



GeoNetwork User Manual

Release 2.6.5-SNAPSHOT

GeoNetwork

January 21, 2014

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Welcome to the GeoNetwork User Manual v2.6.5-SNAPSHOT. The manual is a comprehensive guide to all aspects of using GeoNetwork opensource.

Other documents:

[GeoNetwork Developer Manual](#)

[GeoNetwork User Manual \(PDF\)](#)

Preface

1.1 About this Project

This document provides guidelines to install, configure, use and customise the GeoNetwork opensource software.

The GeoNetwork project started out as a Spatial Data Catalogue System for the Food and Agriculture organisation of the United Nations (*FAO*), the United Nations World Food Programme (*WFP*) and the United Nations Environmental Programme (*UNEP*).

At present the project is widely used as the basis of Spatial Data Infrastructures all around the world.

The project is part of the Open Source Geospatial Foundation (*OSGeo*) and can be found at [GeoNetwork opensource](#).



1.2 License Information

1.2.1 Software

The GeoNetwork opensource software is released under the *GPL* v2 license and can be used and modified free of charge.

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The document is written in reStructuredText format for consistency and portability.

1.3 Author Information

The documentation was written by the GeoNetwork opensource Developers and other community members. The basis for the reStructuredText based documentation is based on the work done by the [GeoServer](#) project and the [Sphinx](#) framework.

If you have questions, found a bug or have enhancements, please contact us through the GeoNetwork opensource Development Mailing list at geonetwork-devel@lists.sourceforge.net

Quick Start Guide

2.1 Geographic Information Management for all

2.1.1 Introduction

What is GeoNetwork opensource

GeoNetwork opensource is a standard based and decentralised 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 organisations 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 software is to increase collaboration within and between organisations 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, organised and documented in a standard and consistent way.

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 synchronisation of metadata between distributed catalogues
- Groups and users management
- Fine grained access control

Background and evolution

The prototype of the GeoNetwork catalogue was developed by the Food and Agriculture organisation of the United Nations (FAO) in 2001 to systematically archive and publish the geographic datasets

produced within the organisation. The prototype was built on experiences within and outside the organisation. 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 catalogue 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 [GeoNetwork Community website](#).

GeoNetwork opensource is the result of the collaborative development of many contributors. These include among others the Food and Agriculture organisation (FAO), the UN Office for the Coordination of Humanitarian Affairs (UNOCHA), the Consultative Group on International Agricultural Research (CSI-CGIAR), The UN Environmental Programme (UNEP), The European Space Agency (ESA) and many others. Support for the metadata standard ISO19115:2003 has been added 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 Catalogue Service for the Web (CSW 2.0.2) 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.

The use of International 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 architecture is largely compatible with the OGC Portal Reference Architecture, i.e. the OGC guide for implementing standardised geospatial portals. Indeed the 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 visualisation. The system is also fully compliant with the OGC specifications for querying and retrieving information from Web catalogues (CSW). It 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 visualising maps through the Internet.

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.

2.1.2 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 releases. At present, the user and developer mailing lists count well over 250 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 `irc://irc.freenode.net/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 have 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.

The documentation is written in reStructuredText format using the [Sphinx](#) framework to ensure versioning and support of multiple output formats (e.g. HTML and PDF).

2.2 Getting Started

Please make sure you have opened the home page of the GeoNetwork based catalogue.

If you installed the software on your local machine and started it, the default URL is <http://localhost:8080/geonetwork>

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 (*privileges*).

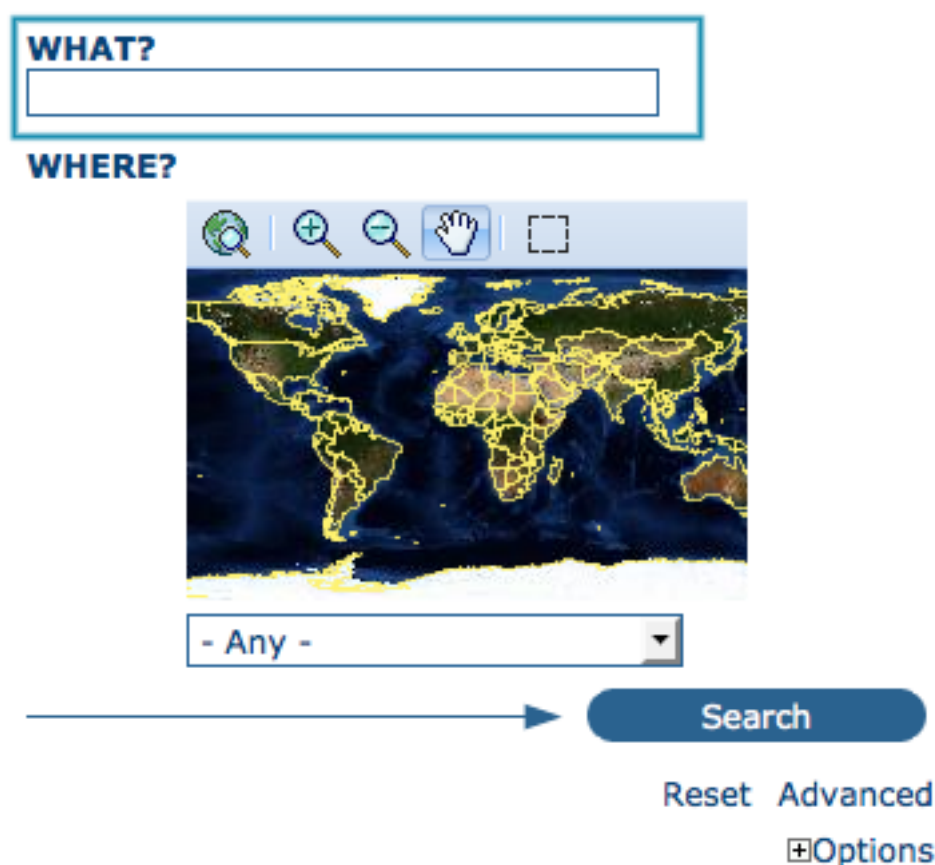
Note: The term *data* in this application refers to datasets, maps, tables, documents, etc. that are linked to the metadata of a specific record.

2.2.1 Default Search

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

Free text search. *Type* a search term in the *What?* field. You can type anything here (free text). You can use quotes around text to find exact combinations of words.

Text and operators (and, or, not) are not case sensitive.



The screenshot displays the search interface. At the top, there is a 'WHAT?' text input field. Below it is a 'WHERE?' section featuring a map of the world with yellow location markers. Above the map is a toolbar with icons for zooming in (+), zooming out (-), panning (hand), and a selection box. Below the map is a dropdown menu currently set to '- Any -'. To the right of the map area is a large blue 'Search' button. Below the 'Search' button are two links: 'Reset' and 'Advanced'. At the bottom right, there is a link labeled '+Options'.

Figure 2.1: *The free text field.*

Geographic search. 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;

WHAT?

WHERE?



Africa

Search

Reset Advanced

+Options

Figure 2.2: *The region field*

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.

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

Click the *Search* button to proceed and show the results.

2.2.2 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 practises**, **Conference proceedings**, **Datasets**, **Directories**, **Interactive resources**, **Maps and graphics**, **Other information resources**, **Photo**.

To search only for maps, click on **Maps and Graphics**. 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 2.3: *Interactive Area Of Interest map*



Figure 2.4: *The Search button*



Figure 2.5: Search by Category

2.2.3 Advanced Search

The advanced search option 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 focusing one of the following aspects: *What?*, *Where?*, *When?*

To perform an **advanced search**, from the home page **click Advanced** just below the search bottom.

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 customise your search further. You can also specify the level of accuracy you wish to reach in performing your search.

- 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.

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.

- 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.

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**. If you use this field, be cautious as this limits your output data as follows:

WHAT?

Either of the words

Title

Abstract

Keywords

☐ Map type

☐ Search accuracy

WHERE?

lat (max)

long (min)

long (max)



lat (min)

Type

Region

The figure shows a world map with yellow outlines of continents. Above the map is a toolbar with icons for zoom in, zoom out, pan, and a square selection box. The map is centered on the Atlantic Ocean, showing North and South America on the left and Europe and Africa on the right.

☐ **WHEN?**

[Reset](#) [Hide advanced options](#)

☐ Restrict to ☐ Options

Figure 2.6: *Advanced search options*

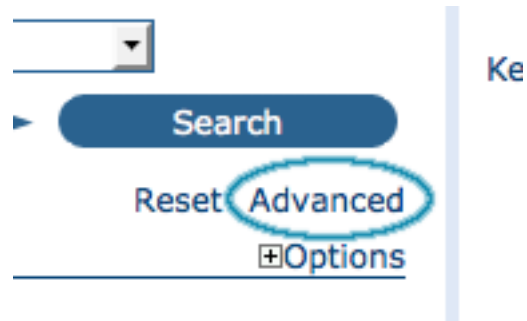


Figure 2.7: Show advanced search options

WHAT?

Either of the words

Title

Abstract

Keywords

☐ Map type

☐ Digital ☐ Interactive

☐ Hard copy ☐ Downloadable

☐ Search accuracy

Precise ☐ ☒ ☐ ☐ ☐ Imprecise

Figure 2.8: “What” section in the Advanced search

WHERE?

lat (max)

long (min) long (max)



lat (min)

Type

Region

Figure 2.9: “Where” section in the Advanced search

- 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.

- 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.

Finally, the advanced search allows you to apply further restrictions on the basis of additional parameters as data source, data categories and data format.

- To limit your queries to only one **Catalogue** out of those made available by the installation through the harvesting process, highlight the catalogue of preference or just keep **Any** selected to search all sites.
- To search for data organised 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

☐ **WHEN?**

☒ Anytime

☐ Metadata change date

From  To  

☐ Temporal Extent

From  To  

Figure 2.10: “When” section in the Advanced search

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 customise 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.

☐ Restrict to ☐ Options

Sort by

Hits per page

Output

Catalog

Category

Figure 2.11: Other options in the Advanced search

2.2.4 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.

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 process for retrieving data is simple and



Figure 2.12: Search results

quick by just clicking the download button or by using the proper link in the specific metadata section for distribution info in the full metadata view.

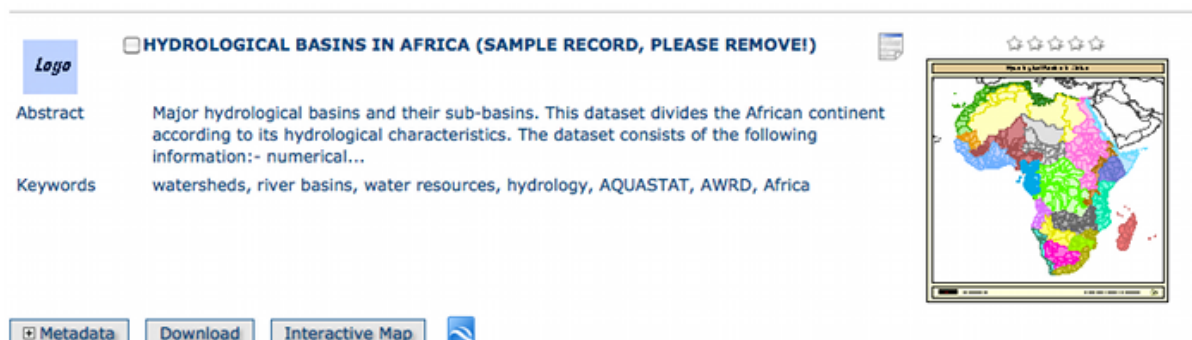


Figure 2.13: A single search result



Figure 2.14: Available services related to the resource

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 visualise the map through the map viewer, **click** on **Show Map** on the top of search results panel.
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.

2.2.5 Privileges, roles and user groups

GeoNetwork uses a system of *Privileges*, *Roles* and *User groups*.

There are no restrictions for users to search and access **public information** in a GeoNetwork opensource based catalogue. To get access to **restricted information** or advanced functionality, an account to log in is required. This should be provided by the GeoNetwork administrator.

To log in, simply go to the home page and enter your username and password in the dedicated fields on the top right corner, then click the login button.

