

## 11 Portrayal

This clause defines the rules for layers and styles to be used for portrayal of the spatial object types defined for this theme. Portrayal is regulated in Article 14 of the IRs.

### IR Requirement

#### Article 14

#### Portrayal

1. For the portrayal of spatial data sets using a view network service as specified in Commission Regulation No 976/2009 <sup>(1)</sup>, the following shall be available:
  - (a) the layers specified in Annex II for the theme or themes the data set is related to;
  - (b) for each layer at least a default portrayal style, with as a minimum an associated title and a unique identifier.
2. For each layer, Annex II defines the following:
  - (a) a human readable title of the layer to be used for display in user interface;
  - (b) the spatial object type(s), or sub-set thereof, that constitute(s) the content of the layer.

In section 11.1, the *types* of layers are defined that are to be used for the portrayal of the spatial object types defined in this specification. A view service may offer several layers of the same type, one for each dataset that it offers data on a specific topic.

**NOTE** The layer specification in the IRs only contains the name, a human readable title and the (subset(s) of) spatial object type(s), that constitute(s) the content of the layer. In addition, these Technical Guidelines suggest keywords for describing the layer.

**Recommendation 1** It is recommended to use the keywords specified in section 11.1 in the *Layers Metadata parameters* of the INSPIRE View service (see Annex III, Part A, section 2.2.4 in Commission Regulation (EC) No 976/2009).

Section 11.2 specifies one style for each of these layers. It is proposed that INSPIRE view services support this style as the default style required by Article 14(1b).

**TG Requirement 1** For each layer specified in this section, the styles defined in section 11.2 shall be available.

**NOTE** The default style should be used for portrayal by the view network service if no user-defined style is specified in a portrayal request for a specific layer.

In section 11.3, further styles can be specified that represent examples of styles typically used in a thematic domain. It is recommended that also these styles should be supported by INSPIRE view services, where applicable.

**Recommendation 2** In addition, it is recommended that, where applicable, INSPIRE view services also support the styles defined in section 11.3.

Where XML fragments are used in the following sections, the following namespace prefixes apply:

- sld="http://www.opengis.net/sld" (WMS/SLD 1.1)
- se="http://www.opengis.net/se" (SE 1.1)
- ogc="http://www.opengis.net/ogc" (FE 1.1)

<sup>1</sup> OJ L 274, 20.10.2009, p. 9.

## 11.1 Layers to be provided by INSPIRE view services

No layers are specified for the themes Atmospheric Conditions and Meteorological Geographical Features.

The generic data model used for defining spatial objects for the AC-MF theme is based on the Observations & Measurements standard (O&M, ISO 19156:2011). Each O&M Observation instance models an observation event for estimating the values one or more atmospherically meaningful properties at a particular place and time (past or future at the time of making the observation). These Observation events are the only spatial objects of the AC-MF data model.

The layers provided by an INSPIRE View Service offering AC-MF data sets typically do not try to visualise the geometries or temporal properties of O&M Observation events, or their features-of-interest, but the results of these Observation events. These result objects are typically modelled as discrete coverages.

The Technical Guidance for the implementation of INSPIRE View Services, version 3.0<sup>2</sup> contains the following requirement considering the Name property of the INSPIRE View Service:

**"Implementation Requirement 39** Name shall be mapped with the <wms:Name> element. The harmonised name of a layer shall comply with the Layer requirements of the [INS DS, Article 14]"

However, the annex II of referred EU Commission regulation only defines the layer names for INSPIRE Annex I themes. The intended relationship between INSPIRE datasets and the View Service layers are further defined in the Draft Implementing Rule View Service, version 3.0<sup>3</sup>:

"An INSPIRE theme may include several layers, such as the "transport theme", and for each INSPIRE theme the related layer(s) shall be defined. They have the same title but in various languages (read by humans) across all the MS. They shall have the same name (read by machines, eventually keywords from a controlled list corresponding to data themes) across Europe so that it will be possible for a client application to ask to several View Services one specific layer (using the "harmonised" name). This harmonised name is given by Data Specification Implementing Rules for each INSPIRE theme."

All spatial objects of the AC-MF theme consist of O&M Observation objects, regardless of the types of the contained estimated properties, like precipitation or wind speed. Thus it's not useful from the end-user perspective to follow the harmonised layer naming convention of the Annex I and II consisting of a theme-specific prefix followed by the name of the spatial object type (like GN.GeographicalNames). If the harmonised naming convention mentioned above would be followed, all the layers would be either of type "ACMF.OM Observation", with no indication of the actual data content visualised by the layer.

