Tutorial on EUMETView Service access through WMS GetCapabilities and GetMap requests

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1 INTRODUCTION

This guide describes how users can access the EUMETView WMS Service just sending a simple request to the server by an URL. In the next paragraphs the basic concepts of how a web service works will be described, then the required steps to create an URL to connect to EUMETView WMS Service will be explained.

If you need an explanation of what is EUMETView WMS Service is, which are the available layers, and a detailed description of WMS Service characteristics and usages, please refer to the guide "Tutorial on EUMETView Service – Introduction" in the same web page of this guide.

2 SENDING REQUESTS TO A WMS SERVICE

If you want to interact with a WMS Service, you will need a client which can connect to the service. A generic web browser is the simplest client (software component that can invoke an operation from a server) of a WMS Service.
Requests to WMS Service can be issued through HTTP, in particular client applications work with a string created by appending parameters to the service's URL.
A request to the WMS is a URL (or better a string) composed by different parts: the first one is a link to the WMS service, then, using different separators, a certain number of couples parameter/value will follow (the first two are the type of service and the type of request). The type of parameters change according to the type of request, and their corresponding values change according to what the user wants.

Here is a generic request to a WMS Service:

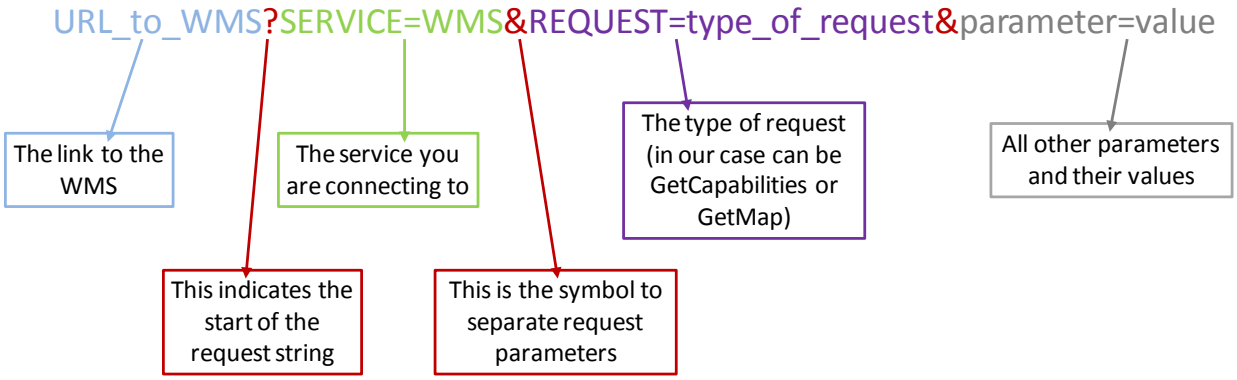


Figure 1: Structure of a generic WMS request

To connect to the WMS service, you have to know the service URL (location of the WMS service). This location is usually known as "end point" of the service.
EUMETView WMS Service URL is: http://eumetview.eumetsat.int/geoserver/wms.

The responses (or exceptions) from a WMS request are returned from the server to the client through the web browser, in different formats.
A WMS service requests from a client can perform different operations (which correspond to different request types), all described in detail in the OGC WMS specification (http://portal.opengeospatial.org/files/?artifact_id=14416).
To download maps from EUMETView WMS Service, you have to send two different requests to the WMS in this order:

1. GetCapabilities request: to retrieve WMS metadata as an xml file.
2. GetMap request: the command to download the image you want.

2.1.1 How to send a GetCapabilities request

GetCapabilities request retrieves metadata about a WMS server, including how to generate WMS requests and what parameters can be used. The returned metadata file includes supported operations and parameters, and a list of the available layers. Metadata for each layer include: bounding box, coordinate reference system, URI of the data, whether the layer is opaque or not etc.
There are three parameters (and values) that always have to be passed in a GetCapabilities request:

Request parameter	Value description
SERVICE	The service name. It tells the server that a WMS request is forthcoming.
VERSION	It tells the server which version of the WMS is being requested (in the case of EUMETView WMS Service is 1.3.0)
REQUEST	The name of the operation. It tells the server that the operation requested is the GetCapabilities operation.