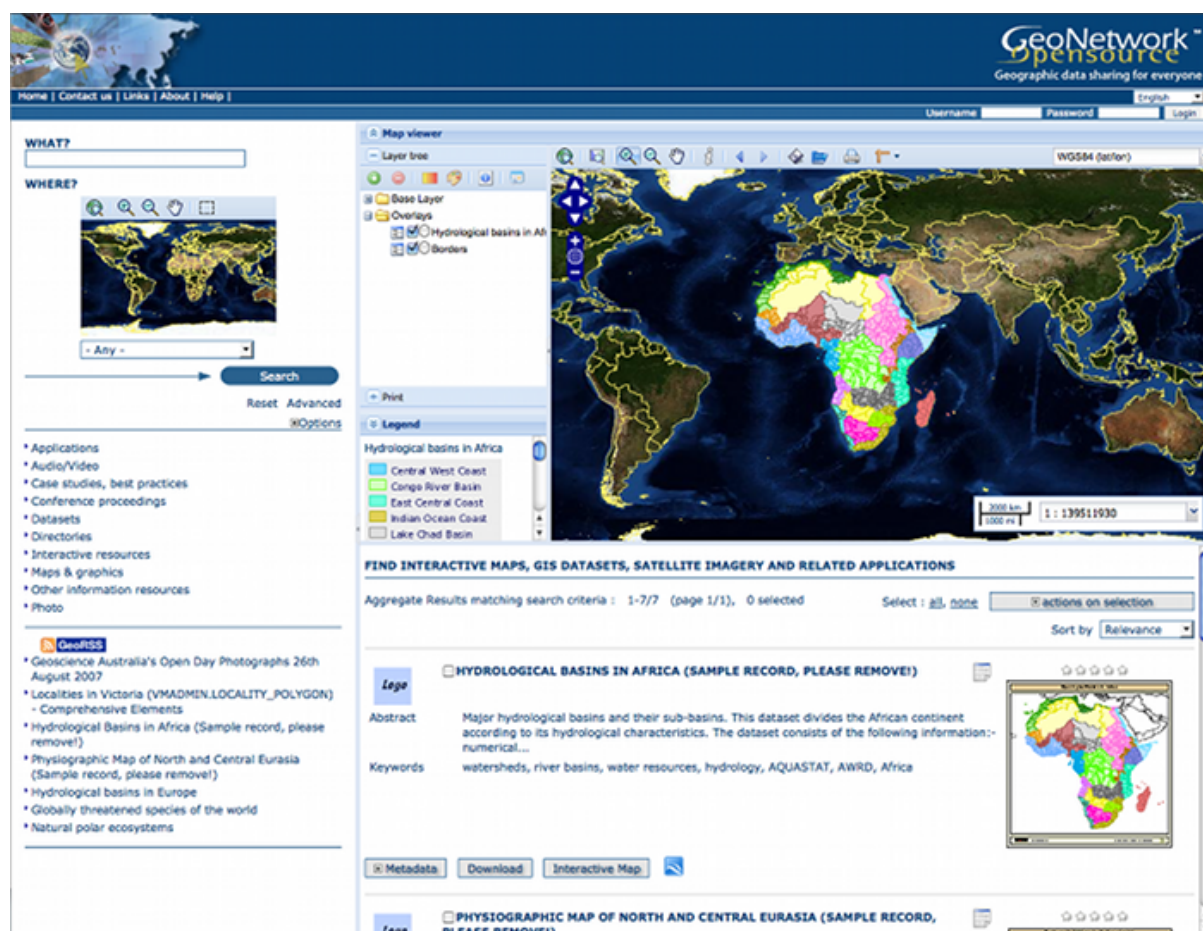


Figure 2.15: The interactive map viewer

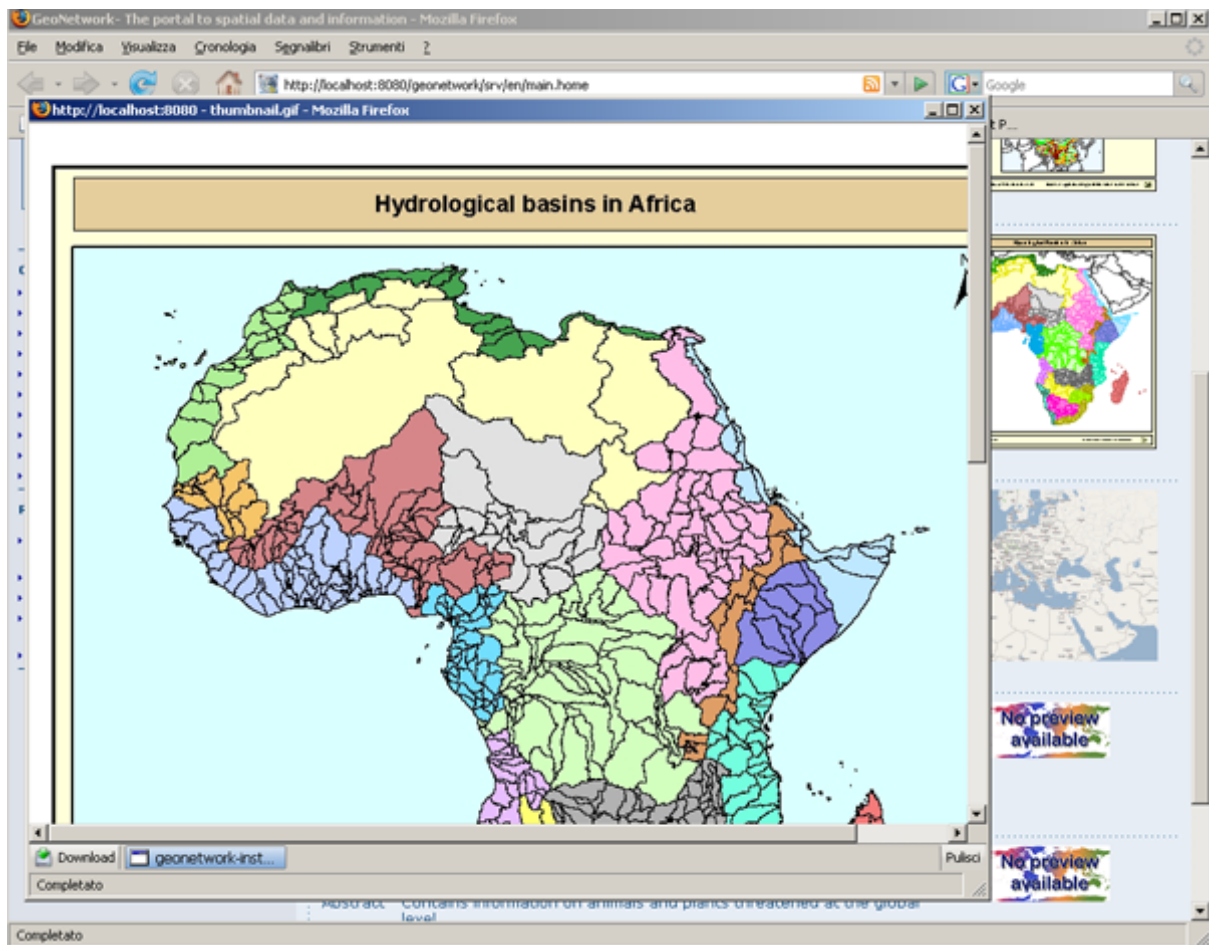


Figure 2.16: *Large preview image*

			English
Username		Password	
			Login

Figure 2.17: *Login*

Privileges. Depending on the privileges set on a metadata record and on your role as an authenticated user, you will be able to read about a resource and download or interactively browse data related to that resource.

Roles. Users with an *Editor* role can create, import and edit metadata records. They can also upload data and configure links to interactive map services.

User groups. Every authenticated user is assigned to a particular work group and is able to view data within that work group.

2.3 Viewing and Analysing the Data

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

The metadata profiles used by GeoNetwork opensource 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.

2.3.1 Metadata 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 organised in sections and the most important, illustrated in *main_sections*, are the: *Identification Section*, *Distribution Section*, *Reference System Section*, *Data Quality Section* and *Metadata Section*. These sections are described here in details.

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.

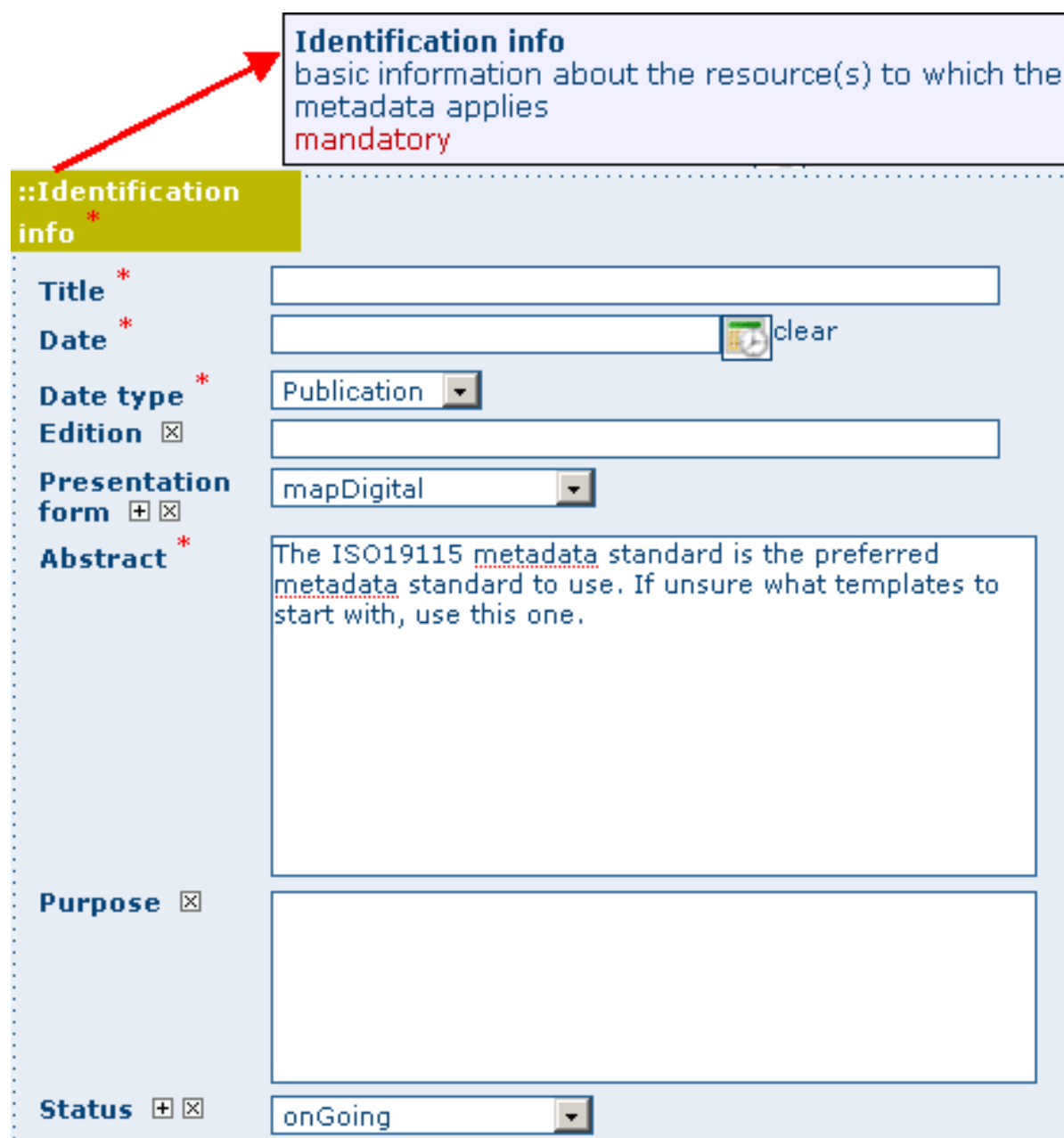
This section also contains information about the person or organisation responsible for the data and who is considered to be a *point of contact* for the resource i.e. the dataset owner, originator, distributor, publisher, etc. and it provides information on *data maintenance* i.e. annually, monthly,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

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.)

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.

Identification info	Identification info basic information about the resource(s) to which the metadata applies mandatory
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
Distribution info	Distribution info provides information about the distributor of and options for obtaining the resource(s)
OnLine resource	
OnLine resource	http://localhost:8080/geonetwork/srv/en/resources.get?id=13&fname=&access=private
Reference system info	Reference system info description of the spatial and temporal reference systems used in the dataset
Code	
Data quality info	Data quality info provides overall assessment of quality of a resource(s)
Hierarchy level	
Metadata	Metadata info information about the metadata itself mandatory
File identifier	5ca7b99
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	

Figure 2.18: *Main metadata sections*



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

::Identification info *

Title *

Date *  clear

Date type *

Edition

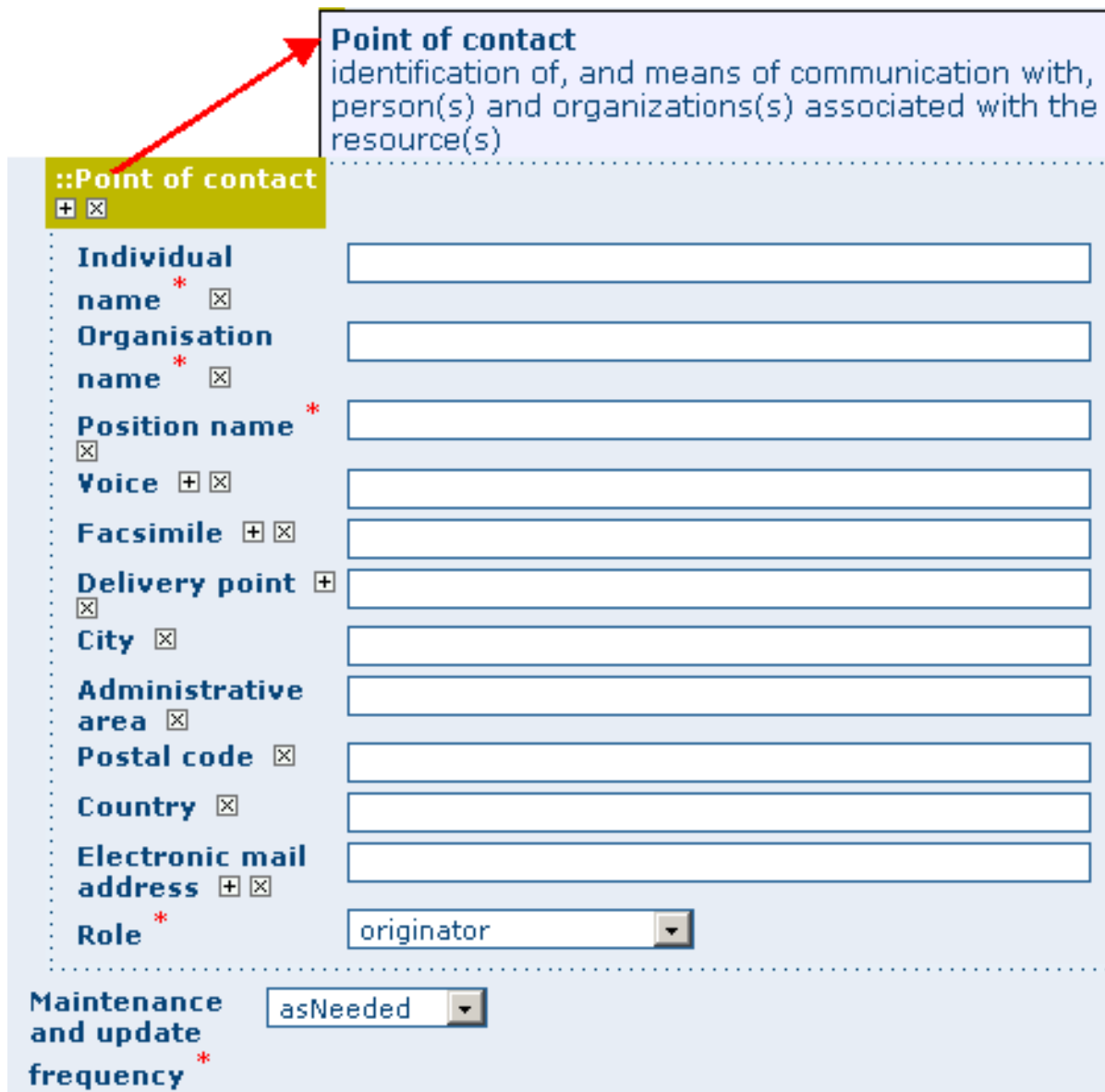
Presentation form

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

Purpose

Status

Figure 2.19: Identification information



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 ▼

Figure 2.20: *Point of Contact*

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

::Descriptive keywords + x ▲

Keyword +

Type x

Access constraints + x

Use constraints + x

Other constraints * + x

Spatial representation type + x

Figure 2.21: *Descriptive keywords*

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

::Equivalent scale *

Denominator *

Language * +

Character set utf8

Topic category code *

Figure 2.22: *Scale and other data properties*

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 2.23: *Temporal extent*

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. Free text *supplemental information* can be added to complete the data identification section.

Figure 2.24: *Geographic bounding box*

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 *online resource* and see the map interactively.

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

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

The form contains three sections for adding online resources. Each section has fields for URL, Protocol (with a dropdown), Description, and File (with a 'Browse...' button). An 'Upload' button is located at the bottom right of the form.

Figure 2.25: Distribution information

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. 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.

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

Code * WGS 1984

The form shows a single section for the reference system with a 'Code' field containing the value 'WGS 1984'.

