

# **Quick Start Guide - GeoNetwork opensource Version 2.1.0**

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# Chapter 1. A Geographic Information Management System for all

## 1.1. Introduction

GeoNetwork opensource is a standard based and decentralized spatial information management system, designed to enable access to geo-referenced databases and cartographic products from a variety of data providers through descriptive metadata, enhancing the spatial information exchange and sharing between organizations and their audience, using the capacities and the power of the Internet. The system provides a broad community of users with easy and timely access to available spatial data and thematic maps from multidisciplinary sources, that may in the end support informed decision making. The main goal of the GeoNetwork software is to increase collaboration within and between organizations for reducing duplication and enhancing information consistency and quality and to improve the accessibility of a wide variety of geographic information along with the associated information, organized and documented in a standard and consistent way.

### GeoNetwork Main Features

- Instant search on local and distributed geospatial catalogues
- Uploading and downloading of data, documents, PDF's and any other content
- An interactive Web map viewer that combines Web Map Services from distributed servers around the world
- Online map layout generation and export in PDF format
- Online editing of metadata with a powerful template system
- Scheduled harvesting and synchronization of metadata between distributed catalogues
- Groups and users management
- Fine grained access control

## 1.2. GeoNetwork opensource background and its evolution

The prototype of the GeoNetwork catalog was developed by the Food and Agriculture Organization of the United Nations (FAO) in 2001 to systematically archive and publish the geographic datasets produced within the Organization. The prototype was built on experiences within and outside the organization. It used metadata content available from legacy systems that was transformed into what was then only a draft metadata standard, the ISO 19115. Later on, another UN agency, the World Food Programme (WFP) joined the project and with its contribution the first version of the software was released in 2003 and operational catalogues were established in FAO and WFP. The system was based on the ISO19115:DIS metadata standard and embedded the Web Map Client InterMap that supported Open Geospatial Consortium (OGC) compliant Web Map Services. Distributed searches were possible using the standard Z39.50 catalog protocol. At that moment it was decided to develop the program as a Free and Open Source Software to allow the whole geospatial users community to benefit from the development results and to contribute to the further advancement of the software.

Jointly with the UN Environmental Programme (UNEP), FAO developed a second version in 2004. The new release allowed users to work with multiple metadata standards (ISO 19115, FGDC and Dublin Core) in a transparent manner. It also allowed metadata to be shared between catalogues through a caching mechanism, improving reliability when searching in multiple catalogues.

In 2006, the GeoNetwork team dedicated efforts to develop a DVD containing the GeoNetwork version 2.0.3 and the best free and open source software in the field of Geoinformatics. The DVD was produced and distributed in hard copy to over three thousand people and is now also available for download from the <http://geonetwork-opensource.org> Web site.

The latest release of GeoNetwork version 2.1, issued in late 2007, is the result of another round of critical improvements, supported by FAO, the UN Office for the Coordination of Humanitarian Affairs (UNOCHA), the Consultative Group on International Agricultural Research (CSI-CGIAR), UNEP and other donors. Support for the final metadata standard ISO19115:2003 has been enabled by using the ISO19139:2007 implementation specification schema published in May 2007. The release also serves as the open source reference implementation of the OGC Catalog Service for the Web (CSW 2.0.1) specification. Improvements to give users a more responsive and interactive experience have been substantial and include a new Web map viewer and a complete revision of search interface.

## **1.3. The use of Standards**

GeoNetwork has been developed following the principles of a Free and Open Source Software (FOSS) and based on International and Open Standards for services and protocols, like the ISO-TC211 and the Open Geospatial Consortium (OGC) specifications. The GeoNetwork architecture is largely compatible with the OGC Portal Reference Architecture, i.e. the OGC guide for implementing standardized geospatial portals. Indeed, the GeoNetwork' own structure relies on the same three main modules identified by the OGC Portal Reference Architecture, that are focused on spatial data, metadata and interactive map visualization. GeoNetwork is also fully compliant with the OGC specifications for querying and retrieving information from Web catalogues (CSW 2.0.1). GeoNetwork supports the most common standards to specifically describe geographic data (ISO19139 and FGDC) and the international standard for general documents (Dublin Core). It uses standards (OGS WMS) also for visualizing maps through the Internet.

## **1.4. Harvesting geospatial data in a shared environment**

Within the geographic information environment, the increased collaboration between data providers and their efforts to reduce duplication have stimulated the development of tools and systems to significantly improve the information sharing and guarantee an easier and quicker access of data from a variety of sources without undermining the ownership of the information. The harvesting functionality in GeoNetwork is a mechanism of data collection in perfect accordance with both rights to data access and data ownership protection. Through the harvesting functionality it is possible to collect public information from the different GeoNetwork nodes installed around the world and to copy and store periodically this information locally. In this way a user from a single entry point can get information also from distributed catalogues. The logo posted on top each harvested record informs the user about the data source.

## **1.5. GeoNetwork and the Open Source Community Development**

The community of users and developers of the GeoNetwork software has increased dramatically since the release of version 2.0 in December 2005 and the subsequent pre-releases of version 2.1. At present, the user and developer mailing lists count nearly 200 subscriptions each. Subscription to these lists is open to anyone interested. The archive of the mailing lists provides an important resource for users and can be freely browsed online. Members provide feedback within the community and provide translations, new functionalities, bug reports, fixes and instructions to the project as a whole. Building a self sustaining community of users and developers is one of the biggest challenges for the project. This community-building process relies on active participation and interaction of its members. It also relies on building trust and operating in a transparent manner, thereby agreeing on the overall

objectives, prioritization and long term direction of the project. A number of actions have been taken by the project team to facilitate this process.

The foundation for the establishment of a GeoNetwork Advisory Board was laid at the 2006 workshop in Rome and membership criteria were defined.

A work plan is presented and discussed at the yearly GeoNetwork workshop; subsequently, the plan is maintained and updated throughout the year where needed. The project management team reports back to the advisory board about the reached developments and objectives during the annual workshops.

Two public Websites have been established. One focuses on the users of the software (<http://geonetwork-opensource.org>), while the other one is dedicated to the developers (<http://trac-osgeo.org/geonetwork>). Both can be updated and maintained online by trusted members of the community. They provide documentation, bug reporting and tracking, Wiki pages et cetera. A small part of the community connects through Internet Relay Chat (IRC) on a public geonetwork channel. But most interaction takes place on the user and the developer mailing lists.

During the 2006 workshop, the project advisory board decided to propose the GeoNetwork opensource project as an incubator project to the newly founded Open Source Geospatial Foundation (OSGeo). This incubation process is currently ongoing but close to conclusions. The project Websites has been moved to servers accessible under the umbrella of the OSGeo foundation. Web pages have been updated to reflect the OSGeo principles and a source code review performed.

Source code is maintained in a publicly accessible code repository, hosted at an independent service provider, SourceForge.net that hosts thousands of FOSS projects. Developers and users have full access to all sections of the source code, while trusted developers can make changes in the repository itself. A special mailing list has been established to monitor changes in the code repository. This so-called "commit mailing list" delivers change reports by email to its subscribers.

Standardizing documentation development is the next challenge taken up by the project to ensure versioning and support of multiple output formats (e.g. HTML and PDF).

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# Chapter 2. Metadata Theoretical concepts

## 2.1. What is Metadata?

Metadata, commonly defined as “data about data”, is a structured set of information which describes data (including both digital and non-digital datasets) stored in administrative systems. Metadata may provide a short summary about the content, purpose, quality, location of the data as well as information related to its creation.

## 2.2. What are Metadata Standards?

Metadata standards provide data producers with the format and content for properly describing their data, allowing users to evaluate the usefulness of the data in addressing their specific needs.

## 2.3. Why do we need Standardized Metadata?

Standardized metadata support users in effectively and efficiently accessing data by using a common set of terminology and metadata elements that allow for a quick means of data discovery and retrieval from metadata clearinghouses. The metadata based on standards ensure information consistency and quality and avoid that important parts of data knowledge are lost.

## 2.4. Geographic Information Metadata Standard

Geographic data, which can be defined as any data with a geographic component, is often produced by one individual or organization, and may address the needs of various users, including information system analysts, programme planners, developers of geographic information or policy makers. Proper standard documentation on geographic data enable different users to better evaluate the appropriateness of data to be used for data production, storage, update.

The metadata standards supported by GeoNetwork opensource are the **ISO 19115:2003** - approved by the international community in April 2003 as a tool to define metadata in the field of geographic information - and the **FGDC** - the metadata standard adopted in the United States by the Federal Geographic Data Committee. In addition, GNos supports also the international standard **Dublin Core** for the description of general documents.

This ISO Standard precisely defines how geographic information and related services should be described, providing mandatory and conditional metadata sections, metadata entities and metadata elements. This standard applies to data series, independent datasets, individual geographic features and feature properties. Despite ISO 19115:2003 was designed for digital data, its principles can be extended to many other forms of geographic data such as maps, charts, and textual documents as well as non-geographic data (ISO/FDIS 19115, 2003).



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# Chapter 3. Get connected to the new release!

## 3.1. New version - New functionalities

GeoNetwork opensource version 2.1.0 comes with substantial upgrades of different components for a more intuitive and responsive user-system interaction. Web2 technologies have been adopted, in particular AJAX techniques, to allow for more interactive and faster services in the web interface and for the integration of the existing web map viewer in the home page. Similar functionalities have been implemented in the administrative part of the system, to provide an easier access to the configuration pages related to site settings, catalogue harvesting, scheduling and maintenance.

The search interface has been completely overhauled to provide highly interactive searching capabilities. Furthermore, the new version of GNos embeds GeoServer as map server. Users can now not only overlay OGC web map services available on the web, but also create their own map services for other users to browse without having to download additional plugins. Maps created with web map services can be now saved as PDF and sent to others.

The metadata catalogue handles the latest ISO19115:2003 geographic metadata format based on the ISO191139 schemas, as well as the older ISO19115 final draft format, FGDC and Dublin Core. The metadata editor is able to handle the majority of these complex standards, providing default, advanced and XML editing online tools.

The new version has a number of different harvesting interfaces allowing users to connect their own server to many other catalogues around the world. This is the result of the implementation of the open source reference for the web catalog services according to OGC specifications. Harvesting in the new version is now fully compatible with GeoNetwork 2.0 and 2.1 nodes.

We have added advanced online and offline administration functionalities to configure, backup and migrate the application. We have also added a convenient import and export format "MEF" or Metadata Exchange Format, that allows the users to move metadata, previews and even data in a convenient single file. GNos can be easily expanded with plugins to export/import metadata to/from other software supporting MEF.

**Figure 3.1. Figure 3.1. Home page of the GeoNetwork opensource version 2.1.0**



## 3.2. Where do I get the GeoNetwork opensource installer?

You can find the Geonetwork opensource software on the Internet at the GeoNetwork opensource Community website <http://geonetwork-opensource.org>. The new version 2.1.0 is also distributed through the Sourceforge Website at <http://sourceforge.net/projects/geonetwork>.

## 3.3. System requirements

The GNos can run either on **MS Windows, Linux or Mac OS X**.

Some general system requirements for the software to run without problems are listed below:

**Processor:** 1 GHz or higher

**Memory (RAM):** 512 MB or higher

**Disk Space:** 30 MB minimum. However, it is suggested to have a minimum of 250 MB of free disk space. Additional space is required depending on the amount of spatial data that you expect to upload into the internal geodatabase.

**Other Software requirements:** A Java Runtime Environment (JRE 1.5.0). For server installations, Apache Tomcat and a dedicated JDBC compliant DBMS (MySQL, Oracle) are also required.