Table 1: Parameters and values of a GetCapabilities request

If you want to perform a GetCapabilities request on EUMETView WMS Service, you'll need to append in the same string the URL to the WMS and the required parameters/values couples.
Following the request structure of the previous figure, here is how to send the request:

```
http://eumetview.eumetsat.int/geoserver/wms?SERVICE=WMS&REQUEST=
GetCapabilities&version=1.3.0
```

If you copy and paste this link in a web browser (remember not to put spaces in the URL), the returned response will be the WMS metadata as a Capabilities XML document (Extensible

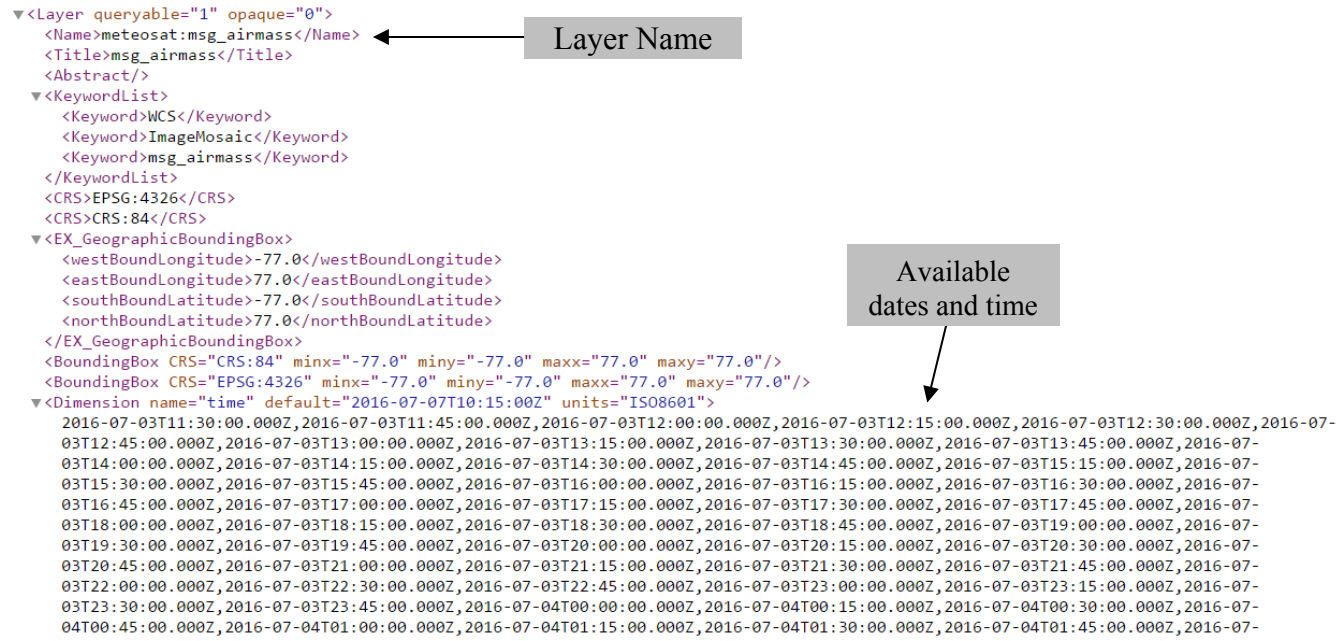
Mark-up Language, a mark-up language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable).

This document is a detailed description of the WMS service. It contains three main sections:

Service	It contains service metadata (for example the service name, the keywords, contact information and so on).
Request	It describes the operations the WMS service provides and the parameters and output formats for each operation.
Layer	It is a list of the available coordinate systems and layers. In the case of EUMETView WMS server, layers are named in the form "instrument:layer". For each layer service metadata such as title, abstract and keywords are provided.