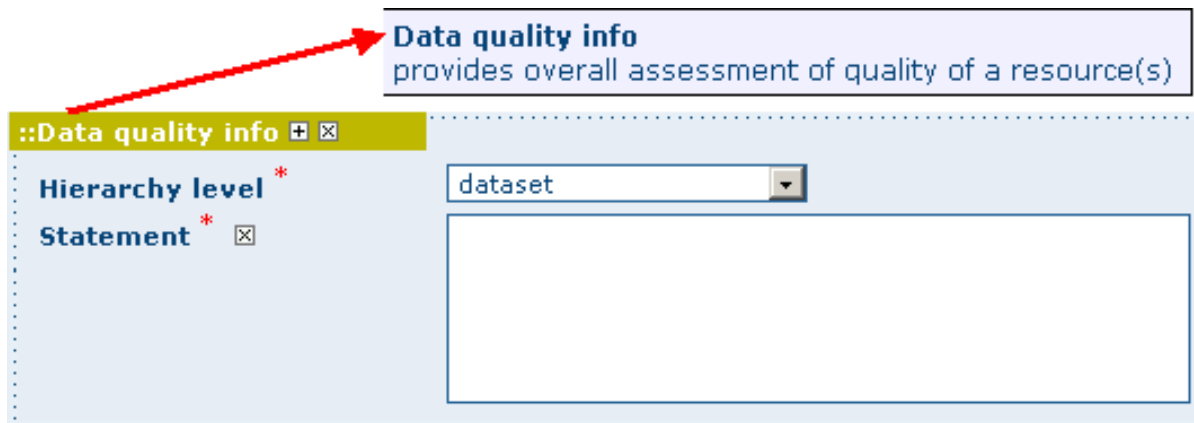
Figure 2.26: Reference system

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.

Metadata Information Section

This section contains information about the metadata itself: the Universally Unique Identifier (UUID) assigned to the record (this is the 'File identifier'), *language* and *charset* used, *date of last edit*



Data quality info
provides overall assessment of quality of a resource(s)

::Data quality info + -

Hierarchy level *

Statement * ☒

dataset

Figure 2.27: Data quality

(‘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.

2.4 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.

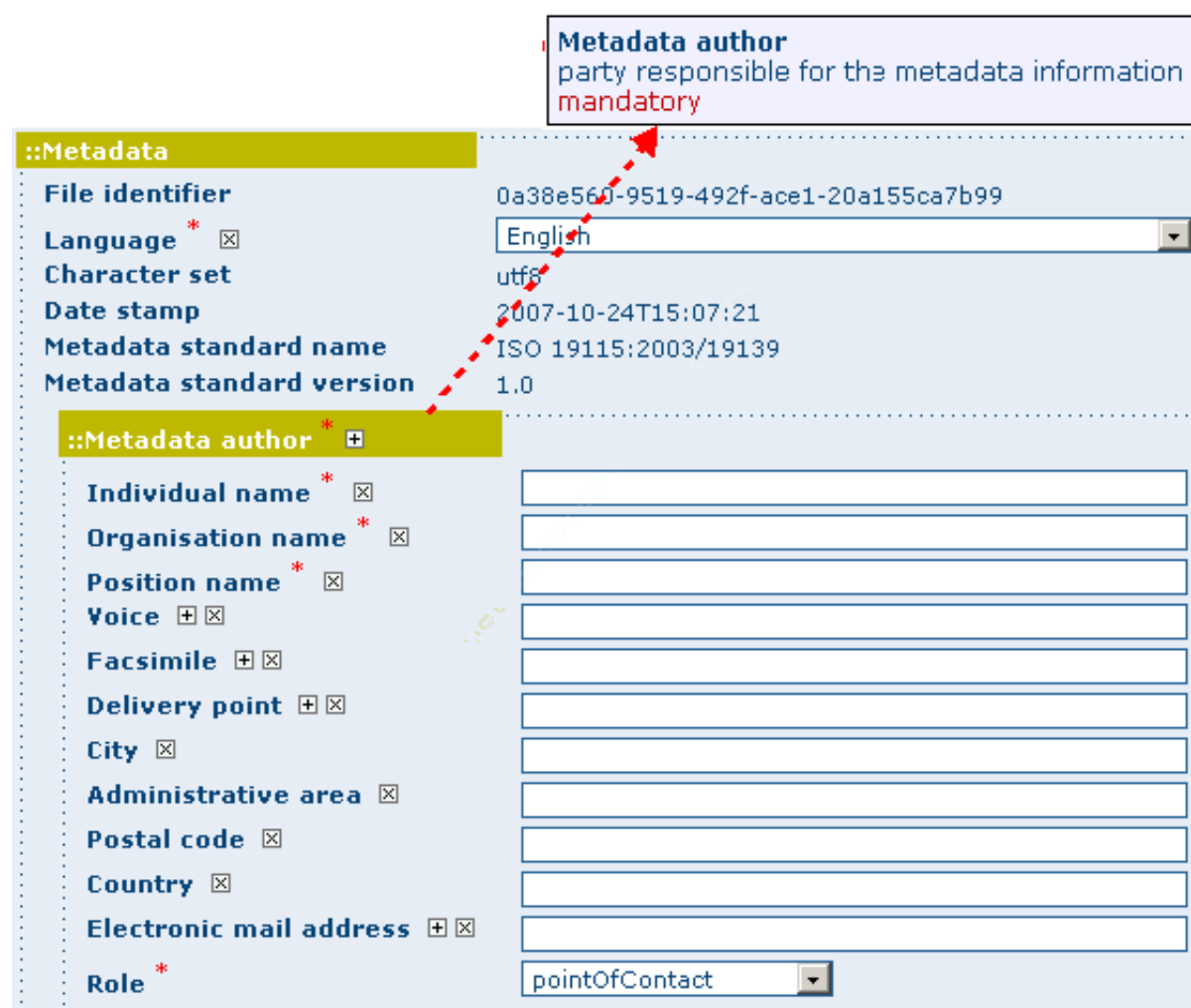
For the metadata creation using the online editor, GNos provides a set of simplified metadata templates based on the cited standards: ISO, FGDC and DC. The templates for vector and raster based on the ISO 19139 are the preferred ones since they are devised in a way that hides the complexity of the ISO19115 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 o 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.



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

Figure 2.28: Metadata properties

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

2.4.1 Creating a New Record using the web based Metadata Editor

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. GeoNetwork open-source 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**.

2.4.2 The steps in more details

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

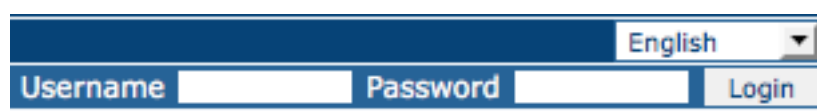


Figure 2.29: Login

2. Open the Administration page by clicking the Administration button in the banner and then click on the New metadata link.

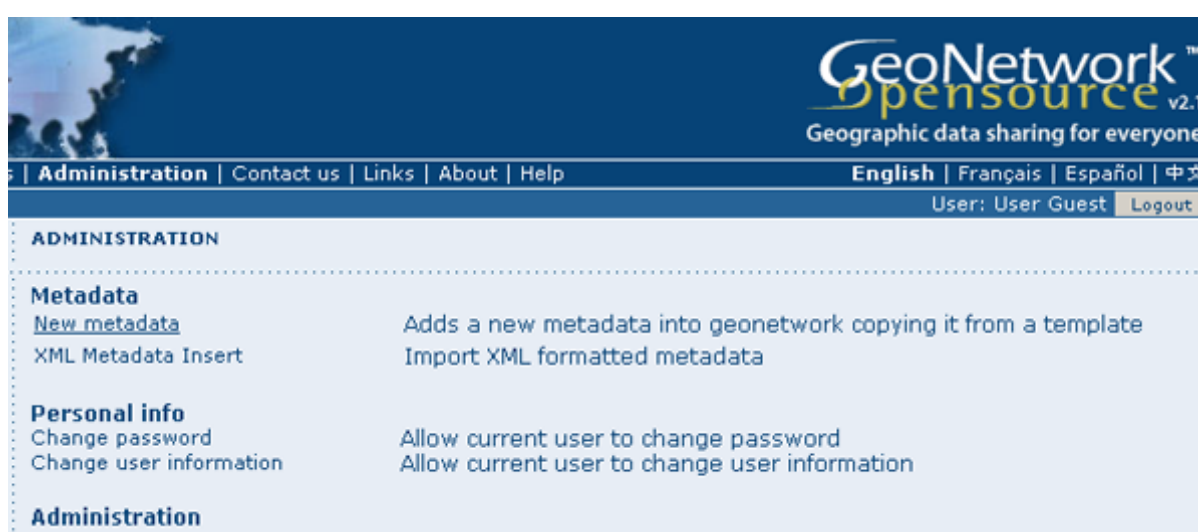


Figure 2.30: Administration panel

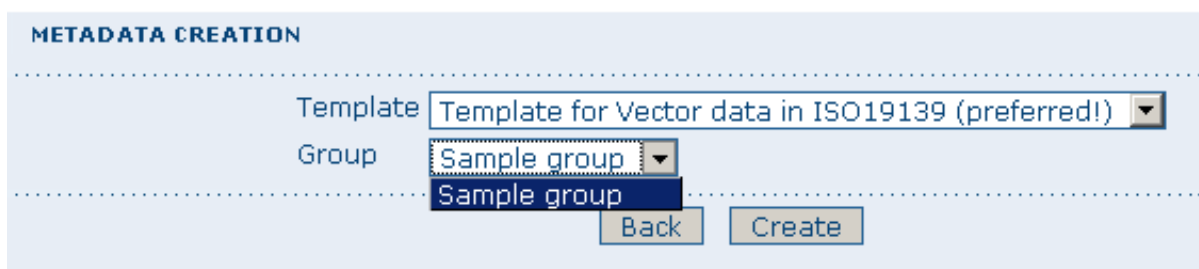
- From the metadata creation page, select the metadata standard to use from the dropdown list (Figure 4.3, “Template selection”)



The screenshot shows a web form titled "METADATA CREATION". It has two dropdown menus. The first, labeled "Template", is open and shows four options: "Template for Dublin Core", "Template for FGDC", "Template for Raster data in ISO19139", and "Template for Vector data in ISO19139 (preferred!)". The second dropdown menu, labeled "Group", is currently empty.

Figure 2.31: *Template selection*

- After selecting the correct template, you should identify which group of users the metadata will belong to and finally click on **Create**.



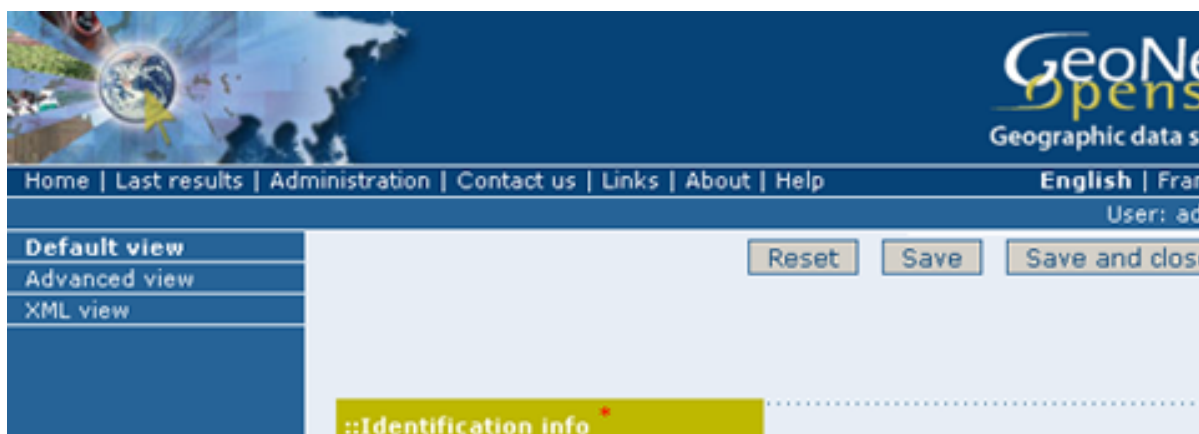
The screenshot shows the same "METADATA CREATION" form. The "Template" dropdown is now set to "Template for Vector data in ISO19139 (preferred!)". The "Group" dropdown is set to "Sample group". Below the dropdowns are two buttons: "Back" and "Create".

Figure 2.32: *Group selection*

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

2.4.3 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.



The screenshot shows the GeoNetwork user interface. At the top, there's a header with the GeoNetwork logo and navigation links. Below the header, there's a sidebar with three options: "Default view", "Advanced view", and "XML view". The "Default view" is currently selected and bolded. To the right of the sidebar, there's a main area with a "Reset" button, a "Save" button, and a "Save and close" button. Below these buttons, there's a section titled "Identification info" with a red asterisk next to it.

Figure 2.33: *Metadata view options*

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.

