to the access to and use of spatial data sets and services	Conditions applying to access and use
Conditions applying to the access to and use of spatial data sets and services	Limitations on public access
The public authorities responsible for the establishment, management, maintenance and distribution of spatial data sets and services	Responsible party
The public authorities responsible for the establishment, management, maintenance and distribution of spatial data sets and services	Responsible party role

The following INSPIRE metadata elements or set of elements shall be also available as search criteria:

(a) Resource Title;

(b) Resource Abstract;

(c) Resource type;

(d) Unique Resource Identifier;

(e) Temporal Reference.

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To allow for discovering resources through a combination of search criteria, logical and comparison operators shall be supported.

To allow for discovering resources based on the geographic location of the resource, the spatial operator listed in Table 2 shall be supported.

Table 2

Operator Name	Property
Intersects	Requires the geographic bounding box INSPIRE metadata element to intersect a defined area of interest

PART B

Operations

1. LIST OF OPERATIONS

In order to be in conformity with Article 11(1) of Directive 2007/2/EC, the Discovery Service shall provide the operations listed in Table 3 of this Annex.

Table 3

Operation	Role
Get Discovery Service Metadata	Provides all necessary information about the service and describes service capabilities
Discover Metadata	The Discover Metadata operation allows requesting INSPIRE metadata elements of resources based on a query statement to be retrieved from the target Discovery Service

In order to be in conformity with Article 12 of Directive 2007/2/EC, the Discovery Service shall support the operations listed in Table 4 of this Annex.

Table 4

Operation	Role
Publish Metadata	The Publish Metadata operation allows editing INSPIRE metadata elements of resources in the Discovery Service (push or pull metadata mechanisms). Editing meaning insert, update and delete
Link Discovery Service	The Link Discovery Service function allows the declaration of the availability of a Discovery Service for the discovery of resources through the Member State Discovery Service while maintaining the resource metadata at the owner location

The request and response parameters of each operation complete the description of each operation and form an integral part of the Discovery Service technical specification.

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2. GET DISCOVERY SERVICE METADATA OPERATION

2.1. **Get Discovery Service Metadata Request**

2.1.1. *Get Discovery Service Metadata Request parameters*

The Get Discovery Service Metadata Request parameter indicates the natural language for the content of the Get Discovery Service Metadata Response

2.2. **Get Discovery Service Metadata Response**

The Get Discovery Service Metadata Response shall contain the following sets of parameters:

— Discovery Service Metadata,

— Operations Metadata,

— Languages.

2.2.1. *Discovery Service Metadata parameters*

The Discovery Service Metadata parameters shall at least contain the INSPIRE metadata elements of the Discovery Service.

2.2.2. *Operations Metadata parameters*

The Operations Metadata parameter provides metadata about the operations implemented by the Discovery Service. These metadata parameters shall describe each operation. It shall at least provide the following:

1. indicate for the Publish Metadata if the Pull Mechanism, the Push Mechanism or both are available;

2. describe each operation, including as a minimum a description of the data exchanged and the network address.

2.2.3. *Languages parameter*

Two language parameters shall be provided:

— the Response Language parameter indicating the natural language used in the Get Discovery Service Metadata Response parameters,

— the Supported Languages parameter containing the list of the natural languages supported by the Discovery Service.

3. DISCOVER METADATA OPERATION

3.1. **Discover Metadata Request**

This Discovery Metadata Request contains the following parameters:

— Language,

— Query.

3.1.1. *Language parameter*

The Language parameter indicates the natural language requested for the content of the Discover Metadata Response.

3.1.2. *Query parameter*

The Query parameter shall contain the combination of search criteria as specified in part A.

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3.2. **Discover Metadata Response**

3.2.1. *Discover Metadata Response parameter*

The Discover Metadata Response parameter shall contain at least the INSPIRE metadata elements of each resource matching the query.

4. PUBLISH METADATA OPERATION

The Publish Metadata function enables the publication of the INSPIRE metadata elements of resources at the Discovery Service. Two alternatives are:

— Push Mechanism: allowing editing of the INSPIRE metadata elements of resources accessible from the Discovery Service,

— Pull Mechanism: allows the Member State Discovery Service to pull INSPIRE metadata elements of resources from a remote location.

At least one of the above alternatives shall be supported.