Table 2: Sections of a GetCapabilities xml response

Once you have the metadata file, you can search the name of the layer you want to download (for example, let's search the Meteosat Airmass layer: you can find it in the xml under the tag Name with the value "Meteosat:msg_airmass"). Then, you can see the available date/times below the layer name.




```
▼<Layer queryable="1" opaque="0">
   <Name>meteosat:msg_airmass</Name>
   <Title>msg_airmass</Title>
   <Abstract/>
  ▼<KeywordList>
     <Keyword>WCS</Keyword>
     <Keyword>ImageMosaic</Keyword>
     <Keyword>msg_airmass</Keyword>
   </KeywordList>
   <CRS>EPSG:4326</CRS>
   <CRS>CRS:84</CRS>
  ▼<EX_GeographicBoundingBox>
     <westBoundLongitude>-77.0</westBoundLongitude>
     <eastBoundLongitude>77.0</eastBoundLongitude>
     <southBoundLatitude>-77.0</southBoundLatitude>
     <northBoundLatitude>77.0</northBoundLatitude>
   </EX_GeographicBoundingBox>
   <BoundingBox CRS="CRS:84" minx="-77.0" miny="-77.0" maxx="77.0" maxy="77.0"/>
   <BoundingBox CRS="EPSG:4326" minx="-77.0" miny="-77.0" maxx="77.0" maxy="77.0"/>
  ▼<Dimension name="time" default="2016-07-07T10:15:00Z" units="ISO8601">
     2016-07-03T11:30:00.000Z,2016-07-03T11:45:00.000Z,2016-07-03T12:00:00.000Z,2016-07-03T12:15:00.000Z,2016-07-03T12:30:00.000Z,2016-07-
     03T12:45:00.000Z,2016-07-03T13:00:00.000Z,2016-07-03T13:15:00.000Z,2016-07-03T13:30:00.000Z,2016-07-03T13:45:00.000Z,2016-07-
     03T14:00:00.000Z,2016-07-03T14:15:00.000Z,2016-07-03T14:30:00.000Z,2016-07-03T14:45:00.000Z,2016-07-03T15:15:00.000Z,2016-07-
     03T15:30:00.000Z,2016-07-03T15:45:00.000Z,2016-07-03T16:00:00.000Z,2016-07-03T16:15:00.000Z,2016-07-03T16:30:00.000Z,2016-07-
     03T16:45:00.000Z,2016-07-03T17:00:00.000Z,2016-07-03T17:15:00.000Z,2016-07-03T17:30:00.000Z,2016-07-03T17:45:00.000Z,2016-07-
     03T18:00:00.000Z,2016-07-03T18:15:00.000Z,2016-07-03T18:30:00.000Z,2016-07-03T18:45:00.000Z,2016-07-03T19:00:00.000Z,2016-07-
     03T19:30:00.000Z,2016-07-03T19:45:00.000Z,2016-07-03T20:00:00.000Z,2016-07-03T20:15:00.000Z,2016-07-03T20:30:00.000Z,2016-07-
     03T20:45:00.000Z,2016-07-03T21:00:00.000Z,2016-07-03T21:15:00.000Z,2016-07-03T21:30:00.000Z,2016-07-03T21:45:00.000Z,2016-07-
     03T22:00:00.000Z,2016-07-03T22:30:00.000Z,2016-07-03T22:45:00.000Z,2016-07-03T23:00:00.000Z,2016-07-03T23:15:00.000Z,2016-07-
     03T23:30:00.000Z,2016-07-03T23:45:00.000Z,2016-07-04T00:00:00.000Z,2016-07-04T00:15:00.000Z,2016-07-04T00:30:00.000Z,2016-07-
     04T00:45:00.000Z,2016-07-04T01:00:00.000Z,2016-07-04T01:15:00.000Z,2016-07-04T01:30:00.000Z,2016-07-04T01:45:00.000Z,2016-07-
```

Figure 2: Example of a GetCapabilities response xml file

You can display only maps in the date/time listed in metadata xml.

When you decide the layer and the date/time you want to display, you have to send a GetMap request.

2.1.2 How to send a GetMap request

A WMS server responding to a GetMap request returns a map image for a specified area and content.
The request has a similar structure as the GetCapabilities request, but you will need to specify further parameters/value couples.
For example, if you want to download METEOSAT Airmass map in the Western European area, you have to append to the request the following parameters/values (separated by the "&" symbol):

Parameter name	Description	Value
LAYERS	The layer name	Meteosat%3Amsg_airmass%2Coverlay%3Avector-overlay
VERSION	EUMETSAT WMS version	1.3.0
STYLES	The rendering style	raster%2C
TRANSPARENT	Layer transparency	TRUE
EXCEPTIONS	The format in which exceptions will be reported by the WMS	INIMAGE
WIDTH, HEIGHT	Width and height in pixels of the downloaded image	844, 487
FORMAT	The format of the downloaded image (in this case let's download a jpeg file)	image%2Fjpeg
BBOX	The area of interest. It is required in the form latitude/longitude or y/x.	31.58624985069, -36.205000251532, 70.41375014931, 29.205000251532
SRS	The Coordinate reference system (in this case is WGS84)	EPSG%3A4326
TIME	The date/time of the image. Let's choose as date July, 07 2016 and as time 10:45:00	2016-07-17T10%3A45%3A00.000Z