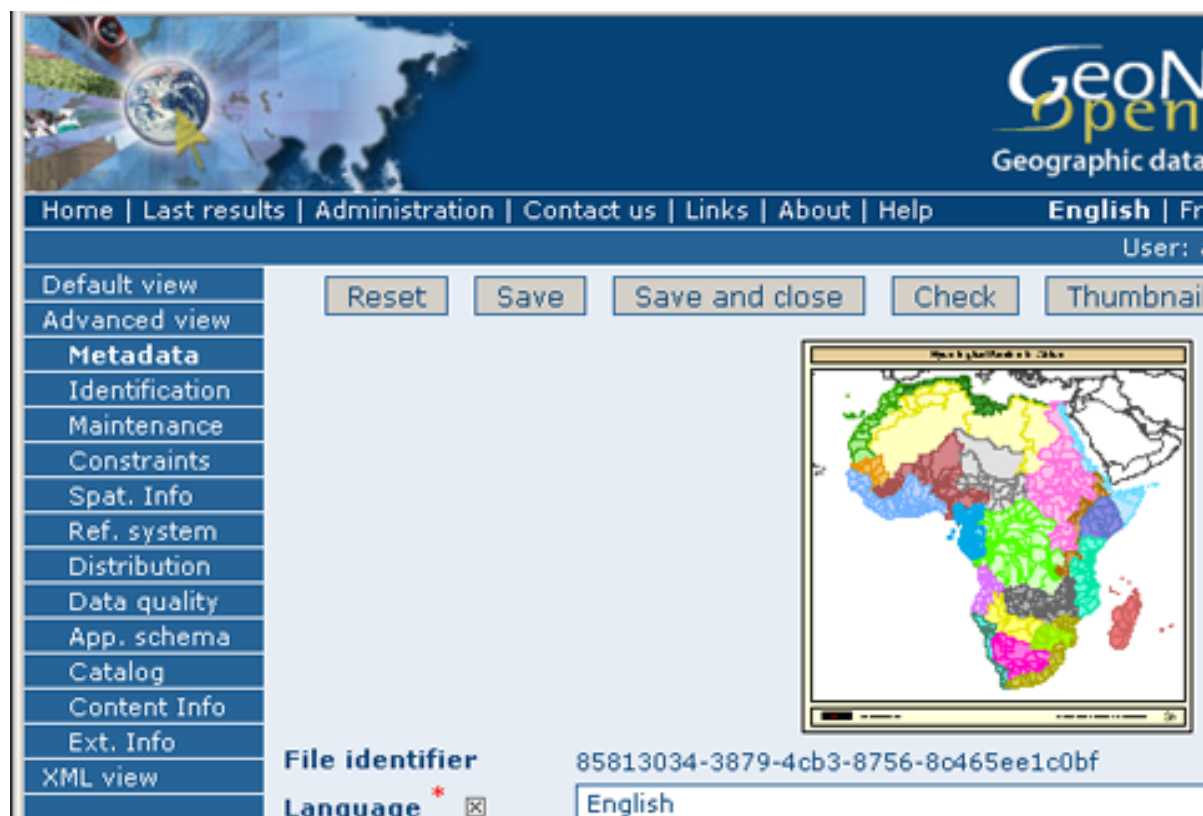


Figure 2.34: *Advanced view*

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>
```

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, 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

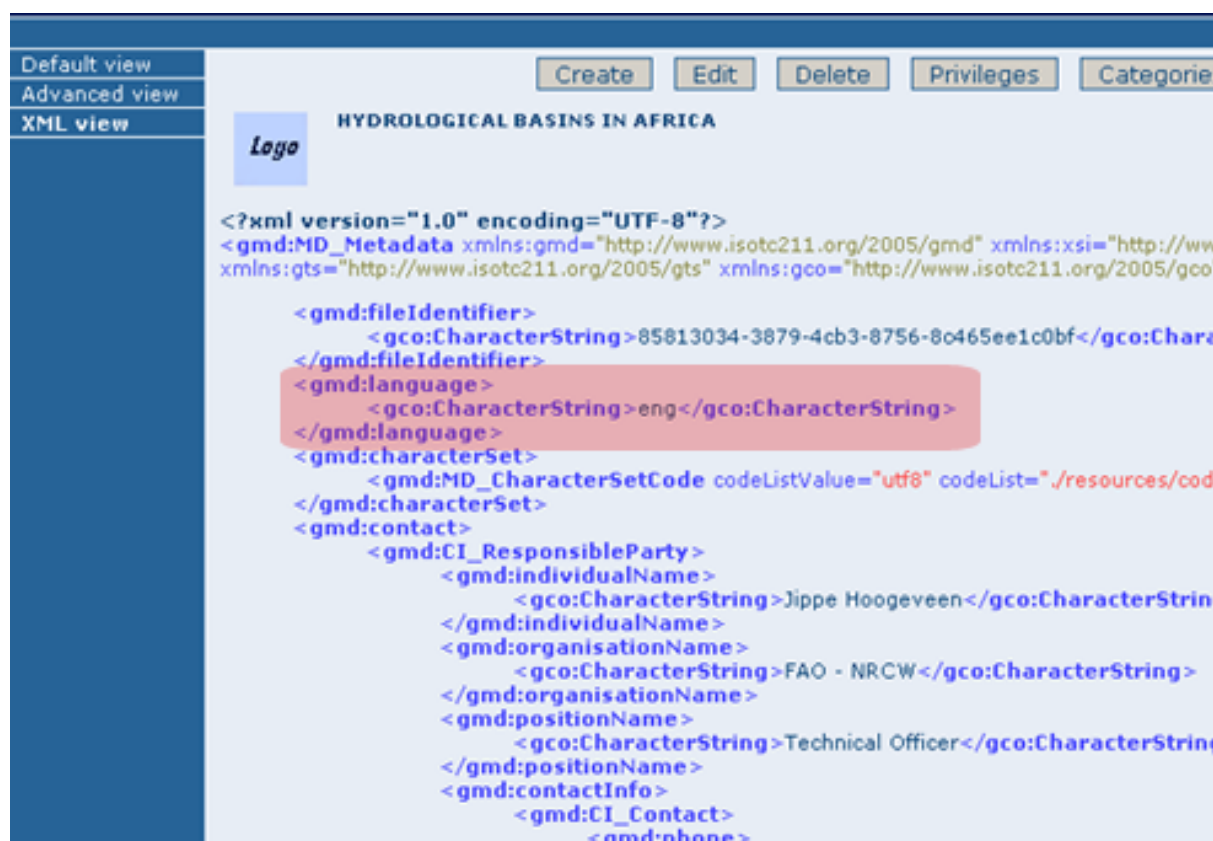


Figure 2.35: XML view

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.

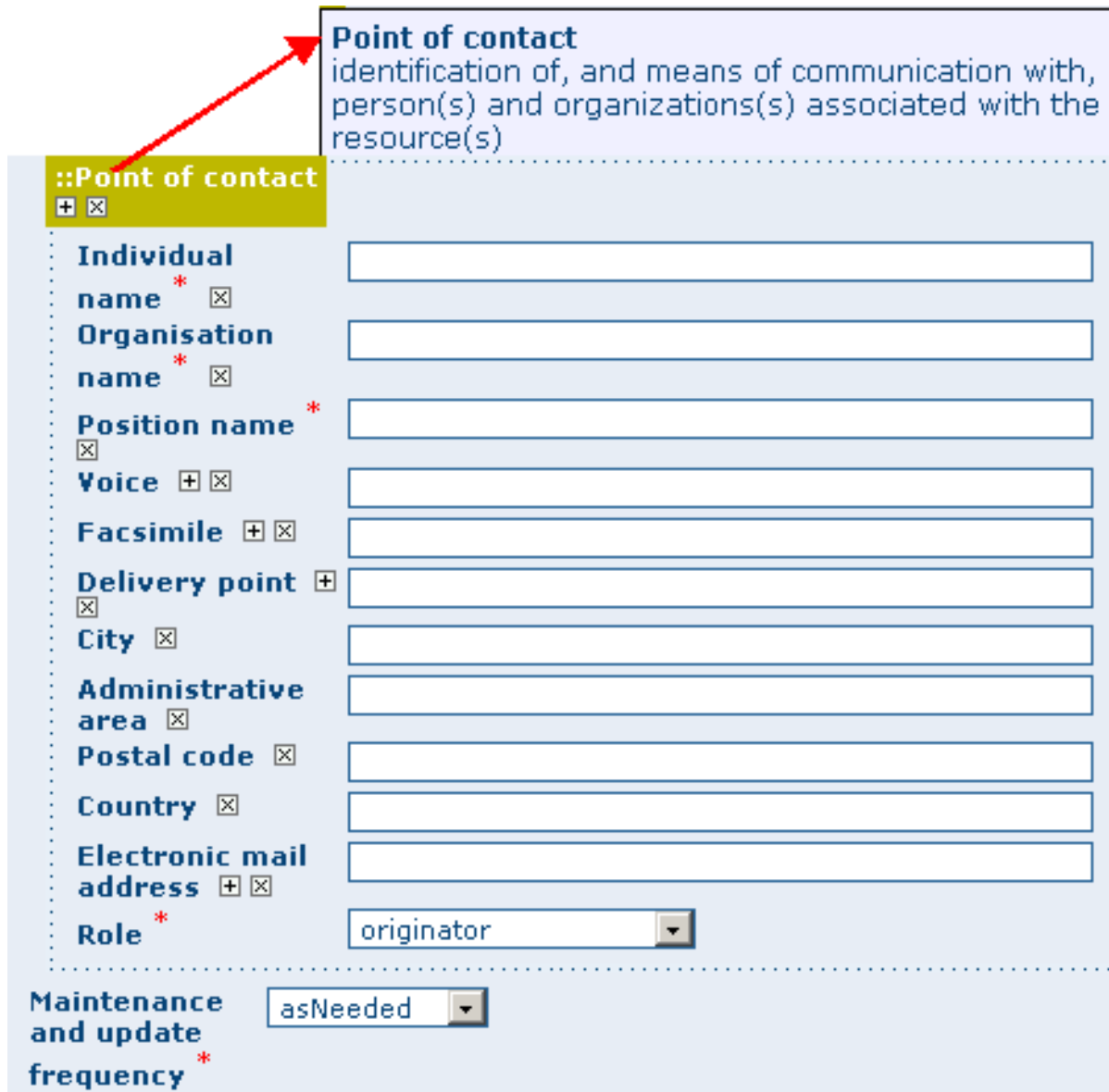
The **mandatory** fields as well as those **highly recommended** are flagged with **red asterisk** [*]. The standard definition for each field can be read by passing the mouse on the element name.

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.

2.4.4 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



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 ▼

Figure 2.36: *Point of Contact*

need to add multiple fields can arise if the content of your dataset has some text written in two different languages.

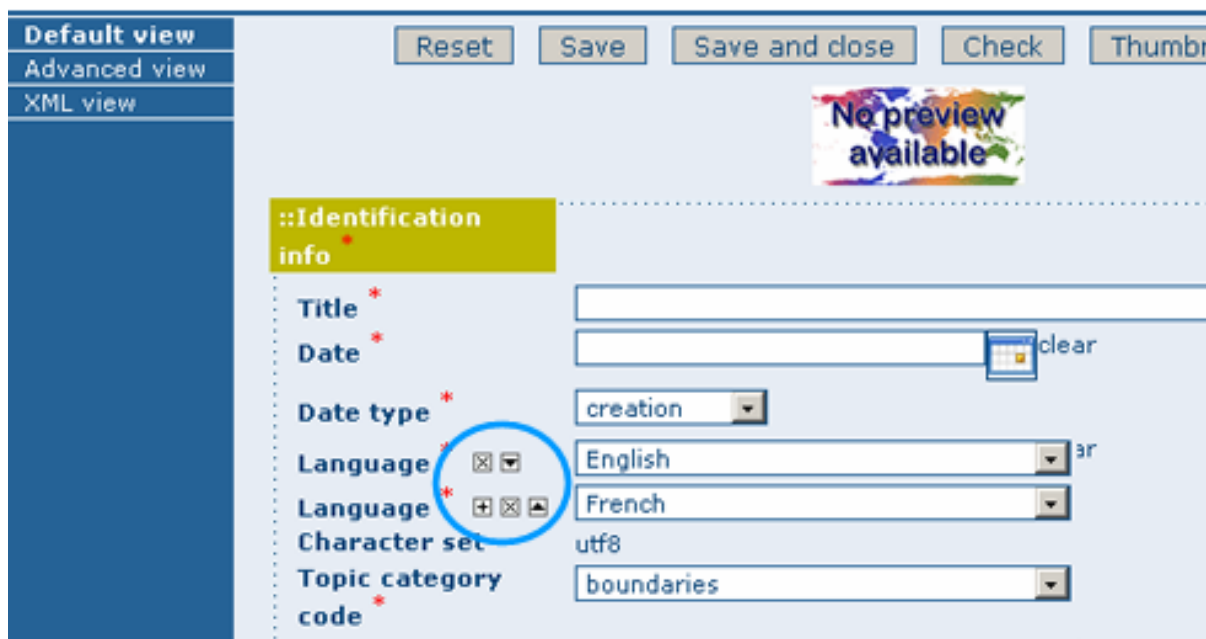
The screenshot shows the 'Identification info' section of a metadata form. On the left is a sidebar with 'Default view' selected, and 'Advanced view' and 'XML view' are also visible. At the top right are buttons for 'Reset', 'Save', 'Save and close', 'Check', and 'Thumbnail'. A 'No preview available' message is displayed. The 'Identification info' section contains several fields: 'Title' (text input), 'Date' (text input with a calendar icon and a 'clear' button), 'Date type' (dropdown menu showing 'creation'), 'Language' (dropdown menu showing 'English' with a red asterisk and a red circle around its controls), 'Language' (dropdown menu showing 'French'), 'Character set' (text input showing 'utf8'), and 'Topic category code' (dropdown menu showing 'boundaries').

Figure 2.37: Describing multilingual data

2.5 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.

2.5.1 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 hierarchical 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.

2.5.2 Metadata validation

In editing mode, editors could validate the current metadata record against standard rules and recommendations.

For all standards, a first level of validation is made for XML metadata validation based on XML Schema (XSD). For ISO19139 records, other rules are checked:

- ISO recommendations
- GeoNetwork recommendations
- (Optional and not available by default) INSPIRE recommendations

The validation report display the list of rules checked and their status (pass or failed). The top checkbox allows to display only errors or all.

2.5.3 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.

- You will be taken to the Thumbnail Management wizard.
- 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.

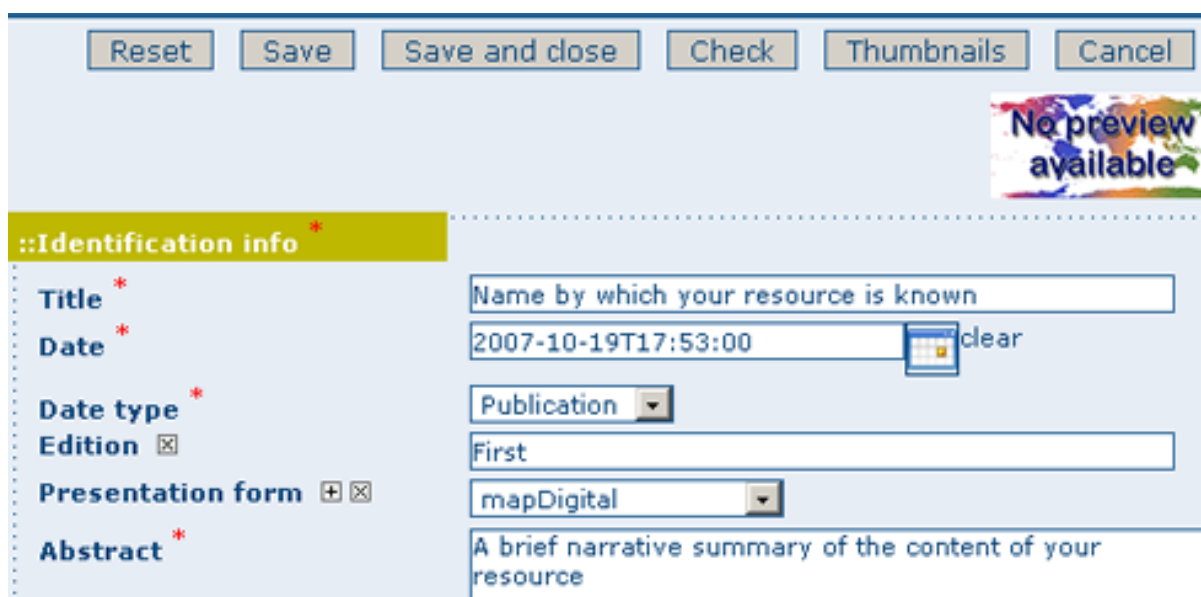
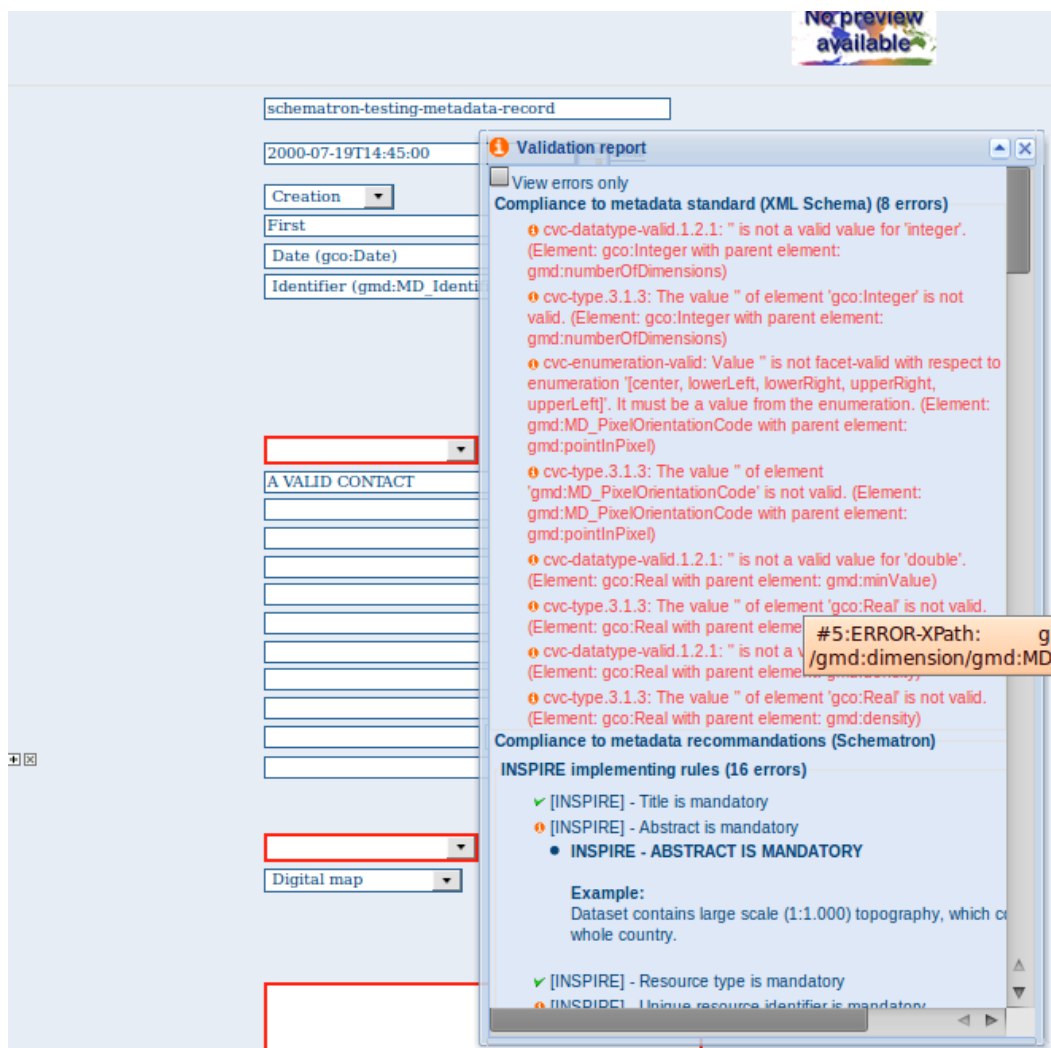


Figure 2.38: The thumbnail wizard button

THUMBNAIL MANAGEMENT

 Small thumbnail

☒ Scale image

☐ Scale width

☐ Scale height

 Large thumbnail

☒ Scale image

☐ Scale width

☐ Scale height

☒ Create small

☐ Scale width

☐ Scale height

Figure 2.39: *Thumbnail wizard*

THUMBNAIL MANAGEMENT

	Small thumbnail thumbnail_s.png	Delete
	Large thumbnail thumbnail.png	Delete

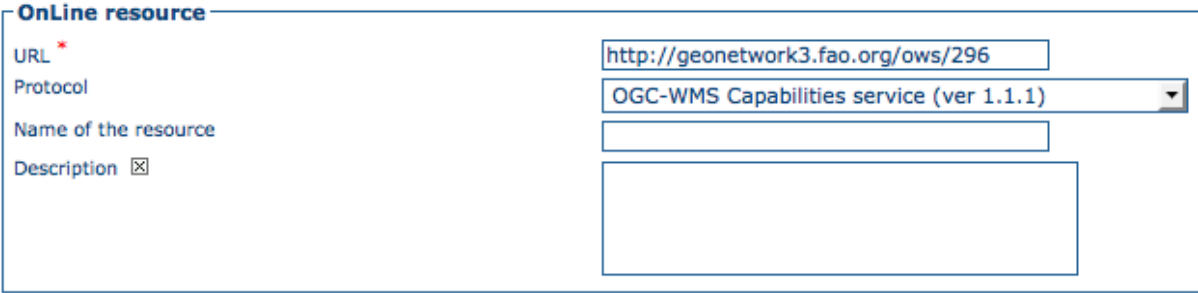
Figure 2.40: *Completed thumbnail wizard*

2.5.4 Linking WMS online resources

Metadata records in ISO19139 could be related to resources defined in WMS services. When searching metadata that has related WMS online resources, the *Interactive Map* button is displayed to load the WMS layer/s in the map viewer. A WMS online resource can be referenced in metadata like:

- Selecting protocol **OGC-WMS Web Map Capabilities 1.1.1** or **OGC-WMS Web Map Capabilities 1.3.0**:

1. *URL*: Url of WMS service