The requirement for using harmonised layer names for the AC-MF View Services is not just non-informational, but would also cause serious implementation difficulties for the data providers. In many cases the same service instances used for providing the INSPIRE View Services are also used for providing the same data for fulfilling other national or EU level regulations and data exchange agreements. In these cases the layer names may also be specified by those agreements, or the use of names descriptive in all the involved contexts is required.

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2 Technical Guidance for the implementation of INSPIRE View Services,  
[http://inspire.jrc.ec.europa.eu/documents/Network\\_Services/TechnicalGuidance\\_ViewServices\\_v3.0.pdf](http://inspire.jrc.ec.europa.eu/documents/Network_Services/TechnicalGuidance_ViewServices_v3.0.pdf)

3 D3.7.2 Draft Implementing Rules for View Services,  
[http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/network/D3.7.2\\_Draft\\_IR\\_View\\_Services\\_v3.0.pdf](http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/network/D3.7.2_Draft_IR_View_Services_v3.0.pdf)  
, page 9

**Recommendation 3** Providers of INSPIRE View Services for Atmospheric Conditions compliant spatial data are free to use any text as values of the Name properties for the provided layers. The use of theme-specific INSPIRE harmonised layer names is not required for AC-MF data sets.

It's still very important to be able to ensure the interoperability of the AC-MF View Services, even when harmonised layer names cannot be used for that purpose: The users of the View Services of different providers should be able to find out which layers (if any) provided by both providers offer visualisations of the same measured or predicted atmospheric properties. This need of using harmonised property names between different data providers has been widely recognised in the scientific community, and several well-know code lists and standardised parameter name lists are currently in use, such as the WMO GRIB codes , Climate Forecast Conventions (CF) Standard names and the NASA Semantic Web for Earth and Environmental Terminology (SWEET) Ontology classes.

**Recommendation 4** For INSPIRE View Services for Atmospheric Conditions theme implemented using OGC WMS 1.3, it is recommended to use the layer specific "Keyword" elements to provide detailed information about the atmospheric properties visualised by the layer. More than one Keyword element with a different "vocabulary" attribute per layer may be used for referring to alternative sources of property definitions.

**Recommendation 5** Each layer should include at least one Keyword element with its "vocabulary" attribute referring to a well-know catalog, dictionary or another machine-readable online source providing a non-ambiguous definition of the underlying atmospheric property visualised as that layer.

The Keyword approach allows the users of AC-MF View Services to recognise the basic geophysical properties, like air temperature, behind each View Service layer, even if the exact definition of the the property would be a complicated one (monthly mean of the daily maximum of the air temperature measurements at 10m height from the ground).

#### Example: A WMS 1.3 Capabilities document fragment with atmospheric properties for each layer identified by Keyword elements

```
<wms:WMS_Capabilities version="1.3.0" xmlns:wms="http://www.opengis.net/wms">
  ...
  <wms:Capability>
    ...
    <wms:Layer>
      <wms:Title>Latest ECMWF Deterministic Model Run</wms:Title>
      <wms:Layer>
        <wms:Name>[any name appropriate in the usage context]</wms:Name>
        <wms:Title>[any human-readable, localized title]</wms:Title>
        <KeywordList>
          <Keyword vocabulary=" urn:x-inspire:specification:DS-AC-MF:observable-
property-name:WMO:GRIB-code:2010">001</Keyword>
          <Keyword vocabulary=" urn:x-inspire:specification:DS-AC-MF:observable-
property-name:cf-standard-name:1.6">air_pressure</Keyword>
        </KeywordList>
        <MetadataURL type="ISO-19115:2003">
          <Format>application/gml+xml; version=3.2</Format>
          <OnlineResource xlink:type="simple" xlink:href="http://discovery-
service.some.org/?SERVICE=CSW&VERSION=2.0.2&REQUEST=GetRecordById&ID=95
558944&outputSchema=http://www.isotc211.org/2005/gmd&elementSetName=full"/>
        </MetadataURL>
      </wms:Layer>
    </wms:Layer>
    <wms:Layer>
      <wms:Name>[any name appropriate in the usage context]</wms:Name>
      <wms:Title>[any human-readable, localized title]</wms:Title>
      <KeywordList>
        <Keyword vocabulary="urn:x-inspire:specification:DS-AC-MF:observable-
property-names:WMO:GRIB-code:GRIB:2010">011</Keyword>
```

```

    <Keyword vocabulary="urn:x-inspire:specification:DS-AC-MF:observable-
property-name:cf-standard-name:1.6">air_temperature</Keyword>
  </KeywordList>
  <MetadataURL type="ISO-19115:2003">
    <Format>application/gml+xml; version=3.2</Format>
    <OnlineResource xlink:type="simple" xlink:href="http://discovery-
service.some.org/?SERVICE=CSW&VERSION=2.0.2&REQUEST=GetRecordById&ID=95
558944&outputSchema=http://www.isotc211.org/2005/gmd&elementSetName=full"/>
  </MetadataURL>
</wms:Layer>
</wms:Layer>
</wms:Capability>
</wms:WMS_Capabilities>