Table 3: Parameters and values of a GetMap request

So, the string to request the map is the following:

```
http://eumetview.eumetsat.int/geoserv/wms?SERVICE=WMS&REQUEST=GetMap&TRANSPARENT=TRUE&EXCEPTIONS=INIMAGE&VERSION=1.3.0&LAYERS=meteosat%3Amsg_airmass%2Coverlay%3Avector-overlay&STYLES=raster%2C&SRS=EPSG%3A4326&WIDTH=844&HEIGHT=487&BBOX=31.58624985069,-36.205000251532,70.41375014931,29.205000251532&FORMAT=image%2Fjpeg&TIME=2016-07-17T10%3A45%3A00.000Z&
```

When you paste this URL it in the browser, this will be the result:

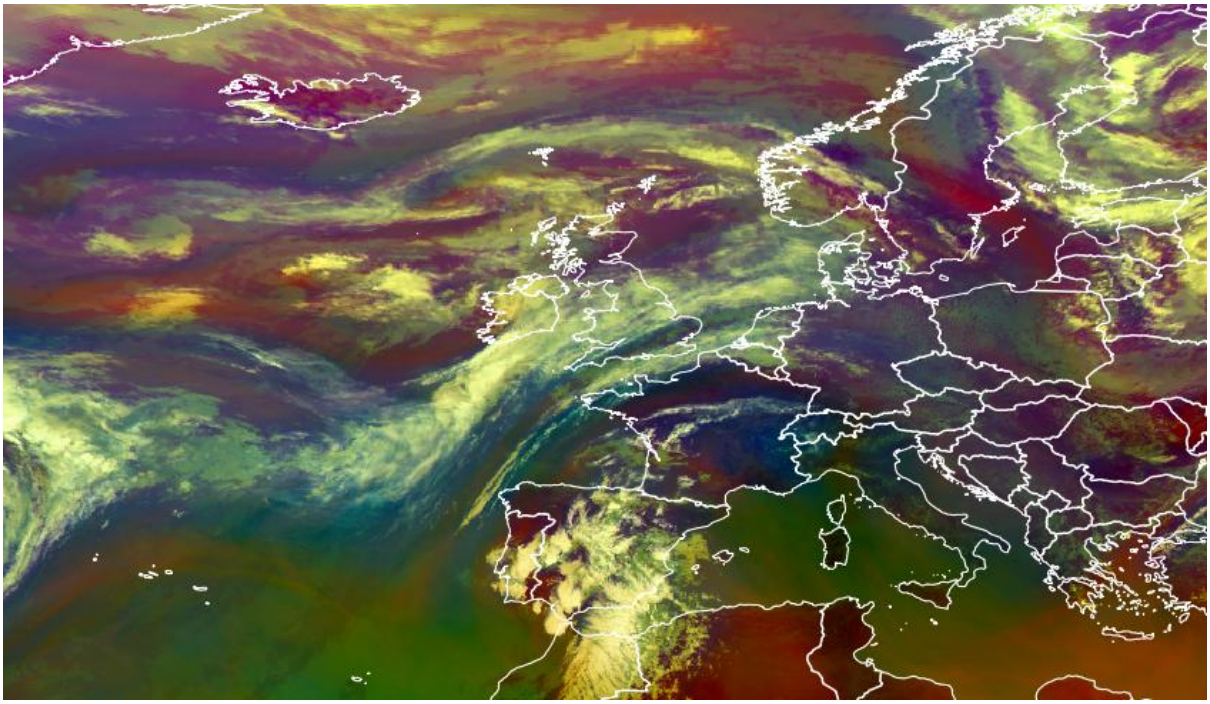


Figure 3: Resulting image from the GetMap request
(http://eumetview.eumetsat.int/geoserv/wms?SERVICE=WMS&REQUEST=GetMap&TRANSPARENT=TRUE&EXCEPTIONS=INIMAGE&VERSION=1.3.0&LAYERS=meteosat%3Amsg_airmass%2Coverlay%3Avector-overlay&STYLES=raster%2C&SRS=EPSG%3A4326&WIDTH=844&HEIGHT=487&BBOX=31.58624985069,-36.205000251532,70.41375014931,29.205000251532&FORMAT=image%2Fjpeg&TIME=2016-07-17T10%3A45%3A00.000Z&)

If you want to download other layers, or other zones or other times, just change the values to LAYERS, BBOX and TIME parameters.