2. Name of the resource: empty.



The screenshot shows a web form titled "OnLine resource". It contains the following fields:

- URL ***: A text input field containing the URL "http://geonetwork3.fao.org/ows/296".
- Protocol**: A dropdown menu with the selected option "OGC-WMS Capabilities service (ver 1.1.1)".
- Name of the resource**: An empty text input field.
- Description**: A text area with a small "x" icon in the top right corner, currently empty.

Figure 2.41: WMS online resource

The *Interactive Map* button opens a window to select the layer/s defined in WMS capabilities document to load in map viewer.

- Selecting protocols **OGC-WMS Web Map Service**, **OGC Web Map Service 1.1.1** or **OGC Web Map Service 1.3.0**:

1. *URL*: Url of WMS service
2. *Name of the resource*: WMS layer name (optional)

The behaviour the *Interactive Map* button depends if user indicated the layer name in the field *Name of the resource* or not, to show the window to select the layer/s to load in map viewer or load the layer directly.

2.5.5 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:

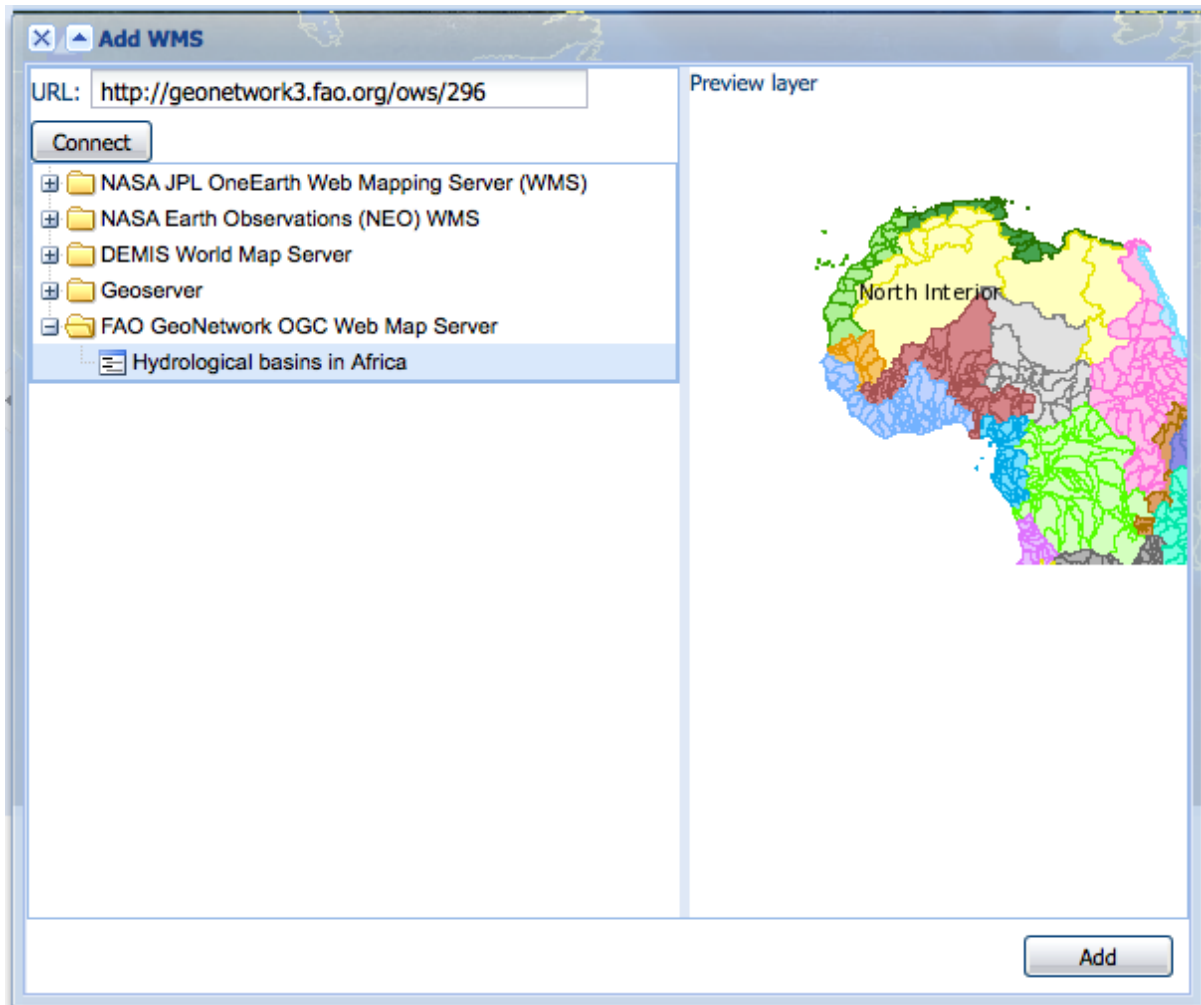


Figure 2.42: Window to select WMS layer/s referenced in online resource to load in map viewer

OnLine resource	
URL *	http://geonetwork3.fao.org/ows/296
Protocol	OGC Web Map Service (ver 1.1.1)
Name of the resource	hydrological_basins
Description ☒	

Figure 2.43: WMS online resource

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 2.44: *An online resource*

2.5.6 Linking metadata

Metadata records in ISO19139 could be related together based on ISO elements using for example:

- parent identifier
- operates on element for service metadata

Using GeoNetwork editor, user could define 3 types of relation:

- dataset metadata / service metadata (including a link to the data based on WMS layer name)
- parent / child relation
- feature catalogue (ISO19110) / dataset metadata (ISO19139)

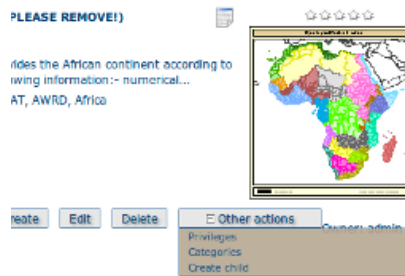
All relations are described in the top right corner of the metadata. The menu allows navigation from one record to the other. Only metadata records visible to current user are displayed (ie. a metadata could be linked to another one but not displayed because not published for current user).

Parent / child relation

To create a child record, editors could click on the other actions menu, create child option in the search results.

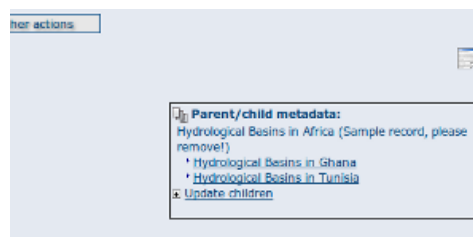
Using this option, parent identifier will be automatically set up when duplicating the record.

Editors could also link an existing metadata record using the parent identifier displayed in the advanced view, metadata section. Clicking on the Add or update parent metadata section on the metadata relation

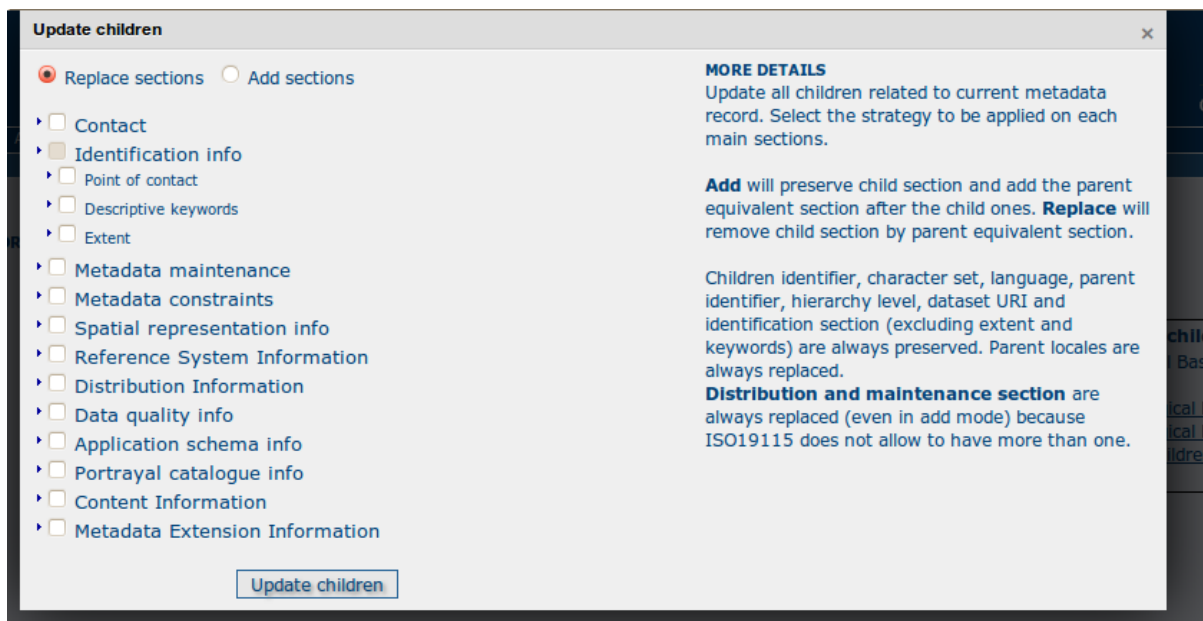


list will move to this view. Then editors should use the (+) to expand the parent identifier and click on the field to open the metadata selection panel.

Once the parent selected, it will appear in the metadata relation list on the top right corner of the editor.



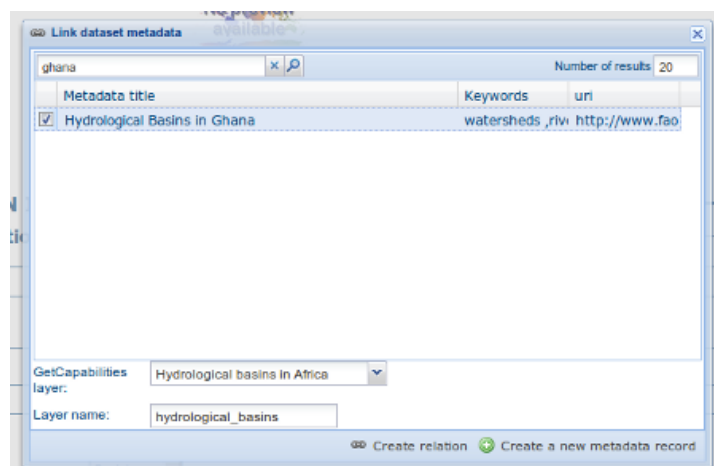
If a metadata record has children attached, the editor suggest the children update mechanism which propagate changes from a parent to all its children. The following interface define the configuration of the propagation:



Metadata on dataset / metadata on service relation

Linking a dataset to a service or a service to a dataset is made using the following panel:

Editor could define a layer name using the combo box (which try to retrieve layers from the WMS GetCapabilities document) or typing the layer name in the text field. This information is required to display the layer using the map viewer.



Relation is stored in :