```

The names used as values of the "vocabulary" attribute for these keywords should be commonly standardised among the AC-MF INSPIRE user community and a machine-readable metadata description for each of them should be accessible at well-known community catalogs or registries. The allowed values for the values of the vocabulary attribute is not restricted by this document, because this would make the specification too inflexible. However, to encourage harmonisation, two standard vocabularies are recommended here pointing to well-known atmospheric property name definitions: the WMO GRIB codes and the CF convention standard-names:

**Recommendation 6** If a layer of an INSPIRE View Service for AC-MF datasets visualises a geophysical property that has name in GRIB Code and Flag table 4.2 defined in the WMO Manual of Codes<sup>4</sup>, it should contain a "Keyword" element with a vocabulary attribute value identifiable with the WMO GRIB codes. If this vocabulary is used, the value of the Keyword element must be the numerical GRIB code for the corresponding property as a string with possible leading zeros.

**Recommendation 7** If an INSPIRE View Service layer visualises a geophysical property that has name in CF Conventions Standard Names, it should contain a "Keyword" element with the vocabulary attribute value identifiable with CF Standard names. If this vocabulary is used, the value of the Keyword element must be the same as the CF "Standard name" for the corresponding property.

It's worth pointing out that the client software should make no assumptions on the data format of the visualised data set based on the used property identifying vocabulary: The GRIB code table name for air temperature "001" may be used for identifying an air temperature layer even if the visualised data had never been encoded in a GRIB file.

A detailed example of a INSPIRE AC-MF compliant WMS 1.3 Capabilities document with the INSPIRE service level metadata references is provided as Annex F.

### IR Requirement Article 14 Portrayal

(...)

3. For spatial object types whose objects can be further classified using a code list-valued attribute, several layers may be defined. Each of these layers shall include the spatial objects corresponding to one specific code list value. In the definition of such sets of layers in Annexes II-IV,
  - (a) the placeholder <CodeListValue> shall represent the values of the relevant code list, with the first letter in upper case,
  - (b) the placeholder <human-readable name> shall represent the human-readable name of the code list values;

- |   |
|---|
| (c) the spatial object type shall include the relevant attribute and code list, in parentheses;<br>(d) one example of a layer shall be given. |
|---|

#### **11.1.1 Layers organisation**

None.

### **11.2 Styles required to be supported by INSPIRE view services**

An even more difficult task than defining layer names, is to define a standard visualisation styles for atmospheric coverage data. Well-known and widely used, even legally mandating meteorological data visualisation styles have been defined by the WMO and ICAO, but these are designed for specific usage contexts (weather forecasters and aviation), and may not be suitable for non-expert or cross-theme usage contexts.

Most meteorological properties are portrayed differently according to the intended usage: For example a ground temperature coverage could be visualised as a colour map, an isoline contour plot, or as numerical values at certain points on a map. Which visualisation is the most suitable not only depends on a use case, but also from the selected visualisation styles of other layers at display.

For the reasons stated above, this document does not specify any requirements or recommendations for styling of the meteorological coverage data as INSPIRE View Service layers. It is however recommended that existing de facto or de jure standards for coverage and feature meteorological data visualisation be used when the anticipated user community is expecting them: If the service is mainly intended for meteorological expert users, then the visualisations should follow the WMO meteorological data visualisation standards as closely as possible. The compliance with existing visualisation standards should be indicated in the layer or service metadata.

### **11.3 Styles recommended to be supported by INSPIRE view services**

No other styles are recommended.