### Supporting Software

- Java Runtime Environment (JRE 1.4.0 +) (Windows & Linux)
- MySQL DBMS v5.5 (All)\*
- Apache Tomcat v5.5 (All)\*
- Apache HTTP v2.0 (Windows)
- Druid v3.8 (All)\*
- Firefox v1.5 (All)\*
- Internet Explorer (Windows)

\* All = Windows, Linux and Mac OS X

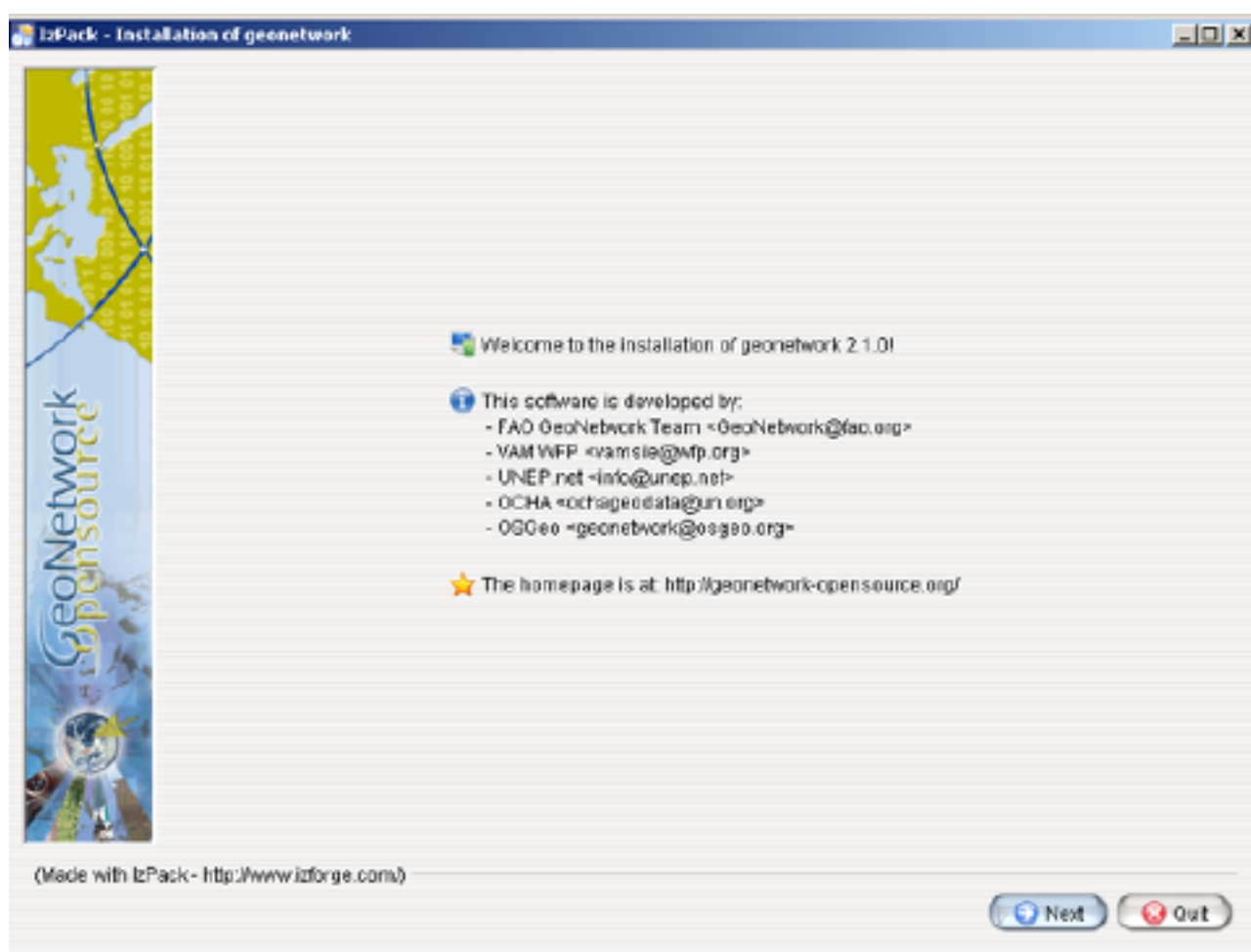
## 3.4. How do I install GeoNetwork opensource?

Before running the GeoNetwork installer, make sure that all system requirements are satisfied, and in particular that the Java Runtime Environment version 1.5.0 is set up on your machine.

If you use Windows, the following steps will guide you to complete the installation (other FOSS will follow):

1. Double click on **geonetwork-install-2.1.0.exe** to start the GeoNetwork opensource desktop installer
2. Follow the instructions on screen (figure 3.4)
3. After completion of the installation process, a 'GeoNetwork desktop' menu will be added to your Windows Start menu under 'Programs'
4. Click Start > Programs > GeoNetwork desktop > Start server to start the Geonetwork opensource Web server. The first time you do this, the system will require about 1 minute to complete startup.
5. Click Start > Programs > Geonetwork desktop > Open GeoNetwork opensource to start using GeoNetwork opensource, or connect your Web browser to <http://localhost8080/geonetwork/>

Figure 3.2. Figure 3.4



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## Chapter 4. Getting Started

There are no requirements for general visitors to search and access information in a GeoNetwork opensource based catalog. To get access to advanced features and restricted information, you need an account to log in (e.g. a username and password) that should be provided by the GNos administrator. Depending on your privileges, you will be able to access, submit and edit metadata records. Each user is assigned to a particular work group and is able to access data within that work group. To log in, simply go to the homepage and enter your username and password in the dedicated fields on the top right corner, then click the login button. (See figure 4)

**Figure 4.1. Figure 4**



The image shows a user interface for logging into a GeoNetwork catalog. At the top, there is a blue navigation bar with language links: "English | Français | Español | 中文". Below this bar, there is a login section with two input fields labeled "Username" and "Password", followed by a "Login" button.

English   Français   Español   中文		
Username	<input type="text"/>	Password <input type="password"/>
		Login

---

# Chapter 5. Searching for Maps and Data

There are many different ways to search the catalogue for maps and other geographic data. This guide will introduce you to the most popular search methods: default, advanced and by category. Whichever search you choose, remember that you will see results based on your privileges and assigned work group.

Note that the term **data** in this application refers to datasets, maps, tables, documents, etc. that are linked to the metadata of a specific record.

## 5.1. Default Search

The default search allows you to search text within the entire record, such as keywords of the metadata and/or geographic location.

For the free text search:

- **Enter** a search term or letter(s) in the **What?** field. You can use one or more thematic keyword(s) or strings in quotes. Keywords and operators (and, or, not) are not case sensitive. (See figure 5.1 a).

**Figure 5.1. Figure 5.1 a**

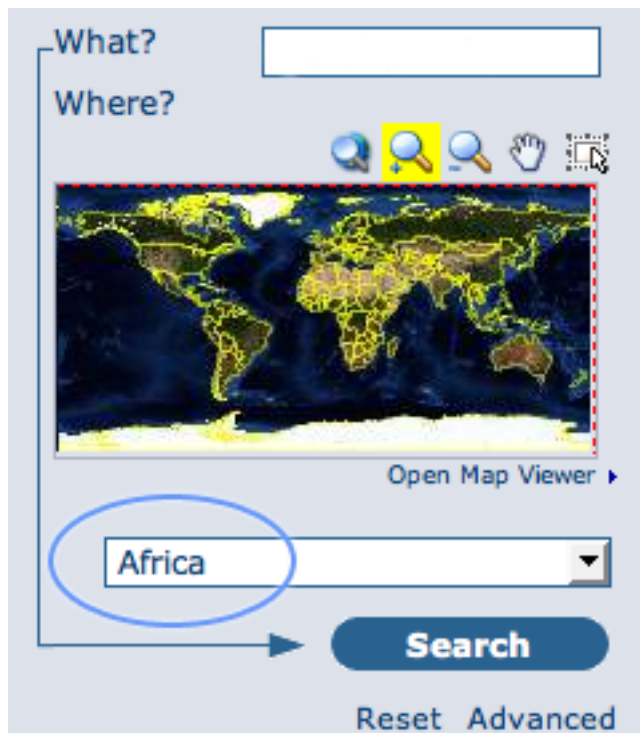


The screenshot shows a search interface with a light blue background. At the top left, the labels 'What?' and 'Where?' are visible. The 'What?' field contains the text 'Hydrological basins' and is circled in blue. Below this is a world map with yellow and green landmasses. To the right of the map is a button labeled 'Open Map Viewer' with a right-pointing arrow. Below the map is a dropdown menu currently showing 'Any'. At the bottom is a large blue 'Search' button. Below the 'Search' button are the links 'Reset' and 'Advanced'.

For the geographic search, two options are available for selecting a particular region to limit the search:

- You can select a **region from a predefined list**. (Figure 5.1 b);

Figure 5.2. Figure 5.1 b



- You can select your own **area of interest** in a more interactive way. A **small global map is shown on the screen from which you can drag and drop the frame of your location area**. Just click on the button on the upper right of the map screen. (**Figure 5.1 c**);

Figure 5.3. Figure 5.1 c



Both types of search, free text search and geographic search can be combined to restrict the query further.

- Click the **Search** button. (Figure 5.1 e).

**Figure 5.4. Figure 5.1 e**



## 5.2. Searching by Categories

An additional way to search data within the GeoNetwork database, from the home page, is searching by **Category**. A list of categories is provided to the user to identify data at a more generic level: **Applications, Audio/Video, Case study and best practices, Conference proceedings, Datasets, Directories, Interactive resources, Maps and graphics, Other information resources, Photo.**

To search only for maps, click on **Maps and Graphics** (Figure 5.2). A list of maps will be displayed from which you may view details of every single map; just clicking on the **Metadata** button of the map you wish to review.

**Figure 5.5. Figure 5.2**



## 5.3. Advanced Search

The advanced search option (Figure 5.3 a) works similarly to the default search. However, you can be more specific in your search criteria as it offers different elements to look for data, each of them answering one of the following questions:

- **WHAT?**

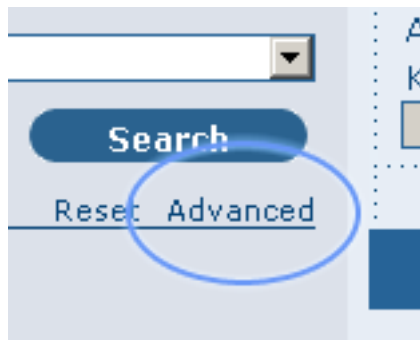


- **WHERE?**
- **WHEN?**

Figure 5.6. Figure 5.3 a

To perform an **advanced search**, from the home page **click Advanced** just below the search bottom (see figure 5.3 from the default search section).

Figure 5.7. Figure 5.3



In the **WHAT?** section the elements are all related to the data content. Through them, in addition to searching only free keywords in the entire metadata content, you can also search directly in the title or abstract fields and add more keywords to customize your search further. You can also specify the level of accuracy you wish to reach in performing your search. (Figure 5.3 b).

- To search by **Title**, **Abstract**, **Free Text**, or **Keyword(s)** type any text into the respective field. You can enter information in one or multiple field(s). If you do not want to search by a given field, simply leave it blank;
- You can choose the **accuracy of your search**, in terms of spelling words, from **Precise** = 1 to **Imprecise** = 0.2, through 3 more consecutive steps which are equal to 0.8, 0.6, 0.4.

**Figure 5.8. Figure 5.3 b**

The image shows a search interface with a light blue background. At the top left, the word "WHAT?" is written in bold blue text. Below it, there are four input fields: "What?" (empty), "Title" (containing "climate change"), "Abstract" (empty), and "Keywords" (containing "desertification"). To the right of the "Keywords" field is a small magnifying glass icon. Below these fields is a section titled "Search accuracy" in blue text. This section contains five radio buttons. The first two are labeled "Precise" and the last one is labeled "Imprecise". The second radio button from the left is selected, indicated by a black dot in the center. A blue arrow points downwards along the left side of the form.

The **WHERE?** parameters, which are related to the spatial extent, allow you, as in the default search, either to select your own area of interest or to select a predefined region from the drop-down list. In this section you can also type the geographic coordinates of a specific location that is not available from the above list. (Figure 5.3 c)

- To select **your own area of interest**, drag and drop the frame of your area on the global map using the appropriate tool on the bottom left of the map screen;
- To use **free coordinates**, type the lat-long geographic references in the appropriate fields around the map screen, without any limitation of decimal figures;
- To use the coordinates of a **predefined region**, select the region from the drop-down list.

**Figure 5.9. Figure 5.3 c**

**WHERE?**

lat (min) 34.64

long (min) -20.58

long (max) 91.199

lat (max) -54.46

Type  
Region

Spatial search type: overlaps

is  
overlaps  
encloses  
is fully outside of

Whatever type of geographic search you decide to perform, in the **Spatial search type** field, you can choose from different options: **is**, **overlaps**, **encloses**, **is fully outside of** (Figure 5.3 c). If you use this field, be cautious as this limits your output data as follows:

- If you choose **Spatial search type** *is* "Country", only maps for the selected country will be displayed. In other words, a city map within that country will not show in the output results.
- If you choose **Spatial search type** *overlaps* "Country", all maps with the bounding box overlapping that country will be displayed in the results, i.e. the neighbouring countries, the continent of which that country is part of and the global maps.
- If you choose **Spatial search type** *encloses* "Country" you will get, in the output results, maps of that country first and then all maps within its bounding box.
- Similarly, if you choose **Spatial search type** *is fully outside of* a selected region, only maps that follow that exact criteria will show in the output results.

The **WHEN?** section gives you the possibility to restrict your search in terms of temporal extent, indicating a specific range of time referred to the data creation or publication date (figure 5.3 d).

- To specify a range of time, click on the date selector button next to **From – To** fields. Make use of the symbols > and >> on top of the calendar to select the month and the year first and then click on the exact day; a complete date will be filled in using the following standard order: YY-MM-DD.
- To clean the time fields, simply click on the white cross on their right; the box **Any** will be automatically selected and the search will be performed without any restriction on the time period.