4.1. **Push Mechanism**

4.1.1. *Edit Metadata Request*

4.1.1.1. E d i t M e t a d a t a R e q u e s t p a r a m e t e r

The Edit Metadata Request parameter provides all information requested for INSPIRE metadata elements of resources to be inserted, updated or deleted at the Discovery Service.

4.2. **Pull Mechanism**

4.2.1. *Collect Metadata Request*

4.2.1.1. C o l l e c t M e t a d a t a R e q u e s t p a r a m e t e r

The Collect Metadata Request parameter provides all information about the remote location required to retrieve the available metadata of resources. It shall include as a minimum the INSPIRE metadata elements of the dedicated spatial data service.

5. LINK DISCOVERY SERVICE OPERATION

The Link Discovery Service operation allows the declaration of the availability of a Discovery Service compliant with this Regulation, for the discovery of resources through the Member State Discovery Service while maintaining the resource metadata at the owner location.

5.1. **Link Discovery Service Request**

5.1.1. *Link Discovery Service Request parameter*

The Link Discovery Service Request parameter shall provide all information about the Public Authority's or Third Party's Discovery Service compliant with this Regulation, enabling the Member State Discovery Service to get resources metadata based on a combination of search criteria from the Public Authority's or Third Party's Discovery Service and to collate it with other resources metadata.

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ANNEX III

VIEW SERVICES

PART A

Operations

1. LIST OF OPERATIONS

In order to be in conformity with Article 11(1) of Directive 2007/2/EC, the View Service shall provide the operations listed in Table 1 of this Annex.

Table 1

Operation	Role
Get View Service Metadata	Provides all necessary information about the service and describes service capabilities
Get Map	Returns a map containing the geographic and thematic information coming from the available spatial datasets. This map is an image spatially referenced

In order to be in conformity with Article 12 of Directive 2007/2/EC, the view Service shall support the operations listed in Table 2 of this Annex.

Table 2

Operation	Role
Link View Service	Allows a Public Authority or a Third Party to declare a view Service for the viewing of its resources through the Member State View Service while maintaining the viewing capability at the Public Authority or the Third party location

The request and response parameters of each operation complete the description of each operation and form an integral part of the View Service technical specification.

2. GET VIEW SERVICE METADATA OPERATION

2.1. **Get View Service Metadata Request**

2.1.1. *Get View Service Metadata Request parameters*

The Get View Service Metadata Request parameter indicates the natural language requested for the content of the Get View Service Metadata Response.

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2.2. **Get View Service Metadata Response parameters**

The Get View Service Metadata Response shall contain the following set of parameters:

— View Service Metadata,

— Operations Metadata,

— Languages,

— Layers Metadata.

2.2.1. *View Service Metadata parameters*

The View Service Metadata parameters shall at least contain the INSPIRE metadata elements of the View Service.

2.2.2. *Operations Metadata parameters*

The Operation Metadata parameter describes the operations of the View Service and shall contain as a minimum a description of the data exchanged and the network address of each operation.

2.2.3. *Languages parameters*

Two language parameters shall be provided:

— the Response Language parameter indicating the natural language used in the Get Service Metadata Response parameters,

— the Supported Languages parameter containing the list of the natural languages supported by this view service.

2.2.4. *Layers Metadata parameters*

The metadata elements listed in Table 3 shall be provided for each layer.

Table 3

Metadata elements	Description
Resource Title	The title of the layer, used for human communication, for presentation of the layer, e.g. in a menu
Resource Abstract	Layer abstract
Keyword	Additional keywords
Geographic Bounding Box	The minimum bounding rectangle in all supported Coordinate Reference Systems of the area covered by the layer
Unique Resource Identifier	The Unique Resource Identifier of the resource used to create the layer

The layer specific parameters listed in Table 4 shall be provided for each layer.