```
<srv:operatesOn uuidref="" xlink:href="" />
```

and (according to ISO CSW profil)

```
<srv:coupledResource>
  <srv:SV_CoupledResource>
    <srv:operationName></srv:operationName>
    <srv:identifier></srv:identifier>
    <gco:ScopedName></gco:ScopedName>
  </srv:SV_CoupledResource>
</srv:coupledResource>
```

Only relation between records in the same catalogue are handle. Use of XLink attributes are not supported to create relation between datasets and services.

Feature catalogue relation

Feature catalogues are records stored in ISO 19110 standard. Relation between the 2 records are created using the link feature catalogue menu.

2.5.7 Compute bounding box from keywords

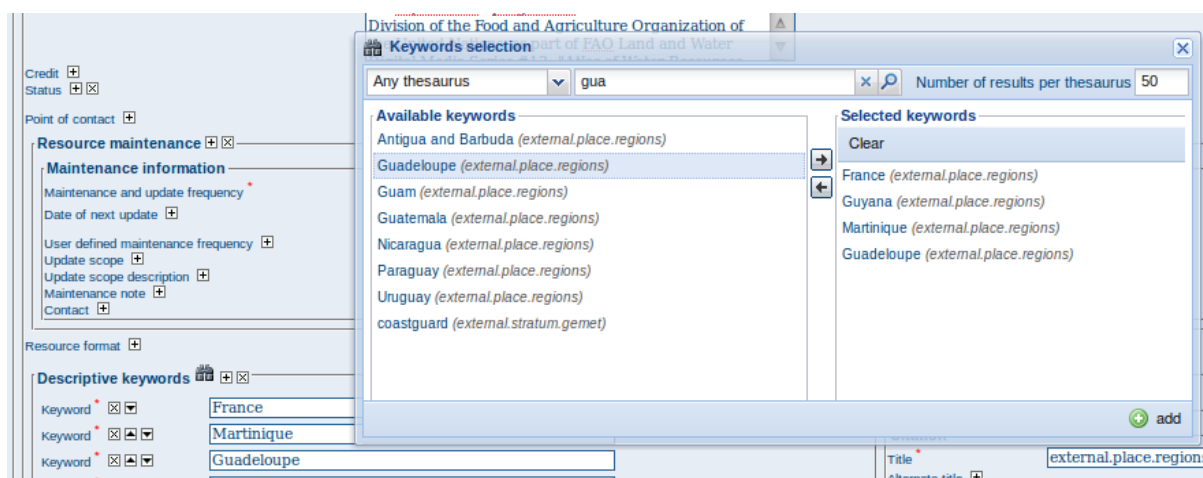
Editor can add extent information based on keyword analysis.

- For each keywords
- Search for the keyword in thesaurus
- If keyword in the thesaurus has an extent
- Add an extent with a description and a bounding box to the metadata record.

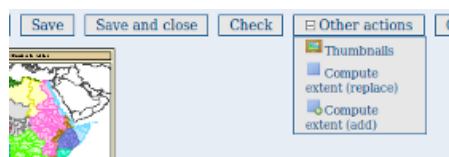
The process could be run in 2 modes :

- Add : Keep existing extent elements and add the new one at the end. Editor could clean the section after processing.
- Replace : Remove all extent having only a bounding box (temporal, vertical and bounding polygon are not removed), and add the new one at the end.

Editor need to select keyword from a thesaurus with spatial information. The name is added to the extent description field.



Then in the other actions menu, the compute boundinx box menus are available:



The metadata is saved during the process and one extent is added for each keywords.

If user manually add keywords just before computing bounding box, then it's recommended to save your metadata record before launching the action in order to have latest keywords taken into account.

2.5.8 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 fdefine 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.

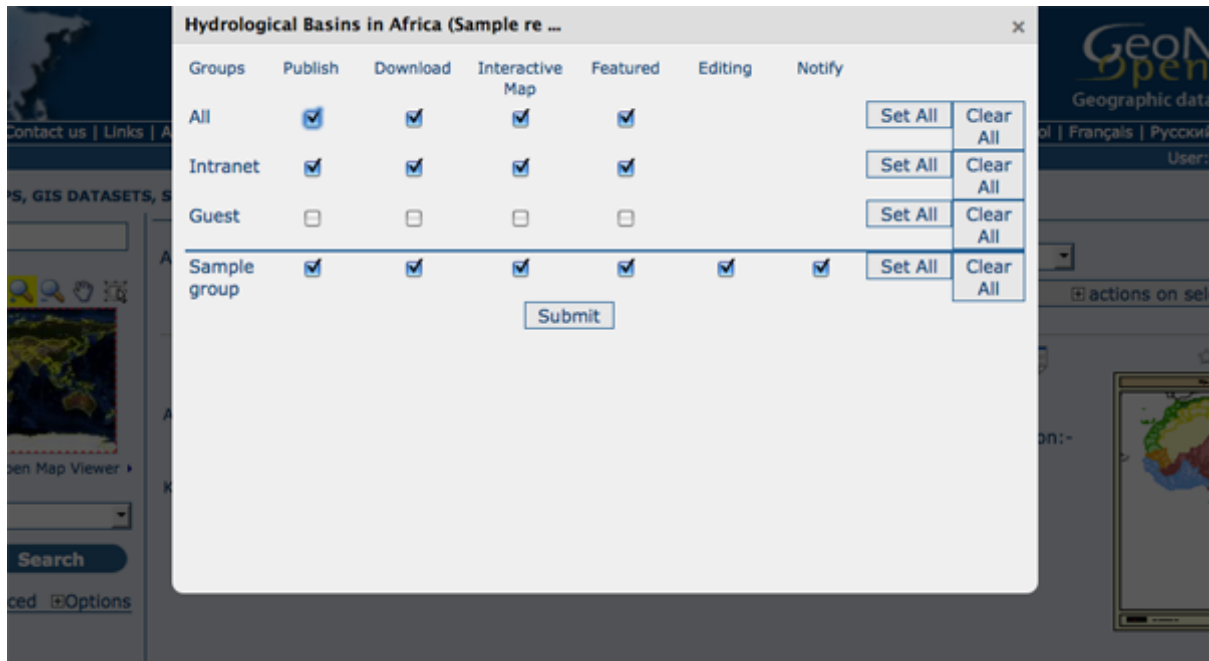
To assign privileges for your map, follow these steps:

- 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.
- 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.

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



Figure 2.45: The editing toolbar with Privileges button

Figure 2.46: *Privileges settings*

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.

2.5.9 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.
- 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.

2.5.10 Multilingual metadata in ISO19139

Editors could create multilingual metadata using ISO 19139. A default template is provided but user could add translation to an existing record.

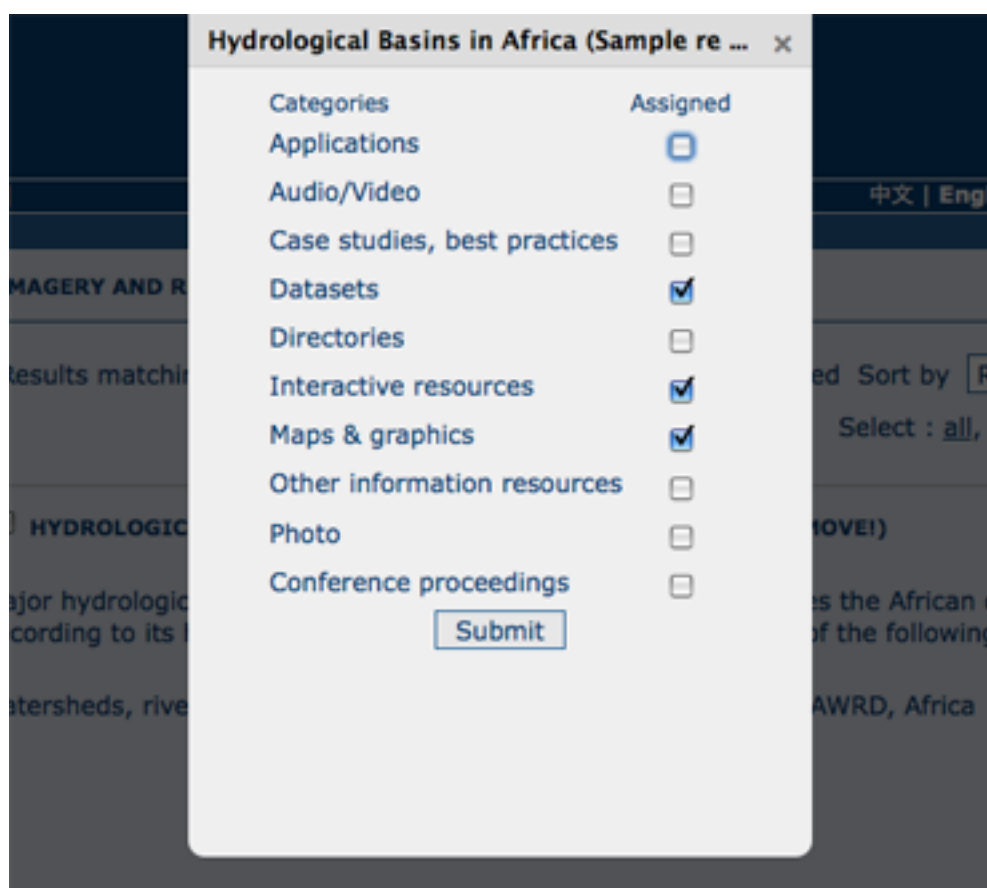


Figure 2.47: *Category management*

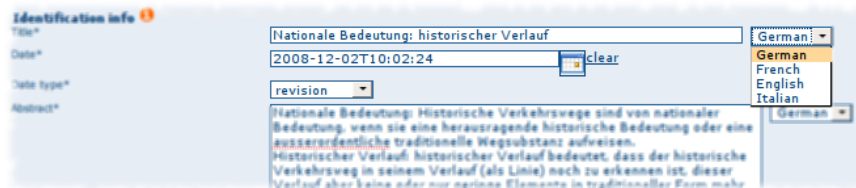
To declare a new language in a metadata record:

- First check, the main language is defined in the metadata section
- then add one or more languages in the other language in the metadata section.

In editing mode, each multilingual elements are composed of:

- text input
- language selection list (language declared on the other language section are listed here)

By default, the selected language is the GUI language if language is defined in the metadata.



Optionnaly, Google translation service could be used. Translation could be suggested to the editor using the small icon right to the language selector. The translation convert the default metadata character string in the current selected language.

In view mode, according to GUI language : if GUI language is available in the metadata, the element is displayed in this language else the element is displayed in metadata default language. This behaviour is also applied to dublin core output for CSW services.

2.6 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 and select the appropriate option from the Administration page.

The main part of the page **Import XML Formatted Metadata** that is displayed 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, FGDC 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.

If your metadata is already in ISO19115 format, the main actions to be performed are the following:

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

ADMINISTRATION	
Metadata	
New metadata	Adds a new metadata into geonetwork copying it from a template
Metadata insert	Import metadata record in XML or MEF format
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
Template	
Sort Templates	Sort your templates
Add templates	Add default templates : ☐ iso19139/119 ☐ iso19110 ☐ dublin-core ☐ fgdc-std ☐ all Add templates
Personal info	
Change password	Allow current user to change password
Change user information	Allow current user to change user information
Administration	
User management	Add/modify/delete and show users
Group management	Add/modify/delete and show groups
Category management	Add/modify/delete and show categories
Manage thesauri	Add/modify/delete and show thesauri
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...
Rebuild Lucene index	Rebuild
Optimize Lucene index	Optimize
Test i18n	This service should help GeoNetwork opensource developers to have up to date localized files for the GUI.
CSW ISO Profile test	Test interface for the CSW ISO Profile catalog interface
Sample metadata	Add sample metadata

Figure 2.48: Administration panel

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.

2.7 Metadata in Spatial Data Management

2.7.1 What is Metadata?

Metadata, commonly defined as “data about data” or “information 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.

2.7.2 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.

The standards provide a documented, common set of terms and definitions that are presented in a structured format.

IMPORT XML FORMATTED METADATA

Metadata

Type

StyleSheet

Destination schema

Validate ☐

Group

Category

Figure 2.49: XML metadata import tool

IMPORT XML FORMATTED METADATA

Metadata	<pre><?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></pre>
Type	Metadata
StyleSheet	none
Destination schema	iso19139
Validate	☒
Group	Sample group
Category	Maps & graphics

Figure 2.50: XML metadata import 2

2.7.3 Why do we need Standardised Metadata?

Standardised 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.

2.7.4 Geographic Information Metadata Standard

Geographic data, which can be defined as any data with a geographic component, is often produced by one individual or organisation, 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, GeoNetwork opensource 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.

The underlying format of an ISO19115:2003 compliant metadata is XML. GeoNetwork uses the *ISO Technical Specification 19139 Geographic information - Metadata - XML schema implementation* for the encoding of this XML.

2.7.5 Metadata profiles

GeoNetwork supports multiple metadata profiles. Profiles can take the form of *Templates* that you can create using the metadata editor. Using the Advanced view of the editor, virtually all of the metadata elements are accessible to the user.

Support for extensions to a metadata standard can also be achieved relatively quick by an experienced XML/XSL software engineer.

2.7.6 Transition between metadata standards

With the ISO19115:2003 Metadata standard for Geographic Information now being the preferred common standard, many have a need to migrate legacy metadata into the new standard.

GeoNetwork provides import (and export) functionality and has a number of transformers in place. It is an easy process for a system administrator to install custom transformers based on XSLT.

2.8 Metadata Massive Update

This section guides you through the process of replacing content in metadata records into the GeoNetwork catalogue.

To use this feature the user you must be **registered** as **Reviewer**, **User Administrator** or **Administrator**.

This section will guide you through the steps to apply a massive update of metadata content.

1. In the home page, do a search to filter the metadata.
2. Select from the results the metadata you want to apply the massive update.
3. Select **Actions on selection > Massive metadata update**.

Massive metadata update

THIS PROCESS ALLOW TO REPLACE CONTENT IN THE SELECTED METADATA.

To define a replacement you should:

1. Select the package that contains the metadata element to replace.
2. Select the metadata element you want to replace.
3. Specify the text content to replace.
4. Specify the new text content.

Note that multiple replacements can be specified and the process will replace any occurrence of the text indicated in (3) with the text indicated in (4) for the metadata element indicated in (2)

☐ Case insensitive search

Package	Element	Search text	Replace text
Identification	Contact > Individual Name	John	Jane
Identification	Contact > Email	john@omnr.com	jane@omnr.com

Update metadata Test

This form allows to configure the replacements to apply to the metadata selection.

2.8.1 Define the replacement(s)

To define the replacements to apply to the selected metadata:

1. Select the package that contains the metadata element to replace:
 - Identification.
 - Maintenance information.
 - Content information.
 - Distribution information.
2. Select the metadata element you want to replace in the package selected.
3. Specify the text content to replace.
4. Specify the new text content.
5. Multiple replacements can be specified clicking on + button.

Once all the replacements are defined, you can test it before applying it. Click **Test** button to produce a report with the metadata that will be updated:

Massive metadata update

THIS PROCESS ALLOW TO REPLACE CONTENT IN THE SELECTED METADATA.

To define a replacement you should:

1. Select the package that contains the metadata element to replace.
2. Select the metadata element you want to replace.
3. Specify the text content to replace.
4. Specify the new text content.

Note that multiple replacements can be specified and the process will replace any occurrence of the text indicated in (3) with the text indicated in (4) for the metadata element indicated in (2)

☐ Case insensitive search

Package	Element	Search text	Replace text
Identification	Contact > Individual Name	John	Jane
Identification	Contact > Email	john@omnr.com	jane@omnr.com

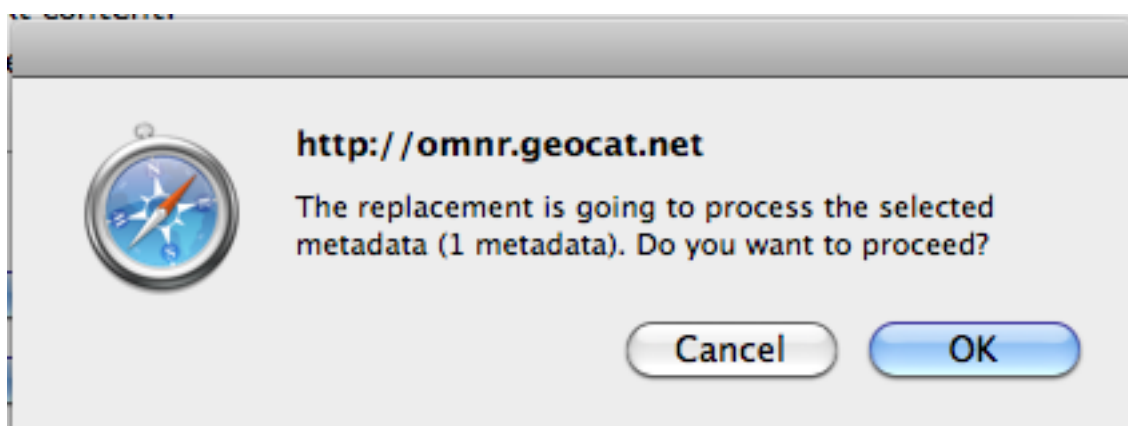
Update metadata Test

MASSIVE UPDATE TEST RESULTS

Metadata Records processed	3
Metadata Records to be updated	0
Metadata Records that could not be processed because you are not the owner	0
Metadata Records not found	0

Note: The test process does not update the metadata with the replacements.

To apply the replacements and save the changes, click **Update metadata** button. A confirmation message is displayed before executing the process.