**Figure 5.10. Figure 5.3 d**

Finally, the advanced search allows you to apply further restrictions on the basis of additional parameters as data source, data categories and data format (see figure 5.3 e).

- To limit your queries to only one **Catalog** out of those made available by the installation through the harvesting process, highlight the catalog of preference or just keep **Any** selected to search all sites. (See more info about **data harvesting** in Section 4 Chapter 1 of these guidelines).
- To search for data organized by **Category**, such as Applications, Datasets, etc., simply highlight the category you wish to search in from the related drop-down list, otherwise we suggest to leave this field in **Any** Category.
- You can search for **Digital** or **Hard Copy** maps. To search in one or the other, simply check the box next to the one you wish to search. If no box is checked, all content will be searched.

At last, you can customize the number of output results per page in the **Hits Per Page** field. Simply highlight the number of records to be displayed or leave the field set on the default number (10).

- Click the **Search** button.

**Figure 5.11. Figure 5.3 e**

## 5.4. Analyzing Search Results

The output of a search provides you a list of the metadata records that should fit your request. For each record, the result page shows the title, an abstract and the keywords. According to the privileges

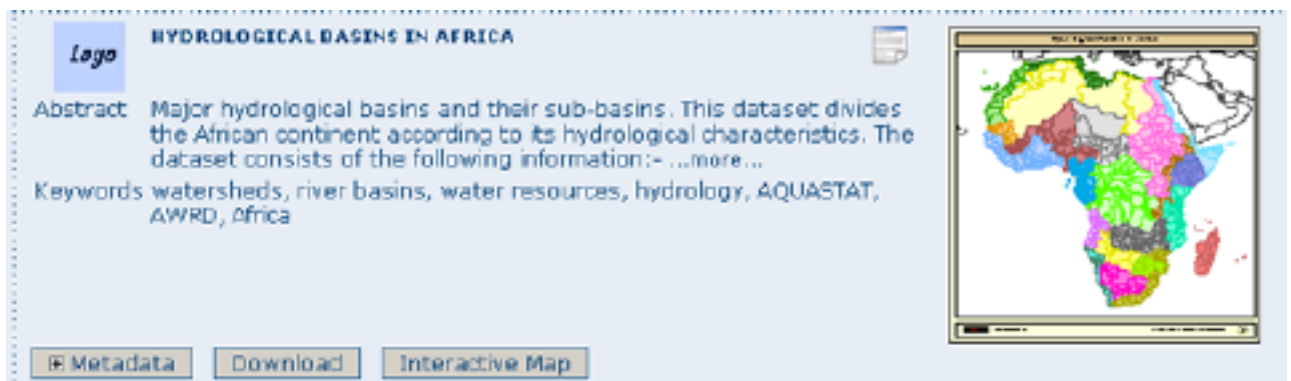
that have been set for each metadata, a maximum of four sections can be consulted, as shown below. (Figure 5.4)

**Figure 5.12. Figure 5.4**

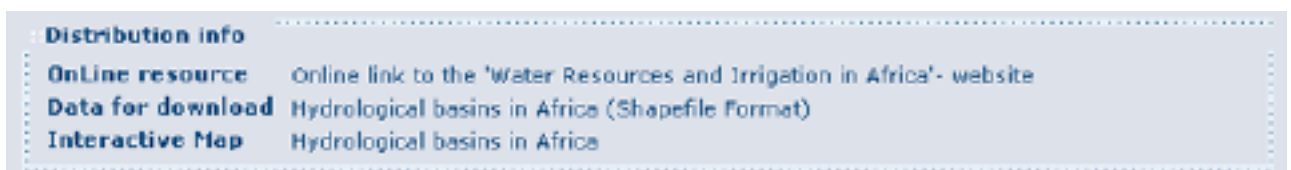


1. **Metadata:** The metadata section describes the dataset (e.g.: citation, data owner, temporal/spatial/methodological information) and could contain links to other web sites that could provide further information about the dataset.
2. **Download:** Depending on the privileges that have been set for each record, when this button is present, the dataset is available and downloadable. The downloadable package is in a compressed format and contains the data and any document or pictures can be included with the primary resources. Note: the actual size of the compressed package can't exceed 50 Mb. The process for retrieving data is simple and quick by just clicking the download button (fig.5.4.2 a) or by using the proper link in the specific metadata section for distribution info (fig.4.4.2 b).

**Figure 5.13. Figure 5.4.2 a**

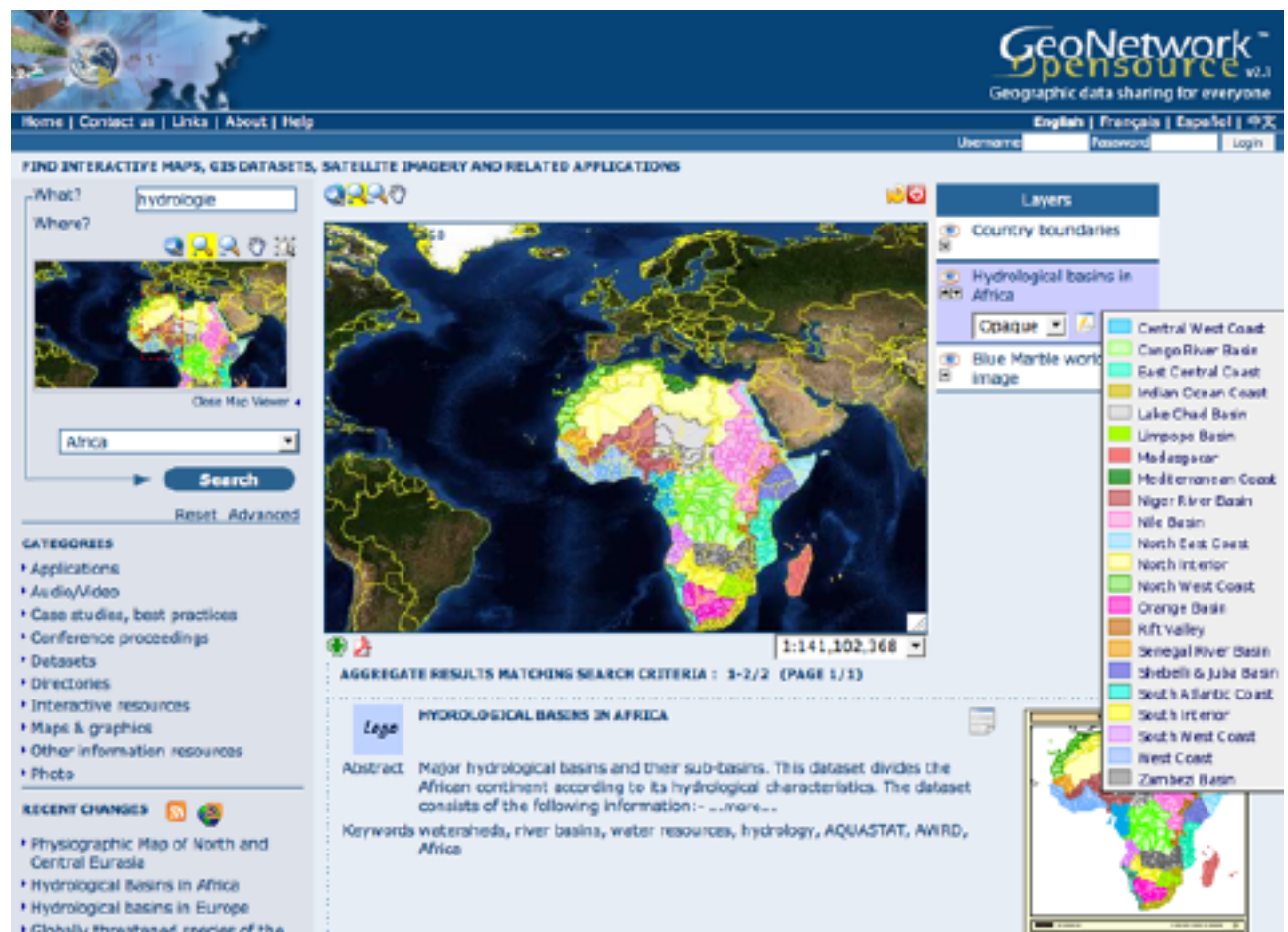


**Figure 5.14. Figure 5.4.2 b**



3. **Interactive Map:** The map service is also optional. When this button is shown, an interactive map for this layer is available and, by default, it will be displayed on the map screen of the simple search. To better visualize the map through the map viewer, **click on Open Map Viewer** on the bottom left of the map screen (figure 5.4.3).

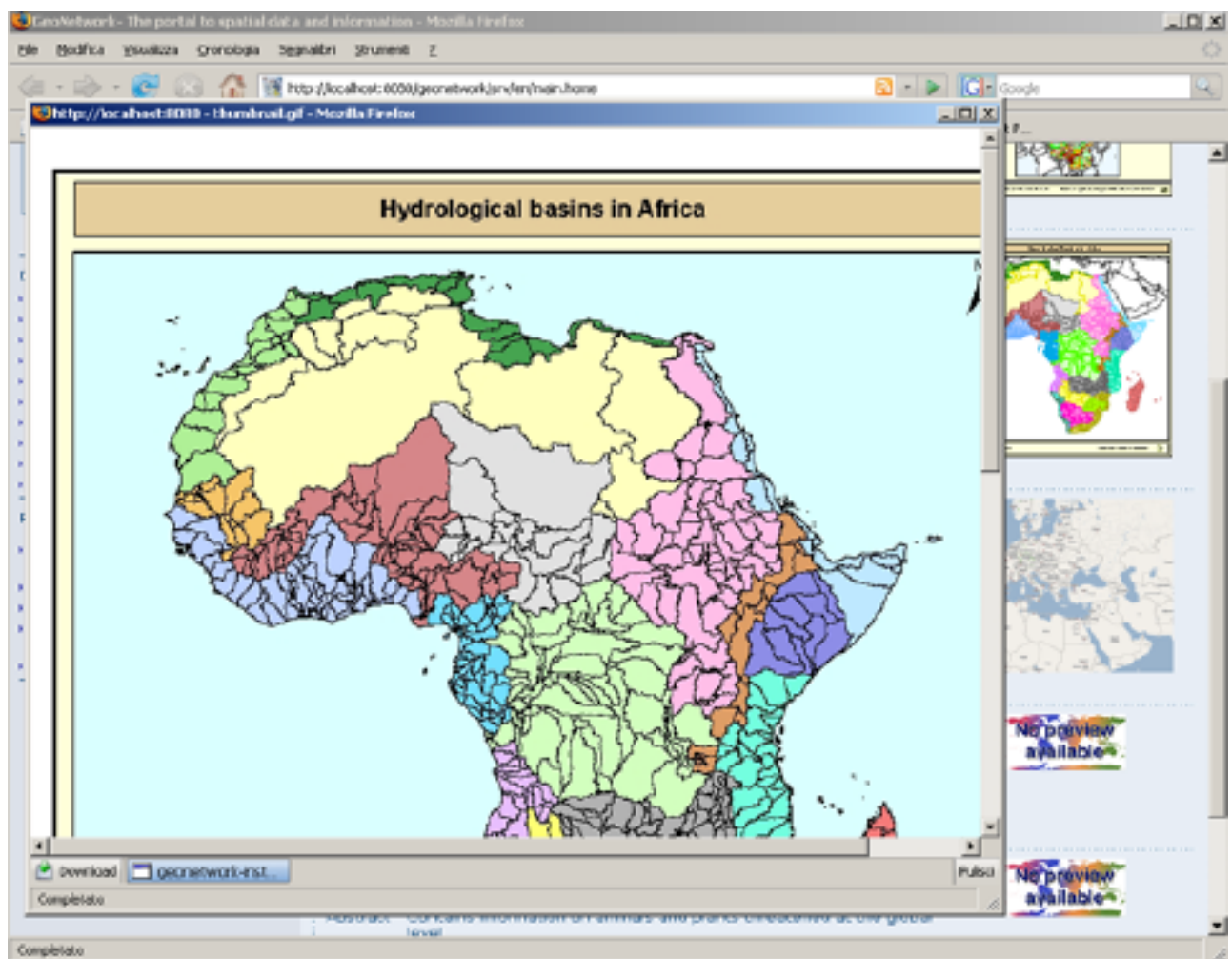
Figure 5.15. Figure 5.4.3



4. **Graphic Overviews:** There are small and large overviews of the map used to properly evaluate usefulness of the data, especially if the interactive map is not available. Simply click on the small image to enlarge it. (Figure 5.4.4)



Figure 5.16. Figure 5.4.4





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# Chapter 6. Viewing and Analyzing the Data

Once you have completed your search, you view details of a particular record by clicking on the **Metadata** button.