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Table 4

Parameter	Description
Name	Harmonised name of the layer
Coordinate Reference Systems	List of Coordinate Reference Systems in which the layer is available
Styles	List of the rendering styles available for the layer.
	A style shall be composed of a title and a unique identifier
Legend URL	Location of the legend for each style, language and dimension pairs
Dimension Pairs	Indicates the supported two dimensional axis pairs for multi-dimensional spatial data sets and spatial data sets series

3.   GET MAP OPERATION

3.1.   **Get Map Request**

3.1.1.   *Get Map Request parameters*

The Get Map Request parameters listed in Table 5 shall be provided

Table 5

Parameter	Description
Layers	List of layer names to be included in the map
Styles	List of style to be used for each layer
Coordinate Reference System	Coordinate Reference System of the map
Bounding box	The 4 corner Coordinate of the two dimensional map for the selected Dimension pair and in the selected Coordinate Reference System
Image width	The map width in pixels
Image height	The map height in pixels
Image format	The output image format
Language	language to be used for the response
Dimension pair	The two dimensional axis to be used for the map. For example, a geographical dimension and time

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4. LINK VIEW SERVICE OPERATION

4.1. **Link View Service Request**

4.1.1. *Link View Service Request parameter*

The Link View Service parameter shall provide all information about the Public Authority's or Third Party's View Service compliant with this regulation, enabling the Member State View Service to get a map from the Public Authority's or Third Party's View Service and to collate it with other maps.

PART B

Other characteristics

The View Service shall have the following characteristics.

1. Coordinate Reference Systems

The layers shall be simultaneously viewed using a single coordinate reference system and the View Service shall support at least the Coordinate Reference Systems in Annex I, point 1 of Directive 2007/2/EC.

2. Image Format

The View Service shall support at least one of the following image formats:

— the Portable Network Graphics (PNG) format,

— the Graphics Interchange Format (GIF), without compression.

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ANNEX IV

DOWNLOAD SERVICES

PART A

Download Operations

1.   LIST OF OPERATIONS

In order to be in conformity with Article 11(1)(c) of Directive 2007/2/-EC, the Download Service shall at least provide the operations listed in Table 1 of this Annex.

Table 1

Operation	Role
Get Download Service Metadata	Provides all necessary information about the service, the available Spatial Data Sets, and describes the service capabilities.
Get Spatial Data Set	The Get Spatial Data Set operation allows the retrieval of a Spatial Data Set.
Describe Spatial Data Set	This operation returns the description of all the types of Spatial Objects contained in the Spatial Data Set.
Link Download Service	Allows the declaration, by a Public Authority or a Third Party, of the availability of a Download Service for downloading Spatial Data Sets or, where practicable, Spatial Objects, through the Member State's Download Service while maintaining the downloading capability at the Public Authority or the Third Party location.

The request and response parameters of each operation complete the description of each operation and form an integral part of the Download Service's technical specifications.

2.   GET DOWNLOAD SERVICE METADATA OPERATION

2.1. **Get Download Service Metadata request**

2.1.1. *Get Download Service Metadata request parameter*

The Get Download Service Metadata request parameter shall indicate the natural language to be used for the content of the Get Download Service Metadata response.

2.2. **Get Download Service Metadata response**

The Get Download Service Metadata response shall contain the following sets of parameters:

— Download Service Metadata,

— Operations Metadata,

— Languages,

— Spatial Data Sets Metadata.

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2.2.1. *Download Service Metadata parameter*

The Download Service Metadata parameters shall at least contain the INSPIRE metadata elements of the Download Service.

2.2.2. *Operations Metadata parameter*

The Operations metadata parameter provides metadata about the operations implemented by the Download Service. It shall at least provide a description of each operation, including as a minimum a description of the data exchanged and the network address.

2.2.3. *Languages parameter*

Two language parameters shall be provided:

— the response Language parameter indicating the natural language used in the Get Download Service Metadata response parameters,

— the Supported languages parameter containing the list of the natural languages supported by the Download Service.

2.2.4. *Spatial Data Sets Metadata parameters*

The INSPIRE metadata elements of the available Spatial Data Sets shall be provided. In addition, for each Spatial Data Set, the list of those Coordinate Reference Systems referred to in Regulation (EU) No 1089/-2010 which are available shall also be provided.

3. GET SPATIAL DATA SET OPERATION

3.1. **Get Spatial Data Set request**

The Get Spatial Data Set request contains the following parameters:

— Language,

— Spatial Data Set Identifier,

— Coordinate Reference System.

3.1.1. *Language parameter*

The Language parameter shall indicate the natural language requested for the Spatial Data Set.

3.1.2. *Spatial Data Set Identifier parameter*

The Spatial Data Set Identifier parameter shall contain the Unique Resource Identifier of the Spatial Data Set.

3.1.3. *Coordinate Reference System parameter*

The Coordinate Reference System parameter shall contain one of the Coordinate Reference Systems included in the list of available Coordinate Reference Systems referred to in point 2.2.4.