The metadata profiles used by GNos to present and describe geographic data and general documents stored in the catalogue are based on the **International Standard ISO 19115:2003**, encoded according to the **implementation schema 19139:2007**, the **FGDC** and the international standard **Dublin Core**.

In this guide the **ISO 19139** metadata implementation will be described in details since it is also suggested as profile for the creation of new metadata records.

## 6.1. Meta Data Description

The metadata ISO 19139 profile used by GeoNetwork opensource to describe the geographic data and services is based on the ISO standard 19115:2003 and provides information related to the identification, the maintenance and constraints, the spatial and temporal extent, the spatial representation and reference, the quality and distribution of a geographic dataset.

The metadata profile is organized in sections and the most important, illustrated in the figure 6.1, are the: **Identification Section**, **Distribution Section**, **Reference System Section**, **Data Quality Section** and **Metadata Section**. These sections are described here in details.

Figure 6.1. Figure 6.1

<b>Identification info</b>	<b>Identification info</b> basic information about the resource(s) to which the metadata applies <b>mandatory</b>
Title	
Date	
Date type	Publication
Abstract	The ISO19115 metadata standard is the preferred metadata standard to use. If unsure
Maintenance and update frequency	asNeeded
Language	English
Character set	utf8
Topic category code	boundaries
<b>Distribution info</b>	<b>Distribution info</b> provides information about the distributor of and options for obtaining the resource(s)
OnLine resource	
OnLine resource	<a href="http://localhost:8080/geonetwork/srv/en/resources.get?id=13&amp;fname=&amp;access=private">http://localhost:8080/geonetwork/srv/en/resources.get?id=13&amp;fname=&amp;access=private</a>
<b>Reference system info</b>	<b>Reference system info</b> description of the spatial and temporal reference systems used in the dataset
Code	
<b>Data quality info</b>	<b>Data quality info</b> provides overall assessment of quality of a resource(s)
Hierarchy level	
<b>Metadata</b>	<b>Metadata info</b> information about the metadata itself <b>mandatory</b>
File identifier	ica7b99
Language	English
Character set	utf8
Date stamp	2007-10-25T18:03:03
Metadata standard name	ISO 19115:2003/19139
Metadata standard version	1.0
Metadata author	

## Identification Section

This section includes information on the citation of the resource (**title**, **date of creation or publication**, **edition**, **presentation form**), the **abstract**, the **purpose** and the present **status** of the resource that can be defined among the options: completed, historical archive, obsolete, ongoing, planned, required or under development. (Figure 6.1.1 a).

Figure 6.2. Figure 6.1.1 a

**Identification info**  
basic information about the resource(s) to which the metadata applies  
**mandatory**

**::Identification info \***

**Title \***

**Date \***

**Date type \***

**Edition** ☐

**Presentation form** ☐

**Abstract \***  
The ISO19115 metadata standard is the preferred metadata standard to use. If unsure what templates to start with, use this one.

**Purpose** ☐

**Status** ☐

This section also contains information about the person or organization responsible for the data and who is considered to be a **point of contact** for the resource i.e. the dataset owner, originator, distributor, publisher, etc. and it provides information on **data maintenance** i.e. annually, monthly, daily, not planned, as needed, etc. (Figure 6.1.1 b)

Figure 6.3. Figure 6.1.1 b

**Point of contact**  
identification of, and means of communication with, person(s) and organizations(s) associated with the resource(s)

**::Point of contact** + x

**Individual** \*

**name** x

**Organisation** \*

**name** x

**Position name** \*

x

**Voice** + x

**Facsimile** + x

**Delivery point** +

x

**City** x

**Administrative area** x

**Postal code** x

**Country** x

**Electronic mail address** + x

**Role** \*

originator

**Maintenance and update frequency** \*

asNeeded

Elements for **keywords** and for describing restrictions on **data access** and **use** are also included in this section in addition to **spatial representation** info like data type (vector, raster, text table, etc.) (figure 6.1.1 c).

Figure 6.4. Figure 6.1.1 c

**Descriptive keywords**  
provides category keywords, their type, and reference source

**::Descriptive keywords** + x a

**Keyword** + World

**Type** x World

**place**

**Access constraints** + copyright

**Use constraints** +

**Other constraints** \*

**Spatial representation type** + x vector

The identification section provides information about the **scale**, the **language** and **character set** used within the resource and the list of **ISO categories** through which your map could be classified (figure 6.1.1 d).

Figure 6.5. Figure 6.1.1 d

**Equivalent scale**  
level of detail expressed as the scale of a comparable  
hardcopy map or chart  
conditional

**::Equivalent scale** \*

**Denominator** \*

**Language** \* + English

**Character set** utf8

**Topic category code** \* boundaries

Finally, the temporal and spatial extent are also defined in this section. The temporal extent is defined through the starting and ending date of data validation (Figure 6.1.1 e);

Figure 6.6. Figure 6.1.1 e

The screenshot shows a form section titled "Temporal Extent" with a subtitle "time period covered by the content of the dataset". Below this, there is a "Begin date" field and an "End date" field, each with a "clear" button. A red arrow points from the "Temporal Extent" title to the "Begin date" field.

The spatial extent of the interested area is defined through geographic coordinates or through the selection of a country or region from a predefined list (Figure 6.1.1 f). Free text **supplemental information** can be added to complete the data identification section.

Figure 6.7. Figure 6.1.1 f

The screenshot shows a form section titled "Geographic bounding box" with a subtitle "geographic position of the dataset". Below this, there are four input fields: "North bound latitude" (90), "West bound longitude" (-180), "East bound longitude" (180), and "South bound latitude" (-90). To the right of these fields is a dropdown menu currently showing "World". A red arrow points from the "Geographic bounding box" title to the "World" dropdown. Another red arrow points from the "World" dropdown to a text label: "Dropdown list of countries, the used map belongs to." Below the bounding box fields is a "Supplemental Information" section with a text area containing instructions on how to customize the template.

## Distribution Section

This section provides metadata elements for **accessing** other useful **on-line resources** available **through the web**. The distribution elements allow for on-line access using an URL address or similar addressing scheme and provide the protocol for the proper connection **for accessing geographic data** or any other types of digital documents **using the download function**. Furthermore, it is possible **to link** a metadata with a **predefined map service** through the **on line resource** and see the map interactively (Figure 6.1.2).

Figure 6.8. Figure 6.1.2

**Distribution info**  
provides information about the distributor of and options for obtaining the resource(s)

**OnLine resource**  
information about online sources from which the resource can be obtained

URL  
Protocol ☒ Web address (URL)  
Description ☒

URL  
Protocol ☒ File for download  
File  Browse...  
Description ☒

URL  
Protocol ☒ OGC Web Map Service (wvr 1.1.1)  
Name ☒  
Description ☒

Upload

Dropdown list of the type of protocol you want to provide as link or to download files from

Browse to the folder where the file you want to upload is stored

Uploads the file

## Reference System Section

The Spatial Reference System section **defines metadata** required to **describe** the **spatial reference system** of a dataset. It contains one element to identify the name of the reference system used (Figure 6.1.3). Using elements **from the advanced form**, this section may be modified to provide more **details** on **data projection**, **ellipsoid** and **datum**. Note that if this information is provided, a reference system identifier is not mandatory.

Figure 6.9. Figure 6.1.3

**Reference system info**  
description of the spatial and temporal reference systems used in the dataset

**Reference system info** ☒

Code \* WGS 1984

## Data Quality Section

The Data Quality section provides a **general assessment** of the **quality of the data**. It describes the **different hierarchical levels of data quality**, namely a **dataset series**, **dataset**, **features**, **attributes**, etc. This section also contains information about **sources of the input data**, and a **general explanation of the production processes** (lineage) used for creating the data (Figure 6.1.4).

**Figure 6.10. Figure 6.1.4**

The screenshot shows a web form with a section titled **Data quality info** in a yellow header bar. To the right of this header, a callout box contains the text: **Data quality info** provides overall assessment of quality of a resource(s). The main form area has a light blue background and contains the following elements:

- Hierarchy level \***: A text input field with the value 'dataset'.
- Statement \***: A text input field with a small 'X' icon to its right.

## Metadata Information Section

This section contains information about the metadata itself: the **Global Unique Identifier** (GUID) assigned to the record (this is the 'File identifier'), **language** and **character set** used, **date of last edit** ('Date stamp') and the **metadata standard** and **version name** of the record. It also contains information on the **metadata author** responsible for the metadata record; this person can also be a point of contact for the resource described. Information on the Metadata author is mandatory (figure 6.1.5).



Figure 6.11. Figure 6.1.5

**Metadata author**  
party responsible for the metadata information  
mandatory

**::Metadata**

File identifier 0a38e560-9519-492f-ace1-20a155ca7b99

Language \* ☐ English

Character set utf8

Date stamp 2007-10-24T15:07:21

Metadata standard name ISO 19115:2003/19139

Metadata standard version 1.0

**::Metadata author** +

Individual name \* ☐

Organisation name \* ☐

Position name \* ☐

Voice + ☐

Facsimile + ☐

Delivery point + ☐

City ☐

Administrative area ☐

Postal code ☐

Country ☐

Electronic mail address + ☐

Role \* pointOfContact

---

# Chapter 7. Adding new Data and Information

This section guides you through the process of adding new records (new data with information) into the GeoNetwork catalogue using either the online metadata editor or the advanced metadata insert tool, based on XML documents. In both cases you will use the template system, add thumbnails, upload data, link to services and set access privileges to the metadata and data.

To add or edit data and metadata, you must be **registered** as an **Editor** into the work group you want to add records to. Contact your administrator if you are not a registered editor for your work group.

For the metadata creation using the online editor, GNos provides a set of simplified metadata templates based on the cited standards: ISO, FGDC and DC. The templates for vector and raster based on the ISO 19139 are the preferred ones since they are devised in a way that hides the complexity of the ISO19115 standard in the default view. At the same time those templates are extensible with new elements to fit specialized needs through the advanced view.

To produce a good metadata record, always try to gather as much details as possible on the resource that you want to describe taking into account the metadata elements that have been presented in the previous chapter. The next step is to fill out properly the fields provided by the metadata templates, while at the same time avoiding duplication of information throughout the form.

The most important fields that may not be waived while compiling a standard based metadata record are the following: **Title, Date of Creation or Publication, Abstract, Language used for documenting data, Topic Category, Scale, Maintenance and Update Frequency, Metadata Author, Language Used for Documenting Metadata.**

In addition to the main mandatory fields, we recommend you to fill out these optional but critical fields (if information is available): **Purpose - Keywords - Presentation Form - Status - Spatial Representation Type - Geographic Location - Reference System Info - Temporal Extent - Data Quality Info - Access and Use Constraints - Point of Contact - Distribution Info: Online Resources.**

You should also prepare an image of your data that is required to be displayed in search results as thumbnail.

Next section will guide you through the process of metadata creation using the online editor.

## 7.1. Creating a New Record using the Metadata Editor on line

1. In the home page, click on the **Administration Tab**.
2. Select **New Metadata** from the List of the admin page.
3. Select the metadata standard **Template**, if possible, using the preferred ones (figure 6.1 c). GeoNetwork opensource comes by default with support for three metadata standards, ISO19139, FGDC and Dublin core. For the ISO standard, two templates have been developed; one for vector and one for raster data. Both contain a relevant set of elements to describe the respective types of data. More templates can be developed online.
4. Select the **Group** the metadata will belong to. These are the groups authorized to add metadata to by your administrator.
5. Click on **Create**.

## The steps in more details

1. Enter your username and password and click on the login button (figure 7.1.1 a). The system will identify you and assign the correct privileges to work with.

**Figure 7.1. Figure 7.1.1 a**

The image shows a login form with a blue header bar containing language links: English | Français | Español | 中文. Below the header, there are two input fields labeled 'Username' and 'Password', followed by a 'Login' button.

2. Open the Administration page by clicking the Administration button in the banner and then click on the New metadata link (figure 7.1.1 b).

**Figure 7.2. Figure 7.1.1 b**

The image shows the 'ADMINISTRATION' page of the GeoNetwork v2.1 interface. The header includes the GeoNetwork logo and navigation links: Administration | Contact us | Links | About | Help. The main content area is divided into sections: 'Metadata' with links for 'New metadata' (description: Adds a new metadata into geonetwork copying it from a template) and 'XML Metadata Insert' (description: Import XML formatted metadata); 'Personal info' with links for 'Change password' (description: Allow current user to change password) and 'Change user information' (description: Allow current user to change user information); and 'Administration'.

3. From the metadata creation page, select the metadata standard to use from the dropdown list (see figure 7.1.1 c)

**Figure 7.3. Figure 7.1.1 c**

The image shows the 'METADATA CREATION' page. It features a 'Template' dropdown menu with the following options: 'Template for Dublin Core', 'Template for Dublin Core', 'Template for FGDC', 'Template for Raster data in ISO19139', and 'Template for Vector data in ISO19139 (preferred)'. The 'Group' field is also visible below the dropdown.

4. After selecting the correct template, you should identify which group of users the metadata will belong to (figure 7.1.1 d) and finally click on **Create**.

**Figure 7.4. Figure 7.1.1 d**

The screenshot shows a web form titled "METADATA CREATION". It contains two dropdown menus: "Template" and "Group". The "Template" dropdown is set to "Template for Vector data in ISO19139 (preferred!)". The "Group" dropdown is set to "Sample group". Below the dropdowns are two buttons: "Back" and "Create".

A new metadata form based on the selected template will be displayed for you to fill out.

## Switching Editing Views from Default to Advanced to XML View

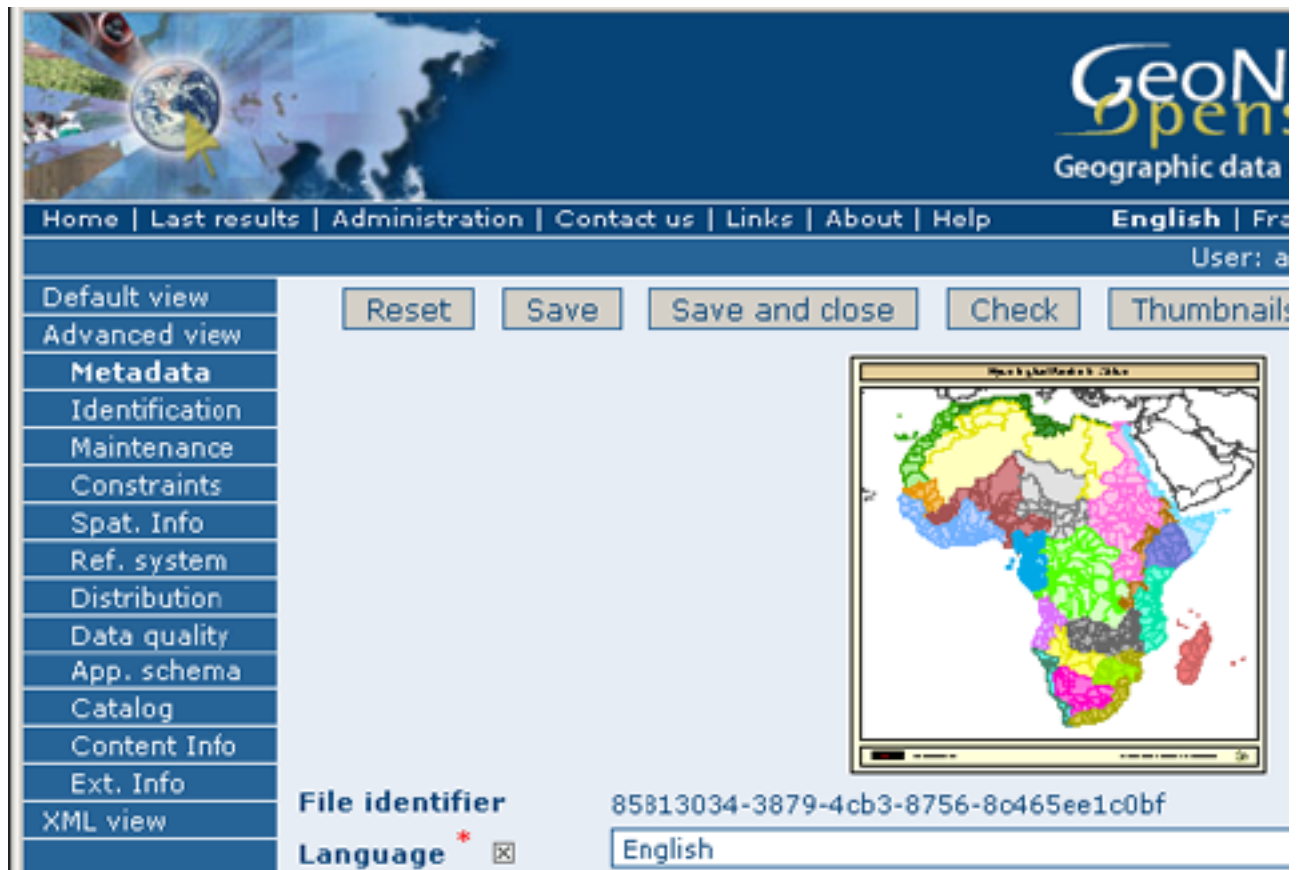
Once you create a new record, you can choose between **Default**, **Advanced** or **XML View**. To switch view, simply click on the view you want to switch to on the left column of the page. The view in **bold** is the view you are currently using (see figure 7.1.2 a).

**Figure 7.5. Figure 7.1.2 a**

The screenshot shows the GeoNetwork interface. At the top, there is a header with the GeoNetwork logo and the text "Geographic data sharing". Below the header is a navigation bar with links: Home | Last results | Administration | Contact us | Links | About | Help. On the right side of the navigation bar, there are links for "English" and "Français", and a user login field "User: admin". Below the navigation bar is a sidebar with three options: "Default view", "Advanced view", and "XML view". The "Default view" option is highlighted in blue. To the right of the sidebar, there are three buttons: "Reset", "Save", and "Save and close". Below the sidebar, there is a yellow box with the text "Identification info".

In the previous chapter you have analyzed the metadata structure as it is presented in the **Default View**. A selection of the main fields from different categories of information is shown in one single view. The minimum set of metadata required to serve the full range of metadata applications (data discovery, determination of data fitness for use, data access, data transfer and use of digital data) is defined here, along with optional metadata elements to allow for a more extensive standard description of geographic data, if required. However, if should be there a need to add more metadata elements, you can switch to the advanced view at any time while editing.

In the **Advanced View**, the ISO profile offers the possibility to visualize and edit the entire metadata structure organized in sections accessible through tabs from the left column. You can use this view to write more advanced metadata descriptions or templates to fit specialized needs. (Figure 7.1.2 b)

**Figure 7.6. Figure 7.1.2 b**

The **XML View** shows the entire content of the metadata in the original hierarchical structure; different colors allow to distinguish between an element's name and its value. The XML structure is composed of tags and to every tag must correspond a closing tag; the content is entirely contained within the two, i.e.

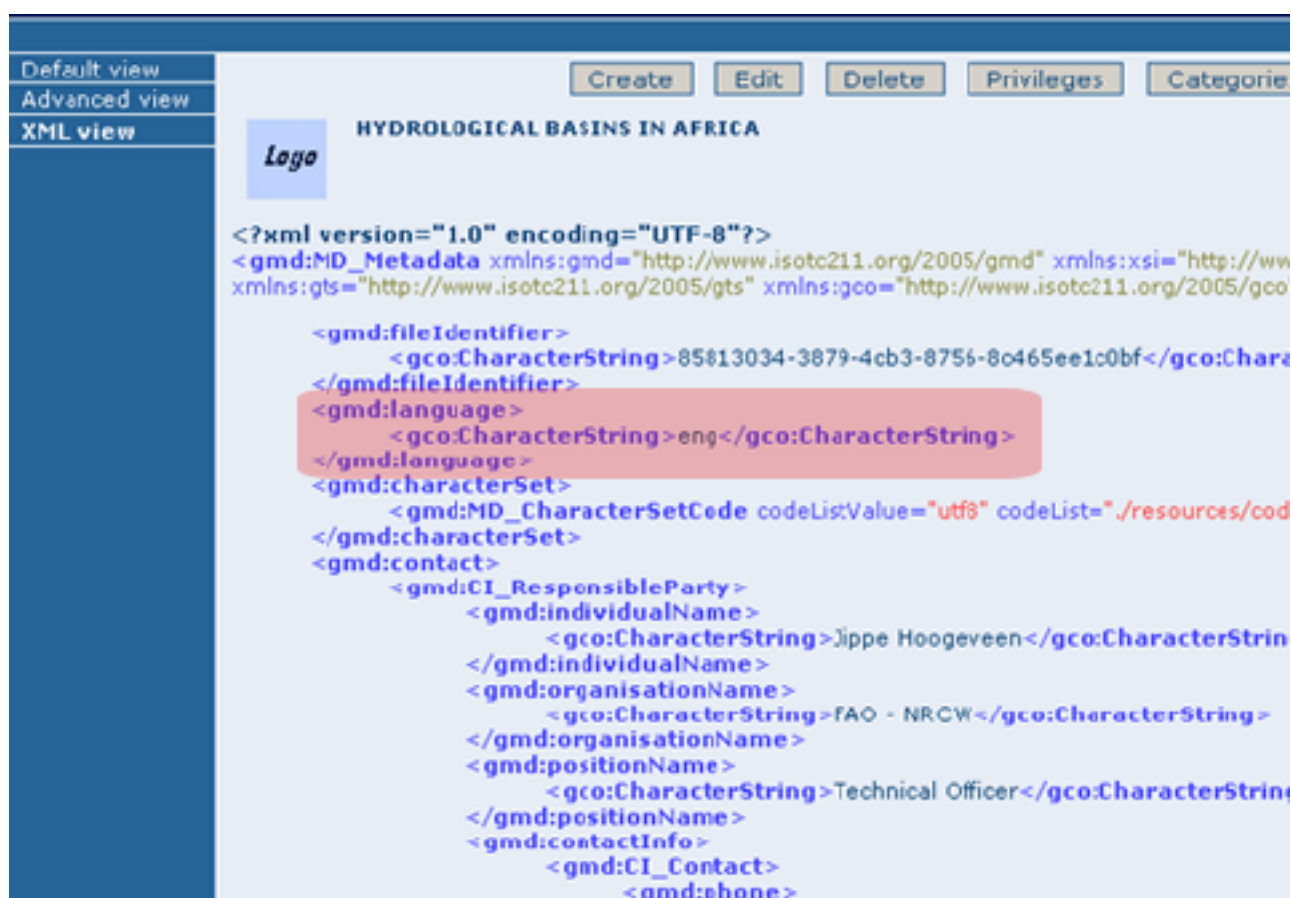
```
<gmd:language>
```

```
<gco:CharacterString>eng</gco:CharacterString>
```

```
</gmd:language>
```

(see figure 7.1.2 c).

Figure 7.7. Figure 7.1.2 c



Nevertheless, the use of the XML view requires some knowledge of the XML language.

Both the **Default** and the **Advanced Views** are composed of **mandatory**, **conditional** and **optional** metadata **fields**. The meaning of mandatory and optional is fairly intuitive; the mandatory fields are required and may not be waived, like *Title* and *Abstract* for instance, whereas the optional fields can be provided but are not fundamental, depending on the metadata author. The conditional fields may be considered mandatory under certain circumstances: essentially a conditional requirement indicates that the presence of a specified data element is dependent on the value or presence of other data elements in the same section. For instance, the *Individual name* metadata element of the *Point of Contact*, which is a conditional element of the Identification section, becomes mandatory if another element of the same section, *Organization name* or *Position name* is not already defined (figure 6.1.1 b).

The **mandatory fields** as well as those **highly recommended** are flagged with **red asterisk [\*]**. The standard definition for each field can be read by passing the mouse on the element name.

The **Default View** is the preferred view as it provides a selection of the available metadata elements, facilitating both the user and the editor in reading and editing a metadata record, and at the same time it ensures that a geospatial data can be properly described, through :

- the minimum set of metadata required to serve the full range of metadata applications (data discovery, determination of data fitness for use, data access, data transfer, and use of digital data);
- optional metadata elements - to allow for a more extensive standard description of geographic data, if required;
- a method for extending metadata to fit specialized needs.

## Using basic commands of the editor

Fields are either **free text fields** or **drop down lists**. Free text means you can type any text into that field. Drop down lists allow you to select only one option from the list. You can add multiple fields of the same kind by clicking on the **[+]** symbol next to the element. Every new field that you will add in the advanced view will then be visible in the default view. You can also delete existing fields by clicking on the **[x]** symbol next to the element. Clearly, mandatory fields cannot be deleted. One example of the need to add multiple fields can arise if the content of your dataset has some text written in two different languages (see figure 7.1.3).

**Figure 7.8. Figure 7.1.3**

The screenshot shows the 'Default view' of the metadata editor. On the left, there are tabs for 'Default view', 'Advanced view', and 'XML view'. At the top right, there are buttons for 'Reset', 'Save', 'Save and close', 'Check', and 'Thumbnail'. A 'No preview available' message is displayed. The main section is titled '::Identification info'. It contains several fields, each with a red asterisk indicating it is mandatory: 'Title', 'Date', 'Date type', 'Language', 'Language', 'Character set', 'Topic category', and 'code'. The 'Language' field is highlighted with a blue circle, and a '+' icon is visible next to it, indicating that multiple language entries can be added. The 'Date type' field is set to 'creation'. The 'Character set' field is set to 'utf8'. The 'Topic category' field is set to 'boundaries'.