3.2. **Get Spatial Data Set response**

3.2.1. *Get Spatial Data Set response parameter*

The Get Spatial Data Set response parameter shall be the requested Spatial Data Set in the requested language and in the requested Coordinate Reference System.

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4.   DESCRIBE SPATIAL DATA SET OPERATION

4.1.   **Describe Spatial Data Set request**

The Describe Spatial Data Set request shall contain the following parameters:

— Language,

— Spatial Data Set Identifier.

4.1.1.   *Language parameter*

The Language parameter shall indicate the natural language requested for the description of the Spatial Objects type.

4.1.2.   *Spatial Data Set Identifier parameter*

The Spatial Data Set Identifier parameter shall contain the Unique Resource Identifier of the Spatial Data Set.

4.2.   **Describe Spatial Data Set response**

4.2.1.   *Describe Spatial Data Set response parameter*

The Describe Spatial Data Set response parameter shall be the description of the Spatial Objects in the requested Spatial Data Set and in the requested language.

5.   LINK DOWNLOAD SERVICE OPERATION

The Link Download Service operation allows the declaration of the availability of a Download Service compliant with this Regulation, for the download of resources through the Member State's Download Service while maintaining the resources at the owner location.

5.1.   **Link Download Service request**

5.1.1.   *Link Download Service request parameter*

The Link Download Service request parameter shall provide all information about the Public Authority's or Third Party's Download Service compliant with this Regulation, enabling the Member State Download Service to provide access to Spatial Data Sets and, where practicable, to Spatial Objects from the Public Authority's or Third Party's Download Service.

PART B

Direct Access Download Operations

6.   LIST OF OPERATIONS

Where the Download Service gives direct access to spatial data sets, it shall provide, in addition to the operations listed in Table 1, the operations listed in Table 2 of this Annex.

Table 2

Operation	Role
Get Spatial Object	This operation allows the retrieval of Spatial Objects based upon a query.
Describe Spatial Object Type	This operation returns the description of the specified Spatial Objects types.

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The request and response parameters of each operation complete the description of each operation and form an integral part of the Download Service's technical specifications.

7. GET SPATIAL OBJECT OPERATION

7.1. **Get Spatial Object request**

The Get Spatial Object request shall support the following parameters:

— Language,

— Spatial Data Set Identifier,

— Coordinate Reference System,

— Query.

7.1.1. *Language parameter*

The Language parameter shall indicate the natural language requested for the Spatial Objects.

7.1.2. *Spatial Data Set Identifier parameter*

The Spatial Data Set Identifier parameter shall contain the Unique Resource Identifier of the required Spatial Data Set. Where the parameter is not provided, it shall be assumed that all available Spatial Data Sets have been selected.

7.1.3. *Coordinate Reference System parameter*

The Coordinate Reference System parameter shall contain one of the Coordinate Reference Systems included in the list of Coordinate Reference Systems set out in Regulation (EU) No 1089/2010.

7.1.4. *Query parameter*

The query parameter shall be composed of the search criteria listed in part C.

7.2. **Get Spatial Object response**

The Get Spatial Object response shall contain the following parameters:

— Spatial Objects Set,

— Spatial Objects Set Metadata.

7.2.1. *Spatial Objects Set parameter*

The Spatial Objects Set parameter shall be the set of Spatial Objects which complies with Regulation (EU) No 1089/2010 and fulfils the search criteria in the query, in the requested language and in the Coordinate Reference System.

7.2.2. *Spatial Objects Set Metadata parameter*

The Spatial Objects Set Metadata parameter shall contain at least the INSPIRE metadata elements of the set of Spatial Objects.

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8.   DESCRIBE SPATIAL OBJECT TYPE OPERATION

8.1.   **Describe Spatial Object Type request**

The Describe Spatial Object Type request shall contain the following parameters:

— Language,

— Spatial Object Type.

8.1.1.   *Language parameter*

The Language parameter shall indicate the natural language requested for the description of the Spatial Object type.

8.1.2.   *Spatial Object Type parameter*

The Spatial Object Type parameter shall contain the language-neutral name of the Spatial Object Type as specified in Regulation (EU) No 1089/2010. Where the parameter is not provided, it shall be assumed that all types of Spatial Objects have been selected.