## 7.2. Entering Metadata for your Map

As we mentioned in the introduction to this guide, GNoS provides tools to describe any type of geographic data (vector layers, raster, tables, map services, etc.) as well as general document like reports, projects, papers, etc. For the purpose of this Quick Start Guide, an example of required and useful metadata elements to properly describe a thematic map will be provided hereafter. You should gather as much information as possible to identify and understand the map's resource and characteristics you want to describe. Use the default view to start. If necessary, you can always switch to advanced view or come back later and edit the record with the additional information collected.

### Entering Metadata For Your Map

Please follow these steps to enter your map's metadata. Note that we will only go through the fields that have been identified as compulsory (i.e. those fields marked with the asterisk [\*], mandatory or highly recommended).

**Title \*:** Under the **Identification Info** field, give your map a **name**. There will be a default name of your data. Use free text to describe your map here.

**Date \***: Indicate the exact **date** of **creation**, **publication** or **revision** on your map.

**Presentation Form**: Specify the type of presentation, i.e. **digital**, **hard copy**, **table**, etc.

**Abstract \***: Enter some description of the map.

**Purpose**: Enter a short summary of the purposes for your map to be developed.

**Status**: Specify the status of your map within the following options: completed, historical archive, obsolete, ongoing, planned, required, under development.

**Point of Contact**: Enter all mandatory information and others you have at hand for the contact of the person(s) associated with this resources of the map. Note that some fields are only conditionally mandatory, such as Organization Name if Individual Name and Position are not entered.

**Maintenance and update frequency\***: Specify the frequency with which you expect to make changes and additions to your map after the initial version is completed. If any changes are scheduled you can leave *As Needed* selected from the drop-down list.

**Descriptive Keywords**: Enter keywords that describe your map. Also specify the type of keyword you are entering, i.e. place, theme, etc. Remember that you can add another keyword field if you need to add different types of keywords.

**Access Constraints**: Enter an access constraint here, such as a copyright, trademark, etc. to assure the protection of privacy and intellectual property.

**User Constraints**: Enter a user constraint here to assure the protection of privacy and intellectual property.

**Other Constraints \***: Enter other constraint here to assure the protection of privacy and intellectual property. Note that this field is conditionally mandatory if Access and Use constraints are not entered.

**Spatial representation type**: Select, from the drop-down list the method used to spatially represent your data. The options are: vector, grid, text table, stereo model, video.

**Scale Denominator \***: Enter the denominator for an equivalent scale of a hard copy of the map.

**Language \***: Select the language used within your map

**Topic category \***: Specify the main ISO category/ies through which your map could be classified (see Annex for the complete list of ISO topic categories).

**Temporal Extent\***: Enter the starting and ending date of the validity period.

**Geographic Bounding Box \***: Enter the longitude and latitude for the map or select a region from the predefined drop-down list. Make sure you use degrees for the unit of the geographic coordinates as they are the basis for the geographic searches.

**Supplemental Information**: Enter any other descriptive information about your map that can help the user to better understand its content.

**Distribution Info**: Enter information about the distributor and about options for obtaining your map.

**Online Resource**: Enter information about online resources for the map, such as where a user may download it, etc. This information should include a link, the link type (protocol) and a description of the resource.

**Reference system info**: Enter information about the spatial reference system of your map. The **default view contains** one element to provide the **alphanumeric value** identifying the reference system used. GNOS uses the **EPSG codes** which are numeric codes associated with coordinate



system definitions. For instance, EPSG:4326 is Geographic lat-long WGS84, and EPSG:32611 is "UTM zone 11 North, WGS84". Using elements **from the advanced view**, you may add **more details** on **data projection**, **ellipsoid** and **datum**. Note that if this information is provided, a reference system identifier is not mandatory.

**Data Quality:** Specify the hierarchal level of the data (**dataset series**, **dataset**, **features**, **attributes**, etc.) and provide a **general explanation on the production processes** (lineage) used for creating the data. The statement element is mandatory if the hierarchical level element is equal to *dataset* or *series*. Detailed information on **completeness**, **logical consistency** and **positional**, **thematic** and **temporal accuracy** can be directly added **into the advanced form**.

**Metadata Author \*:** Provide information about the author of the map, including the person's name, organization, position, role and any other contact information available.

After completion of this section, you may select the **Type** of document that you are going to save in the catalogue. You have three options: **Metadata**, **Template**, **Sub-template**. By default **Metadata** is set up.

When done, you may click **Save** or **Save and Close** to close the editing session.

## - Creating a Thumbnail

Next, you need to create a graphic overview of your map which will be for a double purpose; as small thumbnail will be displayed in search results and as large thumbnail with much more details, to allow users to properly evaluate the data usefulness. As for the latest, the image that you will use as source should be a significant reproduction of the real dataset, possibly inclusive of the legend.

To create a thumbnail, go to the editing menu for your map. If you are no longer in editing mode, retrieve the map from one of the search options then click on **Edit**. Then follow these simple steps:


- From the editing menu, click on the **Thumbnails** button on the top or bottom of the page. (See figure 7.2.2 a)

Figure 7.9. Figure 7.2.2 a

- You will be taken to the **Thumbnail Management** page. (See figure 7.2.2 b)
- To create a small or large thumbnail, click on the **browse** button next to either one. It is recommended that you use 180 pixels for small thumbnails and 800x600 for large thumbnails. Using the 'Large thumbnail' option allows you to create both a small and large thumbnail in one go.
- You can use GIF, PNG and JPEG images as input for the thumbnails.
- A pop up window will appear allowing you to browse your files on your computer. **Select** the file you wish to create a thumbnail with by double-clicking on it.
- Click on **Add**.
- Your thumbnail will be added and displayed on the following page.
- You can then click on **Back to Editing** and save your record. (See figure 7.2.2 c)

**Figure 7.10. Figure 7.2.2 b**

### THUMBNAIL MANAGEMENT



Small thumbnail

Browse...


Add

☒ Scale image

☐ Scale width

☐ Scale height

180 pixel



Large thumbnail

Browse...

Add

☒ Scale image

☐ Scale width

☐ Scale height

800 pixel

☒ Create small

☐ Scale width

☐ Scale height

180 pixel

Back to editing

**Figure 7.11. Figure 7.2.2 c**

## Linking data for download

Finally, you can upload the dataset stored on your local computer and then create a link between data and related description. Files in whatever format can be uploaded: doc, PDF, images, vector layers, etc. For the latter the distribution in a compressed file is recommended. You can include the vector data, the legend, any documentation that can help the interpretation of the data, related reports, detailed descriptions of the data processing, base data used to create the dataset specified and/or other relevant information. Follow these guidelines for uploading datasets:

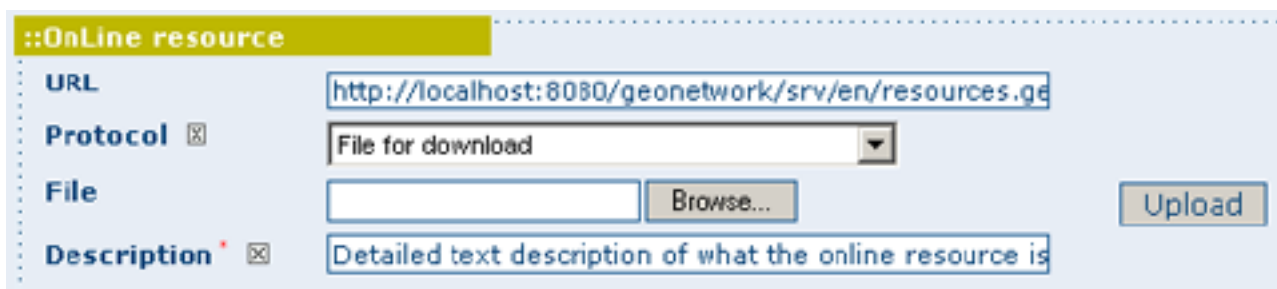
- Make sure the total size of the compressed file is reasonable (less than 50 MB). Should your data be bigger than 50MB, consider a different mechanism to serve this data, e.g. through an FTP or HTTP server and then link the resource through an online resource 'Web address (URL)'.
- You can create several smaller files when appropriate and upload them sequentially.
- You add the size of the file at the end of the description field.

To Upload a Dataset, follow these steps (see figure 7.2.3):

1. The **URL** field can be left empty when uploading a file. The system will automatically fill this field out;
2. Select the correct **protocol** to be used. If you do not see the buttons to browse and upload when File for download is selected, save the metadata and return to the upload section. Both buttons should appear;

3. Provide a short **description** of the data;
4. Click the **Browse** button and navigate to the folder where the file to be released is stored. Consider if you want to upload multiple files as one unique zip file or as multiple separate downloads. It is a good idea to add additional documentation with the datasets that provide the user with information related to the data described. Remind: the size of a single file to upload can't exceed 50 Mbytes;
5. Click **Upload** and then **Save**.

**Figure 7.12. Figure 7.2.3**



The screenshot shows a web form titled "OnLine resource" with a yellow header. The form contains the following fields and controls:

- URL**: A text input field containing the value "http://localhost:8080/geonetwork/srv/en/resources.ge".
- Protocol**: A dropdown menu with the selected option "File for download".
- File**: A text input field next to a "Browse..." button.
- Description**: A text input field containing the placeholder text "Detailed text description of what the online resource is".
- Upload**: A button located to the right of the "File" field.

## Assigning Privileges for a Map

As an important step of entering metadata to your map, you need to assign privileges for each map. This means that you will identify which work groups have which privileges, i.e. view, download, etc. for your particular map.

For instance, you can define if the information and related services is visible to all (Internet users) or just to internal users only (Intranet). Privileges are assigned on a per group basis. Depending on the user profile (Guest, Registered User, Editor, Admin etc.) access to these functions may differ on a per user basis.

To assign privileges for your map, follow these steps:

- Find your map by using the search option. Whether you have multiple or single results from the search, on top of the individual record or next to the record you will always see a row of buttons including a Privileges button. (See figure 7.2.4 a)

**Figure 7.13. Figure 7.2.4 a**

- Click on the Privileges button. This will take you to a new page. You can assign certain privileges to specific groups by selecting or deselecting them from this page. Simply click on the small box next to the privilege to place or remove a checkmark. **Set All** and **Clear All** buttons allow you to place and remove the checkmarks all at once (see figure 7.2.4 b).

**Figure 7.14. Figure 7.2.4 b**

PRIVILEGES							
Groups	Publish	Download	Interactive Map	Featured	Notify		
All	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="button" value="Set All"/>	<input type="button" value="Clear All"/>
Intranet	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="button" value="Set All"/>	<input type="button" value="Clear All"/>
Sample group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="button" value="Set All"/>	<input type="button" value="Clear All"/>
Training	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="button" value="Set All"/>	<input type="button" value="Clear All"/>
						<input type="button" value="Back"/>	<input type="button" value="Submit"/>

Below is a brief description for each privilege to help you identify which ones you should assign to which group(s).

**Publish:** Users in the specified group/s are able to see the map, i.e. if searching with matching criteria.

**Download:** Users in the specified group/s are able to download the map.

**Interactive Map:** Users in the specified group/s are able to get an interactive map. **The interactive map** has to be created separately using a Web Map Server, which is part of the GeoNetwork opensource application.

**Featured:** When selected, the map is placed in the Features Maps of the home page and it appears there randomly.

**Notify:** Users in that work group receive notification that the map has been uploaded.

## Assigning Categories for a Map

As a final step to entering metadata for a map, you should assign categories for it. The assigned categories will determine the categories the map will display under on the home page. To assign categories for a map, follow these steps:

- Find your map by using the search option. Whether you have multiple or single results from your search, on top of the individual record or next to the record, you will always see a row of buttons including a **Categories** button. (See figure 7.2.4 a).
- Click on the **Categories** button. This will take you to a new page. You can assign one or multiple categories selecting or deselecting them from this page. Simply click on the small box next to the category to place or remove a checkmark. (See figure 7.2.5)

**Figure 7.15. Figure 7.2.5**

Categories	Assigned
Maps & graphics	<input checked="" type="checkbox"/>
Datasets	<input type="checkbox"/>
Interactive resources	<input type="checkbox"/>
Applications	<input type="checkbox"/>
Case studies, best practices	<input type="checkbox"/>
Conference proceedings	<input type="checkbox"/>
Photo	<input type="checkbox"/>
Audio/Video	<input type="checkbox"/>
Directories	<input type="checkbox"/>
Other information resources	<input type="checkbox"/>

## 7.3. Uploading a New Record using the XML Metadata Insert Tool

A more advanced procedure to upload a new metadata record in the GeoNetwork system is using an XML document. This procedure is particularly useful for users who already have metadata in XML

format, for instance created by some GIS application. To this regard, it has to be noted that the metadata must be in one of the standards used by GeoNetwork: ISO19115, FGDC and Dublin Core.

To start the metadata uploading process through the **XML Metadata Insert** tool, you should log in (see Step. 1. in paragraph 7.1.1) and select the appropriate option from the Administration page (Figure 7.3 a).

**Figure 7.16. Figure 7.3 a**

ADMINISTRATION	
<b>Metadata</b>	
New metadata	Adds a new metadata into geonetwork copying it from a template
<u>XML Metadata Insert</u>	Import XML formatted metadata
Batch Import	Import all XML formatted metadata from a local directory
Search for Unused	Search for unused or empty metadata
Transfer ownership	Transfer metadata ownership to another user
Manage thesauri	Add/modify/delete and show thesauri
<b>Personal info</b>	
Change password	Allow current user to change password
Change user information	Allow current user to change user information

The main part of the page **Import XML Formatted Metadata** that is displayed (figure 7.3 b) is the **Metadata** text area, where the user can paste the XML metadata to import. Below this, there is the **Type** choice, which allows you select the type of record that you are going to create (Metadata, Template and Subtemplate). Then you can apply a stylesheet to convert your metadata input from ArcCatalog8 to ISO1915 or from ISO19115 to ISO19139, if required. Otherwise you can just leave *none* selected. The **Destination schema** list provides you with four options to choose the final standard layout for your metadata (ISO19115, ISO19139, FDGDC and Dublin Core). Finally you should select the **Group** as main group in charge of the metadata and the **Category** that you want to assign to your metadata. By clicking the **Insert** button the metadata is imported into the system; please note that all links to external files, for instance to thumbnails or data for download, have to be removed from the metadata input, to avoid any conflict within the data repository.

**Figure 7.17. Figure 7.3 b**

**IMPORT XML FORMATTED METADATA**

Metadata

Type: Metadata

StyleSheet: none

Destination schema: iso19139

Validate: ☐

Group: Sample group

Category: none

Back Insert

If your metadata is already in ISO19115 format, the main actions to be performed are the following (Figure 7.3 c):

1. Paste the XML file that contains the metadata information in the **Metadata** text area;
2. Select Metadata as **type** of record that you are going to create
3. Select the metadata schema ISO19139 that will be the final **destination schema**;
4. Select the **validate** check box if you want your metadata to be validated according to the related schema.
5. Select the **group** in charge of the metadata from the drop down list;
6. Select **Maps and Graphics** from the list of categories;
7. Click the **Insert** button and the metadata will be imported into the system.



Figure 7.18. Figure 7.3 c

**IMPORT XML FORMATTED METADATA**

---

Metadata

```
<?xml version="1.0" encoding="UTF-8"?>
<gmd:MD_Metadata xmlns:gmd="http://www.isotc211.org/2005/gmd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:gml="http://www.opengis.net/gml"
xmlns:gts="http://www.isotc211.org/2005/gts"
xmlns:gco="http://www.isotc211.org/2005/gco">
  <gmd:fileIdentifier>
    <gco:CharacterString>/</gco:CharacterString>
  </gmd:fileIdentifier>
  <gmd:language>
    <gco:CharacterString>eng</gco:CharacterString>
  </gmd:language>
  <gmd:characterSet>
    <gmd:MD_CharacterSetCode codeListValue="utf8"
codeList="/resources/codeList.xml#MD_CharacterSetCode"/>
  </gmd:characterSet>
  <gmd:contact>
    <gmd:CI_ResponsibleParty>
      <gmd:individualName>
        <gco:CharacterString/>
      </gmd:individualName>
    </gmd:CI_ResponsibleParty>
  </gmd:contact>
</gmd:MD_Metadata>
```

Type: Metadata

StyleSheet: none

Destination schema: iso19139

Validate: ☒

Group: Sample group

Category: Maps & graphics

Back Insert

---

# Chapter 8. Administration Features

## 8.1. Creation of new Group Profiles

The user with administrative privileges can manage the creation of various groups corresponding to the various contributors/users of the database (e.g. in the FAO-GeoNetwork node you may find as many groups as GIS Projects that produce general geographic information in different fields of activities: Fishery, Agriculture, Land and Water, Health etc).

To create new groups you should first of all authenticate yourself and determine if you have the required administrative privileges. To log in, simply go to the homepage and enter your username and password in the top right corner fields (use admin for both username and password), then click on the login button (figure 8.1a).

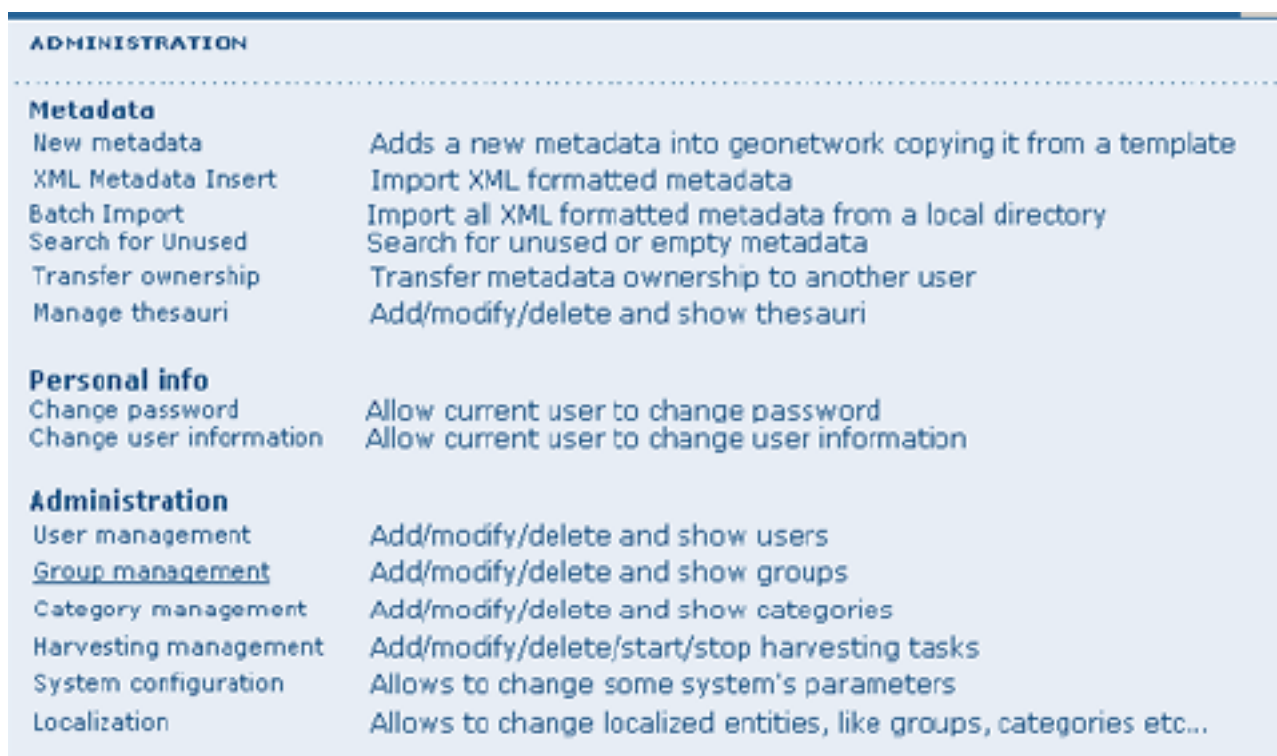
**Figure 8.1. Figure 8.1 a**



The image shows a login interface. At the top, there is a language selection bar with 'English' selected, followed by 'Français', 'Español', and '中文'. Below this, there are two input fields: 'Username' and 'Password', each followed by a text entry box. To the right of these fields is a 'Login' button.

- From the Administration page displayed, select the option related to group management (see figure 8.1 b).

**Figure 8.2. Figure 8.1 b**



ADMINISTRATION	
<b>Metadata</b>	
New metadata	Adds a new metadata into geonetwork copying it from a template
XML Metadata Insert	Import XML formatted metadata
Batch Import	Import all XML formatted metadata from a local directory
Search for Unused	Search for unused or empty metadata
Transfer ownership	Transfer metadata ownership to another user
Manage thesauri	Add/modify/delete and show thesauri
<b>Personal info</b>	
Change password	Allow current user to change password
Change user information	Allow current user to change user information
<b>Administration</b>	
User management	Add/modify/delete and show users
<u>Group management</u>	Add/modify/delete and show groups
Category management	Add/modify/delete and show categories
Harvesting management	Add/modify/delete/start/stop harvesting tasks
System configuration	Allows to change some system's parameters
Localization	Allows to change localized entities, like groups, categories etc...

- To include a new group in the system, you have to apply the following logical steps:
  1. From the Group Management page click on the button **Add a new group**;

**Figure 8.3. Figure 8.1 c**

Name	Description	Operation
sample		<input type="button" value="Edit"/> <input type="button" value="Delete"/>

2. Provide the information related to the new group that you are going to create;

**Figure 8.4. Figure 8.1 d**

**ADD A NEW GROUP**

Name

Description

Download Email

3. Click on **Save**

Depending on the data owner settings, for each record inserted in the system, each group will have different data accessibility privileges in relation to: view of Metadata (**Publish**), data Download, Interactive Map visualization, view of your map appearing on the home page randomly (Featured), Notification when a file gets downloaded.

Below is an example of the privileges management table concerning a certain dataset (figure 8.1 e).

**Figure 8.5. Figure 8.1 e**

Groups	Publish	Download	Interactive Map	Featured	Notify		
All	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="button" value="Set All"/>	<input type="button" value="Clear All"/>
Intranet	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="button" value="Set All"/>	<input type="button" value="Clear All"/>
Sample group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="button" value="Set All"/>	<input type="button" value="Clear All"/>
Training	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="button" value="Set All"/>	<input type="button" value="Clear All"/>

## 8.2. User Profiles

Each group has a number of users with different profiles (administrator, user administrator, content reviewer, editor, registered user) varying in number with respect to the group composition/organization (e.g., one administrator, two user administrators, two content reviewers, five editors and one registered user profile).

User profiles are illustrated in details in the list below:

### 1. Administrator Profile

The Administrator has special privileges that allow for several management activities:

- Full rights for creating new groups and new users
- Rights to change users/groups' profiles
- Full rights for creating/editing/deleting new/old metadata

### 2. User Administrator Profile

The User Administrator is the administrator of his/her own group with the following privileges:

- Full rights on creating new users within the own group
- Rights to change users profiles within the own group
- Full rights on creating/editing/ deleting new/old data within the own group

### 3. Content Reviewer Profile

The content reviewer is the only person allowed to give final clearance on the metadata publication on the Intranet and/or on the Internet:

- Rights on reviewing metadata content within the own group and authorizing its publication

### 4. Editor Profile

The User Administrator is the administrator of his/her own group with the following privileges:

- Full rights on creating/editing/ deleting new/old data within the own group

### 5. Registered User Profile

The User Administrator is the administrator of his/her own group with the following privileges:

- Right to download protected data

## 8.3. Creation of new User Profiles

To include a new user in the GeoNetwork system you will have to apply the following logical steps:

1. Select **User Management** from the Administration link in the toolbar (figure 8.3 a);

**Figure 8.6. Figure 8.3 a**

ADMINISTRATION	
<b>Metadata</b>	
New metadata	Adds a new metadata into geonetwork copying it from a template
XML Metadata Insert	Import XML formatted metadata
Batch Import	Import all XML formatted metadata from a local directory
Search for Unused	Search for unused or empty metadata
Transfer ownership	Transfer metadata ownership to another user
Manage thesauri	Add/modify/delete and show thesauri
<b>Personal info</b>	
Change password	Allow current user to change password
Change user information	Allow current user to change user information
<b>Administration</b>	
<u>User management</u>	Add/modify/delete and show users
Group management	Add/modify/delete and show groups
Category management	Add/modify/delete and show categories
Harvesting management	Add/modify/delete/start/stop harvesting tasks
System configuration	Allows to change some system's parameters
Localization	Allows to change localized entities, like groups, categories etc...

2. Click the button **Add a new user** to the Database (figure 8.3 b);

**Figure 8.7. Figure 8.3 b**

USER MANAGEMENT					
Username	Last Name	First Name	Profile	Operation	
admin	admin	admin	Administrator	Edit	
editor	Guest	Editor	Editor	Edit	Delete
reviewer	Guest	Reviewer	Reviewer	Edit	Delete
user	Guest	User	RegisteredUser	Edit	Delete
useradmin	Guest	Useradmin	UserAdmin	Edit	Delete
				Back	Add a new user

3. Provide the **information** required for the new user (figure 8.3 c);

**Figure 8.8. Figure 8.3 c**

The form is titled "INSERT" and contains the following fields and options:

- Username (\*)
- Password (\*)
- Confirm password (\*)
- Last Name
- First Name
- Address
- State
- Zip
- Country
- Email
- Organisation / department
- Kind: Government
- Profile: Editor
- Groups: Administrator, User administrator, Content reviewer, Editor, Registered user

At the bottom of the form are two buttons: "Back" and "Save".