8.2.   **Describe Spatial Object Type response**

8.2.1.   *Describe Spatial Object Type response parameter*

The Describe Spatial Object type response parameter shall be the description of the spatial object type, in conformity with Regulation (EU) No 1089/2010.

PART C

Search Criteria for the Get Spatial Object Operation

For the purposes of the Get Spatial Object Operation of the Download Service, the following search criteria shall be implemented:

— Unique Resource Identifier of Spatial Data Set,

— all relevant key attributes and the relationship between Spatial Objects as set out in Regulation (EU) No 1089/2010; in particular the Unique Identifier of Spatial Object and the temporal dimension characteristics, including the date of update,

— bounding box, expressed in any of the Coordinate Reference Systems listed in Regulation (EU) No 1089/2010,

— Spatial Data Theme.

To allow for discovering spatial objects through a combination of search criteria, logical and comparison operators shall be supported.

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ANNEX V

TRANSFORMATION SERVICES

Transformation Operations

1.   LIST OF OPERATIONS

In order to be in conformity with Article 11(1)(d) of Directive 2007/2/-EC, the Transformation Service shall provide the operations listed in Table 1 of this Annex.

Table 1

Operation	Role
Get Transformation Service Metadata	Provides all necessary information about the service and describes the service capabilities, including the supported transformation category, supported transformations, accepted input data types, supported model definition and mapping languages.
Transform	Carries out the actual transformation process.
Link Transformation Service	Allows the declaration of availability of a Transformation Service for Transforming Spatial Data Sets through the Member State's Transformation Services while maintaining the Transformation capability at the Public Authority or the Third party location.

The request and response parameters of each operation complete the description of each operation and form an integral part of the Transformation Service's technical specifications.

2.   GET TRANSFORMATION SERVICE METADATA OPERATION

2.1.   **Get Transformation Service Metadata request**

2.1.1.   *Get Transformation Service Metadata request parameter*

The Get Transformation Service Metadata request parameter shall indicate the natural language for the content of the Get Transformation Service Metadata response.

2.2.   **Get Transformation Service Metadata response**

The Get Transformation Service Metadata response shall contain the following sets of parameters:

— Transformation Service Metadata,

— Operations Metadata,

— Languages.

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2.2.1. *Transformation Service Metadata parameter*

The Transformation Service Metadata parameter shall at least contain the INSPIRE metadata elements of the Transformation Service.

2.2.2. *Operations Metadata parameter*

The Operations Metadata parameter provides metadata about the operations implemented by the Transformation Service.

It shall describe each operation, including as a minimum a description of the data exchanged and the network address, and shall list the following:

— the transformation categories accepted by the Transform operation,

— the encoding for the input Spatial Data Set accepted by the Transform operation,

— the Data Model languages accepted by the Transform operation,

— the Model Mapping languages accepted by the Transform operation.

2.2.3. *Languages parameter*

Two parameters shall be provided:

— the response language parameter indicating the natural language used in the Get Transformation Service Metadata response,

— the supported languages parameter containing the list of the natural languages supported by the Transformation Service.

3. TRANSFORM OPERATION

3.1. **Transform request**

The Transform request shall contain the following parameters:

— Input Spatial Data Set,

— Source Model,

— Target Model,

— Model Mapping.

3.1.1. *Input Spatial Data Set parameter*

The Input Spatial Data Set parameter shall indicate the Spatial Data Set to be transformed.

3.1.2. *Source Model parameter*

The Source Model parameter shall specify the model of the Input Spatial Data Set.

3.1.3. *Target Model parameter*

The Target Model parameter shall specify the model to which the input Spatial Data Set shall be transformed.

3.1.4. *Model Mapping parameter*

The Model Mapping parameter shall specify the mapping from the Source Model to the Target Model.

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3.2.   **Transform response**

3.2.1.   *Transform response parameter*

The Transform response parameter shall contain the Spatial Data Set transformed in conformity with Regulation (EU) No 1089/2010.

4.   LINK TRANSFORMATION SERVICE OPERATION

4.1.   **Link Transformation Service request**

4.1.1.   *Link Transformation Service request parameter*

The Link Transformation Service request parameter shall provide all information about the Public Authority's or Third Party's Transformation Service in conformity with this Regulation, enabling the use of the Public Authority's or Third Party's Transformation Service by the Member State's Transformation Service.

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