4. Assign the correct **profile**;
5. Assign the user to a **group**;
6. Click on **Save** (figure 8.3 c).

# Appendix A. Glossary of Metadata Fields Description

This glossary provides you with brief descriptions of the minimum set of metadata fields required to properly describe a geographical data as well as some optional elements highly suggested for a more extensive standard description. Note: the **mandatory fields are in bold in the following list**.

Metadata Elements	Description
<b>Access constraints</b>	access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the resource
<b>Abstract</b>	brief narrative summary of the content of the resource(s)
Administrative area <b>Temporal extent - Begin date</b>	state, province of the location Formatted as 2007-09-12T15:00:00 (YYYY-MM-DDTHH:mm:ss)
<b>Character set</b>	full name of the character coding standard used for the metadata set
Grid spatial representation - <b>Cell geometry</b>	identification of grid data as point or cell
City	city of the location
<b>Reference System Info - Code</b>	alphanumeric value identifying an instance in the namespace
<b>Country</b>	country of the physical address
Data quality info <b>Date</b>	provides overall assessment of quality of a resource(s) reference date and event used to describe it (YYYY-MM-DD)
Date stamp	date that the metadata was created (YYYY-MM-DDThh:mm:ss)
<b>Date type</b>	event used for reference date
<b>Delivery point</b>	address line for the location (as described in ISO 11180, annex A)
<b>Equivalent scale - Denominator</b> <b>Data Quality - Description</b>	the number below the line in a vulgar fraction description of the event, including related parameters or tolerances
<b>OnLine resource - Description</b>	detailed text description of what the online resource is/does
Descriptive keywords	provides category keywords, their type, and reference source
Grid spatial representation - <b>Dimension name</b>	name of the axis i.e. row, column
Grid spatial representation - <b>Dimension size</b>	number of elements along the axis
Dimension size Resolution	number of elements along the axis
Distribution info <b>Geographic bounding box - East bound longitude</b>	provides information about the distributor of and options for obtaining the resource(s)

Glossary of Metadata  
Fields Description

	eastern-most coordinate of the limit of the dataset extent, expressed in longitude in decimal degrees (positive east)
<b>Edition</b>	version of the cited resource
<b>Electronic mail address</b>	address of the electronic mailbox of the responsible organization or individual
<b>Temporal extent - End date</b>	Formatted as 2007-09-12T15:00:00 (YYYY-MM-DDTHH:mm:ss)
<b>Equivalent scale</b>	level of detail expressed as the scale of a comparable hardcopy map or chart
Extent	information about spatial, vertical, and temporal extent
<b>Facsimile</b>	telephone number of a facsimile machine for the responsible organization or individual
File identifier	unique identifier for this metadata file
Vector spatial representation - <b>Geometric object type</b>	name of point and vector spatial objects used to locate zero-, one-and two-dimensional spatial locations in the dataset
Vector spatial representation - Geometric object count	total number of the point or vector object type occurring in the dataset
Geographic bounding box	geographic position of the dataset
Grid spatial representation	information about grid spatial objects in the dataset
Grid spatial representation - <b>Resolution value</b>	degree of detail in the grid dataset
Grid spatial representation - <b>Transformation parameter availability</b>	indication of whether or not parameters for transformation exists
Data Quality - <b>Hierarchy level</b>	hierarchical level of the data specified by the scope
Identification info	basic information about the resource(s) to which the metadata applies
<b>Point of Contact - Individual name</b>	name of the responsible person- surname, given name, title separated by a delimiter
<b>Keyword</b>	commonly used word(s) or formalised word(s) or phrase(s) used to describe the subject
<b>Data Language</b>	language used for documenting data
<b>Metadata - Language</b>	language used for documenting metadata
<b>Data Quality - Lineage</b>	non-quantitative quality information about the lineage of the data specified by the scope. Mandatory if report not provided
<b>OnLine resource - Linkage</b>	location (address) for on-line access using a Uniform Resource Locator address or similar addressing scheme such as <a href="http://www.statkart.no/isotc211">http://www.statkart.no/isotc211</a>
<b>Maintenance and update frequency</b>	frequency with which changes and additions are made to the resource after the initial resource is completed
Metadata author	party responsible for the metadata information



Glossary of Metadata  
Fields Description

<b>Metadata standard name</b>	name of the metadata standard (including profile name) used
<b>Metadata standard version</b>	version (profile) of the metadata standard used
<b>OnLine resource - Name</b>	name of the online resource
Geographic bounding box - <b>North bound latitude</b>	northern-most, coordinate of the limit of the dataset extent expressed in latitude in decimal degrees (positive north)
Grid spatial representation - <b>Number of dimensions</b>	number of independent spatial-temporal axes
Distribution Info - OnLine resource	information about online sources from which the resource can be obtained
<b>Point of Contact - Organisation name</b>	name of the responsible organization
Other constraints	other restrictions and legal prerequisites for accessing and using the resource
Point of contact	identification of, and means of communication with, person(s) and organizations(s) associated with the resource(s)
<b>Point of contact - Position name</b>	role or position of the responsible person
Postal code	ZIP or other postal code
Presentation form	mode in which the resource is represented
OnLine resource - Protocol	connection protocol to be used
Purpose	summary of the intentions with which the resource(s) was developed
Reference system info	description of the spatial and temporal reference systems used in the datasetData
Data Quality - <b>Report</b>	quantitative quality information for the data specified by the scope. Mandatory if lineage not provided
Grid spatial representation - <b>Resolution value</b>	degree of detail in the grid dataset
Point of contact - <b>Role</b>	function performed by the responsible party
Geographic bounding box - <b>South bound latitude</b>	southern-most coordinate of the limit of the dataset extent, expressed in latitude in decimal degrees (positive north)
Spatial representation info	digital representation of spatial information in the dataset
Spatial representation type	method used to spatially represent geographic information
<b>Data Quality - Statement</b>	general explanation of the data producer's knowledge about the lineage of a dataset
Status	status of the resource(s)
Supplemental Information	any other descriptive information about the dataset
Temporal Extent	time period covered by the content of the dataset
Titel	name by which the cited resource is known
<b>Topic category code</b>	high-level geographic data thematic classification to assist in the grouping and search of available geographic data sets. Can be used to group keywords as well. Listed examples are not

Glossary of Metadata  
Fields Description

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	exhaustive. NOTE It is understood there are overlaps between general categories and the user is encouraged to select the one most appropriate.
Grid spatial representation - <b>Transformation parameter availability</b>	indication of whether or not parameters for transformation exists
Vector spatial representation - Topology level	code which identifies the degree of complexity of the spatial relationships
Type	subject matter used to group similar keywords
URL	URL
Use constraints	constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations or warnings on using the resource
Vector spatial representation	information about the vector spatial objects in the dataset
Voice	telephone number by which individuals can speak to the responsible organization or individual
Geographic bounding box - <b>West bound longitude</b>	western-most coordinate of the limit of the dataset extent, expressed in longitude in decimal degrees (positive east)

# Appendix B. ISO Topic Categories

Isotopic Categories and Keywords

Isotopic Category	Main Topic	Examples	Keywords
<b>Base Maps</b>	Base Maps, Scanned Maps, and Charts		Base Map
<b>Biom</b>	Biologic and Ecologic Information Flora and/or fauna in natural environment	wildlife, vegetation, biological sciences, ecology, wilderness, sea life, wetlands, habitat	
<b>Boundaries</b>	Administrative Legal land descriptions and Political Boundaries	political and administrative boundaries	Administrative boundaries,
<b>Climatology Meteorology Atmosphere</b>	cloud cover, weather, climate, atmospheric conditions, climate change, precipitation		NDVI, Drought, Floods
<b>Earth Cover</b>	Earth Surface Characteristics and Land Cover		Land Cover
<b>Economy</b>	Business and Economic Information, Economic activities, conditions and employment	production, labour, revenue, commerce, industry, tourism and ecotourism, forestry, fisheries, commercial or subsistence hunting, exploration and exploitation of resources such as minerals, oil and gas	
<b>Elevation</b>	Elevation and Derived Products, Height above or below sea level	altitude, bathymetry, digital elevation models, slope, derived products	Digital Elevation Model
<b>Environment</b>	Environmental Monitoring and Modelling, Environmental resources, protection and conservation	environmental pollution, waste storage and treatment, environmental impact assessment, monitoring environmental risk, nature reserves, landscape	
<b>Farming</b>	Agriculture and Farming Rearing of animals and/or cultivation of plants	agriculture, irrigation, aquaculture, plantations, herding, pests and diseases affecting crops and livestock	Agriculture, Crop Production, Livestock
<b>Geoscientific Information</b>	Geologic and Geophysical Information, Information pertaining to earth sciences	geophysical features and processes, geology, minerals, sciences dealing with the composition, structure and origin of the earth's rocks, risks of earthquakes, volcanic activity, landslides, gravity	

		information, soils, permafrost, hydrogeology, erosion	
<b>Health</b>	Human Health and Health, health services, human ecology, and Disease safety	disease and illness, factors affecting health, hygiene, substance abuse, mental and physical health, health services	Malnutrition, Wasting, Stunting, Underweight, Food Deficit, Crop Disease, Livestock Disease,
<b>Imagery</b>	Images and Photographs		
<b>Imagery Base Maps Earth Cover</b>	Base maps	land cover, topographic maps, imagery, unclassified images, annotations	
<b>Inland Waters</b>	Inland Water Resources and Characteristics, Inland water features, drainage systems and their characteristics	rivers and glaciers, salt lakes, water utilisation plans, dams, currents, floods, water quality, <u>hydrographic charts</u>	Rivers,
<b>Intelligence Military</b>	Military bases, structures, activities	barracks, training grounds, military transportation, information collection	
<b>Location</b>	Geodetic Networks Positional information and services and Control Points	addresses, geodetic networks, control points, postal zones and services, place names	Cartography
<b>Oceans</b>	Ocean and Estuarine Resources and Characteristics(excluding inland waters), Features and characteristics of salt water bodies	tides, tidal waves, coastal information, reefs	
<b>Planning Cadastre</b>	Cadastral and Legal Land Descriptions. Information used for appropriate actions for future use of the land	land use maps, zoning maps, cadastral surveys, land ownership	
<b>Recreation</b>	Tourism and Recreation		
<b>Society</b>	Society and Cultural and Demographic Information, Characteristics of society and cultures	Settlements, anthropology, archaeology, education, traditional beliefs, manners and customs, demographic data, recreational areas and activities, social impact assessments, crime and justice, census information	Vulnerability, Early Warning, Emergency, <u>IDPS</u> , Refugees, Population, Poverty, Food Security, Regional <u>Bureaux</u> , <u>WFP</u> Facilities, School feeding
<b>Structure</b>	Facilities, Man-made construction, Buildings and Structures	buildings, museums, churches, factories, housing, monuments, shops, towers	
<b>Transportation</b>	Transportation Means and aids for conveying persons and/or goods, Networks and Models	roads, airports/airstrips, shipping routes, tunnels, nautical charts, vehicle or vessel location, aeronautical	Infrastructure, <u>COMPAS</u> , Food Aid, Food Beneficiaries, Railways, Roads, Shipments

		charts, railways	
<b><i>Utilities Communication</i></b>	Utility Distribution Networks, Energy, water and waste systems and communications infrastructure and services	hydroelectricity, geothermal, solar and nuclear sources of energy, water purification and distribution, sewage collection and disposal, electricity and gas distribution, data communication, telecommunication, radio, communication networks	

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# Appendix C. Free and Open Source Software for Geospatial Information Systems

A range of geospatial related software packages can be implemented in addition to GeoNetwork opensource to deploy a full Spatial Data Infrastructure. Within the range of Free and Open Source Software (FOSS) solutions, these may include Web Map Server software, GIS desktop applications and Web Map Viewers.

Below you will find some examples of open source software available for each categories. Note that the FOSS in following list are downloadable from the Sourceforge web site <http://www.sourceforge.net>.

## **Web Map Server software:**

MapServer (All)\*

MapGuide (Windows & Linux)

## **GIS Desktop software:**

GRASS (All)\*

gvSIG (Windows & Linux)

uDIG (All)\*

OSSIM (Windows & OSX)

Quantum GIS (All)\*

## **Web Map Viewers:**

OpenLayers (All)\*

MapBender (All)\*

MapBuilder (All)\*

Ka-Map 1.0b1 (All)\*

\* All = Windows, Linux and Mac OS X