The process will replace any occurrence of the text indicated in (3) with the text indicated in (4) for the metadata element indicated in (2) and can take several time, depending on the size of the selection.

At the end of the process a summary is displayed.

1. Number of records processed: total records processed (selected records).
2. Number of records updated: total records that have been updated.

Metadata massive update	x
Metadata Records processed	3
Metadata Records updated	0
Metadata Records that could not be processed because you are not the owner	0
Metadata Records not found	0

2.8.2 Replacements available

Identification section

- Contact > Individual Name
- Contact > Organization Name
- Contact > Voice phone
- Contact > Fax phone
- Contact > Address
- Contact > City
- Contact > Province
- Contact > Postal code
- Contact > Country
- Contact > Email
- Contact > Online Resource > URL
- Contact > Online Resource > Application Profile
- Contact > Online Resource > Name
- Contact > Online Resource > Description
- Contact > Hours of service
- Contact > Contact Instructions
- Data Identification > Abstract
- Data Identification > Purpose
- Data Identification > Citation > Individual Name
- Data Identification > Citation > Organization Name
- Data Identification > Citation > Voice phone
- Data Identification > Citation > Fax phone
- Data Identification > Citation > Address
- Data Identification > Citation > City
- Data Identification > Citation > Province
- Data Identification > Citation > Postal code
- Data Identification > Citation > Country
- Data Identification > Citation > Email

- Data Identification > Citation > Online Resource > URL
- Data Identification > Citation > Online Resource > Application Profile
- Data Identification > Citation > Online Resource > Name
- Data Identification > Citation > Online Resource > Description
- Data Identification > Citation > Hours of service
- Data Identification > Citation > Contact Instructions
- Data Identification > Point Of Contact > Individual Name
- Data Identification > Point Of Contact > Organization Name
- Data Identification > Point Of Contact > Voice phone
- Data Identification > Point Of Contact > Fax phone
- Data Identification > Point Of Contact > Address
- Data Identification > Point Of Contact > City
- Data Identification > Point Of Contact > Province
- Data Identification > Point Of Contact > Postal code
- Data Identification > Point Of Contact > Country
- Data Identification > Point Of Contact > Email
- Data Identification > Point Of Contact > Online Resource > URL
- Data Identification > Point Of Contact > Online Resource > Application Profile
- Data Identification > Point Of Contact > Online Resource > Name
- Data Identification > Point Of Contact > Online Resource > Description
- Data Identification > Point Of Contact > Hours of service
- Data Identification > Point Of Contact > Contact Instructions
- Data Identification > Keyword
- Data Identification > Resource Constraints > General Constraint > Use Limitation
- Data Identification > Resource Constraints > Legal Constraints > Use Limitation
- Data Identification > Resource Constraints > Legal Constraints > Other Constraints
- Data Identification > Resource Constraints > Security Constraint > Use Limitation
- Data Identification > Resource Constraints > Other Constraints
- Service Identification > Abstract
- Service Identification > Purpose
- Service Identification > Citation > Individual Name
- Service Identification > Citation > Organization Name
- Service Identification > Citation > Voice phone
- Service Identification > Citation > Fax phone

- Service Identification > Citation > Address
- Service Identification > Citation > City
- Service Identification > Citation > Province
- Service Identification > Citation > Postal code
- Service Identification > Citation > Country
- Service Identification > Citation > Email
- Service Identification > Citation > Online Resource > URL
- Service Identification > Citation > Online Resource > Application Profile
- Service Identification > Citation > Online Resource > Name
- Service Identification > Citation > Online Resource > Description
- Service Identification > Citation > Hours of service
- Service Identification > Citation > Contact Instructions
- Service Identification > Point Of Contact > Individual Name
- Service Identification > Point Of Contact > Organization Name
- Service Identification > Point Of Contact > Voice phone
- Service Identification > Point Of Contact > Fax phone
- Service Identification > Point Of Contact > Address
- Service Identification > Point Of Contact > City
- Service Identification > Point Of Contact > Province
- Service Identification > Point Of Contact > Postal code
- Service Identification > Point Of Contact > Country
- Service Identification > Point Of Contact > Email
- Service Identification > Point Of Contact > Online Resource > URL
- Service Identification > Point Of Contact > Online Resource > Application Profile
- Service Identification > Point Of Contact > Online Resource > Name
- Service Identification > Point Of Contact > Online Resource > Description
- Service Identification > Point Of Contact > Hours of service
- Service Identification > Point Of Contact > Contact Instructions
- Service Identification > Connect Point > URL
- Service Identification > Connect Point > Application Profile
- Service Identification > Connect Point > Name
- Service Identification > Connect Point > Description

Maintenance section

- Contact > Individual Name
- Contact > Organization Name
- Contact > Voice phone
- Contact > Fax phone
- Contact > Address
- Contact > City
- Contact > Province
- Contact > Postal code
- Contact > Country
- Contact > Email
- Contact > Online Resource > URL
- Contact > Online Resource > Application Profile
- Contact > Online Resource > Name
- Contact > Online Resource > Description
- Contact > Hours of service
- Contact > Contact Instructions

Content information section

- Feature Catalogue Citation > Individual Name
- Feature Catalogue Citation > Organization Name
- Feature Catalogue Citation > Voice phone
- Feature Catalogue Citation > Fax phone
- Feature Catalogue Citation > Address
- Feature Catalogue Citation > City
- Feature Catalogue Citation > Province
- Feature Catalogue Citation > Postal code
- Feature Catalogue Citation > Country
- Feature Catalogue Citation > Email
- Feature Catalogue Citation > Online Resource > URL
- Feature Catalogue Citation > Online Resource > Application Profile
- Feature Catalogue Citation > Online Resource > Name
- Feature Catalogue Citation > Online Resource > Description
- Feature Catalogue Citation > Hours of service

- Feature Catalogue Citation > Contact Instructions

Distribution information section

- Distributor Contact > Individual Name
- Distributor Contact > Organization Name
- Distributor Contact > Voice phone
- Distributor Contact > Fax phone
- Distributor Contact > Address
- Distributor Contact > City
- Distributor Contact > Province
- Distributor Contact > Postal code
- Distributor Contact > Country
- Distributor Contact > Email
- Distributor Contact > Online Resource > URL
- Distributor Contact > Online Resource > Application Profile
- Distributor Contact > Online Resource > Name
- Distributor Contact > Online Resource > Description
- Distributor Contact > Hours of service
- Distributor Contact > Contact Instructions
- Fees
- Ordering Instructions
- Digital Transfer Options > URL
- Digital Transfer Options > Application Profile
- Digital Transfer Options > Name
- Digital Transfer Options > Description

2.9 Installing the software

2.9.1 New version - New functionality

The new GeoNetwork opensource 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 ISO19139:2007 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 fully compatible with GeoNetwork 2.0 and higher 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.

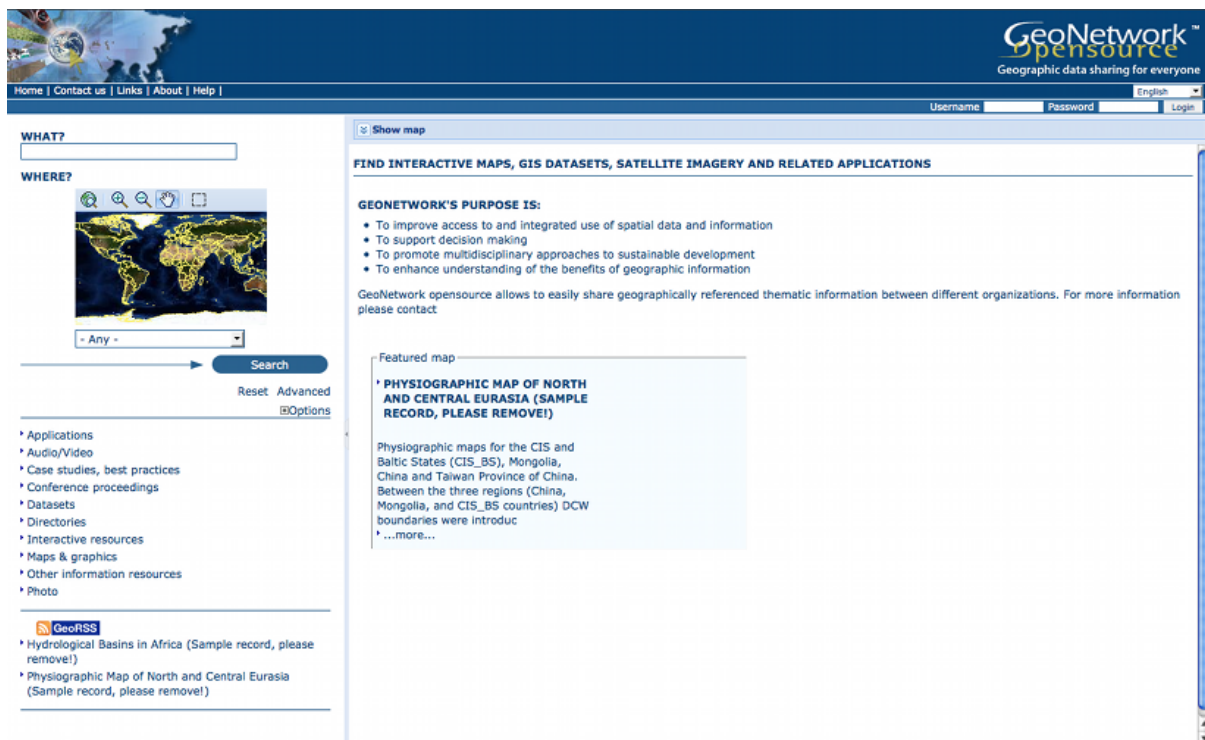


Figure 2.51: Standard home page of GeoNetwork opensource

2.9.2 Where do I get the installer?

You can find the software on the Internet at the GeoNetwork opensource Community website. The software is also distributed through the SourceForge.net Website at <http://sourceforge.net/projects/geonetwork>.

Use the platform independent installer (.jar) if you need anything more than a plain Windows installation.

2.9.3 System requirements

GeoNetwork 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, Postgresql, Oracle) can be used instead of Jetty and McKoiDB respectively.

Additional Software

The software listed here is not required to run GeoNetwork, but can be used for custom installations.

1. MySQL DBMS v5.5+ (All) ¹
2. Postgresql DBMS v7+ (All) ¹
3. Apache Tomcat v5.5+ (All) ¹
4. Druid v3.8 (All) ¹ to inspect the database

Supported browsers

GeoNetwork should work normally with the following browsers:

1. Firefox v1.5+ (All) ¹
2. Internet Explorer v6+ (Windows)
3. Safari v3+ (Mac OS X Leopard)

2.9.4 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.

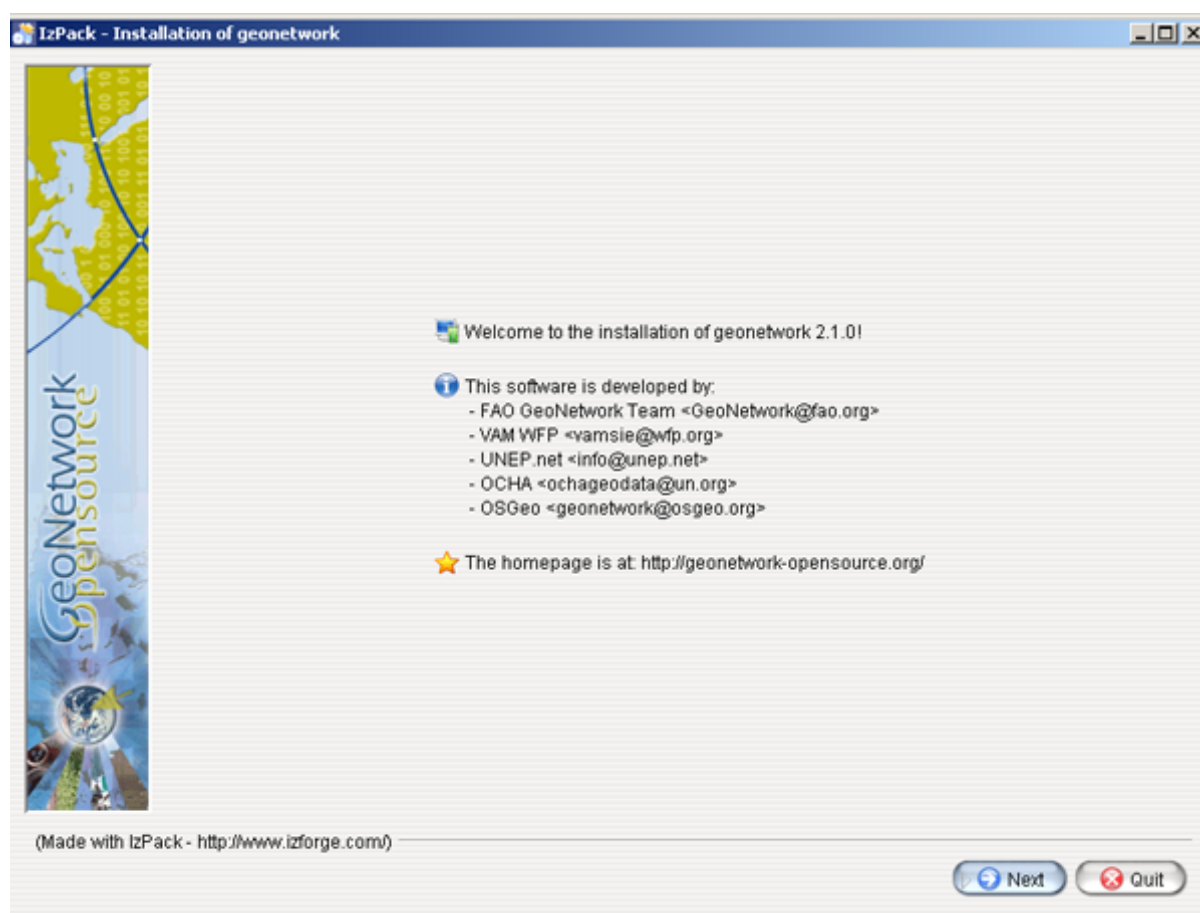
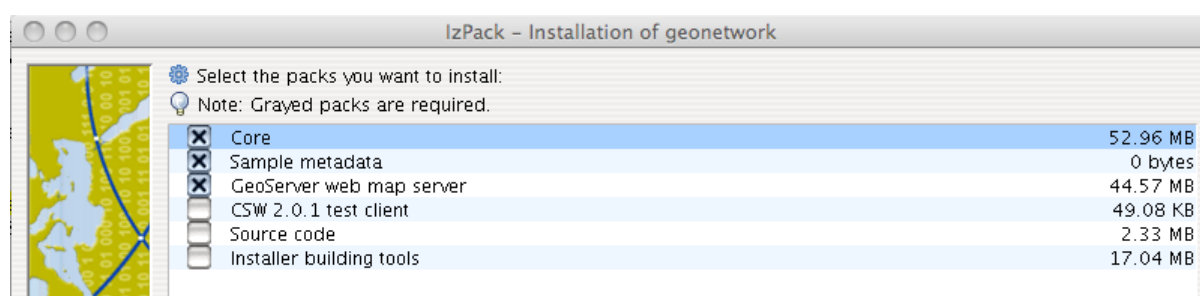
On Windows

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

1. Double click on **geonetwork-install-2.2.0.exe** to start the GeoNetwork opensource desktop installer

¹ All = Windows, Linux and Mac OS X

2. Follow the instructions on screen. You can choose to install sample data, install the embedded map server (based on GeoServer and the CSW 2.0.1 test client. Developers may be interested in installing the source code and installer building tools. Full source code can be found in the GeoNetwork SubVersion code repository.
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://localhost:8080/geonetwork/>

Figure 2.52: *Installer*Figure 2.53: *Packages to be installed*

Installation using the platform independent installer

If you downloaded the platform independent installer (a .jar file), you can in most cases start the installer by simply double clicking on it.

Follow the instructions on screen (see also the section called On Windows).

At the end of the installation process you can choose to save the installation script (Figure Save the installation script for commandline installations).

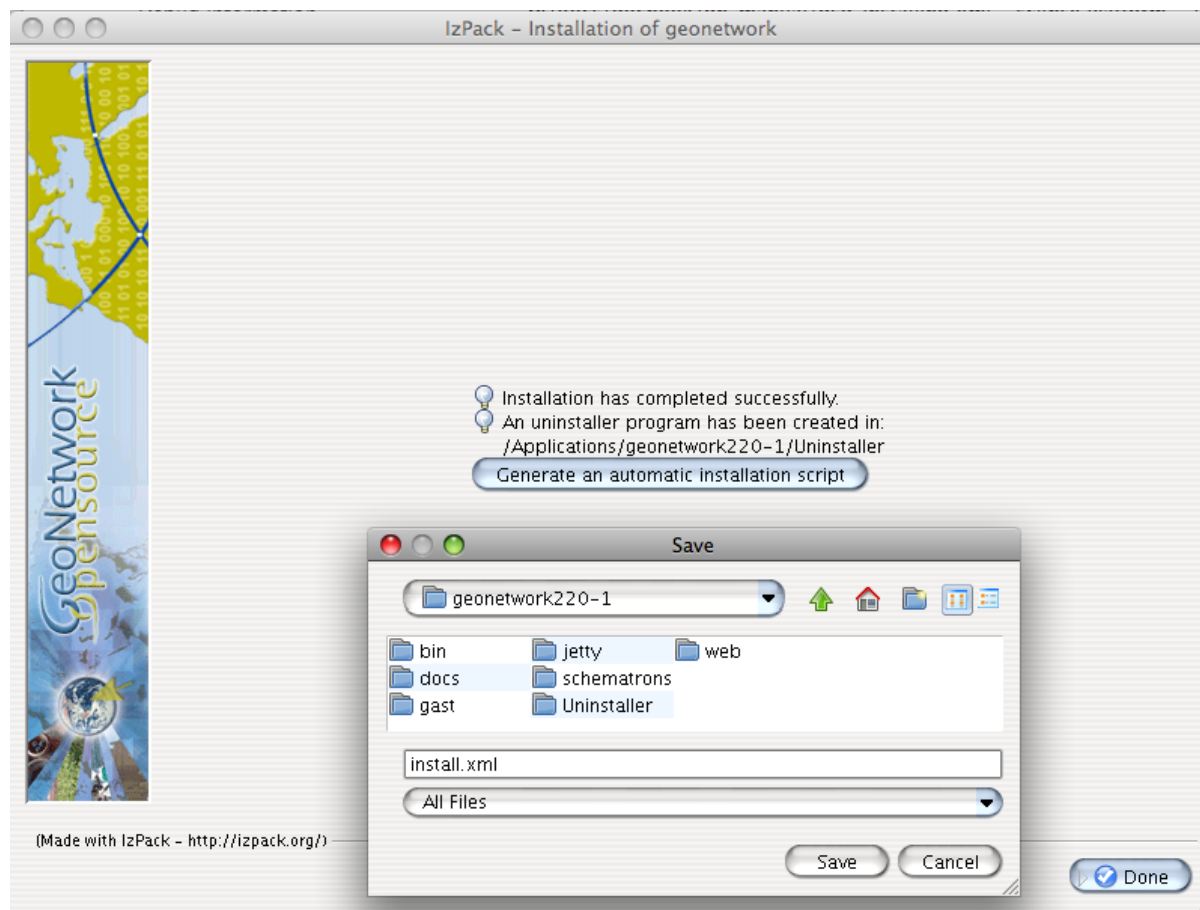


Figure 2.54: Save the installation script for commandline installations

Commandline installation

If you downloaded the platform independent installer (a .jar file), you can perform commandline installations on computers without a graphical interface. You first need to generate an install script (see Figure Save the installation script for commandline installations). This install script can be edited in a text editor to change some installation parameters.

To run the installation from the commandline, issue the following command in a terminal window and hit enter to start:

```
java -jar geonetwork-install-2.2.0-0.jar install.xml
[ Starting automated installation ]
[ Starting to unpack ]
[ Processing package: Core (1/3) ]
```

```
[ Processing package: Sample metadata (2/3) ]  
[ Processing package: GeoServer web map server (3/3) ]  
[ Unpacking finished ]  
[ Writing the uninstaller data ... ]  
[ Automated installation done ]
```

You can also run the installation with lots of debug output. To do so run the installer with the flag *-DTRACE=true*:

```
java -DTRACE=true -jar geonetwork-install-2.6.0-0.jar
```

2.9.5 XSLT processor configuration

The file `INSTALL_DIR/web/geonetwork/WEB-INF/classes/META-INF/javax.xml.transform.Transformers.xml` defines the XSL processor to use in GeoNetwork. The allowed values are:

1. `de.fzi.dbs.xml.transform.CachingTransformerFactory` for XSL caching (recommended value for production use). When caching is on, only the main XSL stylesheet last update date is checked and not all included XSL. If you update an included stylesheet, cache is still used.
2. `net.sf.saxon.TransformerFactoryImpl` to use Saxon

GeoNetwork sets the XSLT processor configuration on the JVM system properties at startup time for an instant to obtain its `TransformerFactory` implementation, then resets it to original value, to minimize affect the XSL processor configuration for other applications.

Administration

3.1 Basic configuration

3.1.1 System configuration

Most of the GeoNetwork system configuration parameters can be changed using the web interface. Those parameters that cannot be changed through the web interface can usually be changed using the GAST application.

Important: Configuration of these parameters is critically important for a proper functioning of the GeoNetwork catalogue in an operational context. Failing to properly change these settings may result in a system that does not function as expected. For example, downloads may fail to be correctly processed, or metadata harvesting from other servers may not work.

To get to the System configuration, you must be logged on as administrator first. Open the Administration page and select System configuration (The link is surrounded with a red rectangle).

Important: New installations of GeoNetwork use admin for both username and password. It is important to change this from the Administration page once you logged on!

Clicking the page's link you will get the set of parameters that you can change. Here follows a detailed description of them:

At the bottom of the page there are some buttons with the following purpose:

Back Simply returns to the main administration page. Save Saves the current options. If some options are invalid, the system will show a dialogue with the wrong parameter and will focus its text field on the page. Once the configuration is saved a success dialogue will be shown. Refresh This button simply refreshes the displayed options taking the new values from the server. This can be useful if some options get changed dynamically (for example by another user).

Public host and port usage

Up to now, the server's host and port are used in these cases:

1. During an editing session, when adding data links to a metadata. The host and port will be used to build download links to store inside the metadata.
2. During CSW requests. The GetCapabilities operation returns an XML document with HTTP links to the CSW services. These links are dynamically built using the host and port values.

ADMINISTRATION	
Metadata	
New metadata	Adds a new metadata into geonetwork copying it from a template
Metadata insert	Import metadata record in XML or MEF format
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
Template	
Sort Templates	Sort your templates
Add templates	Add default templates : ☐ iso19139/119 ☐ iso19110 ☐ dublin-core ☐ fgdc-std ☐ all Add templates
Personal info	
Change password	Allow current user to change password
Change user information	Allow current user to change user information
Administration	
User management	Add/modify/delete and show users
Group management	Add/modify/delete and show groups
Category management	Add/modify/delete and show categories
Manage thesauri	Add/modify/delete and show thesauri
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...
Rebuild Lucene index	Rebuild
Optimize Lucene index	Optimize
Test i18n	This service should help GeoNetwork opensource developers to have up to date localized files for the GUI.
CSW ISO Profile test	Test interface for the CSW ISO Profile catalog interface
Sample metadata	Add sample metadata

Figure 3.1: The link to the System configuration page

Site General site parameters

Name The name of the GeoNetwork installation. This name will be used to identify the node in operations like the harvesting.

Organization The organization the node belongs to. Just for informative reasons.

Server Here you have to enter the address of your GeoNetwork's node. This address is important because it will be used to access the node.

Host The node's address or IP number. If your node is publicly accessible from the Internet, you have to use the machine's domain/address. If your node is hidden into your private network and you have a firewall or web server that redirects incoming calls to the node, you have to enter the public address of the firewall or web server. A typical configuration is to have an Apache web server on address A that is publicly accessible and redirects the requests to a Tomcat server on a private address B. In this case you have to enter A in the host parameter.

Port The node's port (usually 80 or 8080). If the node is hidden, you have to enter the port on the public firewall or web server.

Intranet A common need for an organisation is to discriminate between internal anonymous users (users that access the node from within the organisation) and external ones (users from the Internet). Node's administrators can specify different privileges for internal and external anonymous users and, in order to do so, they have to specify the parameters of the internal network.

Network The internal network's address in IP form.

Netmask The network's mask.

SYSTEM CONFIGURATION**SITE**

Name

Organization

SERVER

Host

Port

INTRANET

Network

Netmask

METADATA SEARCH RESULTS

Maximum selected records

LUCENE INDEX OPTIMIZER

Enable ☒

Run at : (hour of day : minute eg. 23:15)

Will run again every

Z39.50 SERVER

Enable ☒

Port

OAI PROVIDER

Datasearch

ResumptionToken

Timeout

XLINK RESOLVER

Enable ☐

DATA-FOR-DOWNLOAD SERVICE

- ☒ Use GeoNetwork simple file download service (resources.get)
- ☐ Use GeoNetwork disclaimer and constraints service (file.disclaimer)
- ☐ Use metadata linkage as is - no changes to linkage

CSW ISO PROFILE

Enable ☒

Contact

Title

Abstract

Fees

Access

Constraints

Catalogue services (CSW, Z39.50)

OGC CSW configuration

See *OGC CSW Server configuration*

Z39.50 configuration

Z39.50: GeoNetwork can act as a Z39.50 server, which is an OGC communication protocol to query and retrieve metadata.

Enable: Check this option to start the Z39.50 submodule. Please, notice that GeoNetwork must be restarted in order to make this change active.

port: This is the port on which GeoNetwork will be listening for incoming Z39.50 requests. Usually, the value of 2100 is a standard one, but to have multiple GeoNetwork nodes on the same machine you have to change this value in order to avoid port conflicts between the different nodes.

XLink resolver

Enables/disables the XLink resolver. XLink resolver replaces content of the elements with attribute @xlink:href (except for `srv:operatesOn` element) with the referenced content. The XLink resolver is used for example in Metadata fragments harvester to retrieve the metadata fragments referenced in the metadata and insert in it.

Clickable hyperlinks

Enables/disables hyperlinks in metadata content for urls.

INSPIRE

Enables/disables the INSPIRE search options in advanced search panel.

Proxy configuration

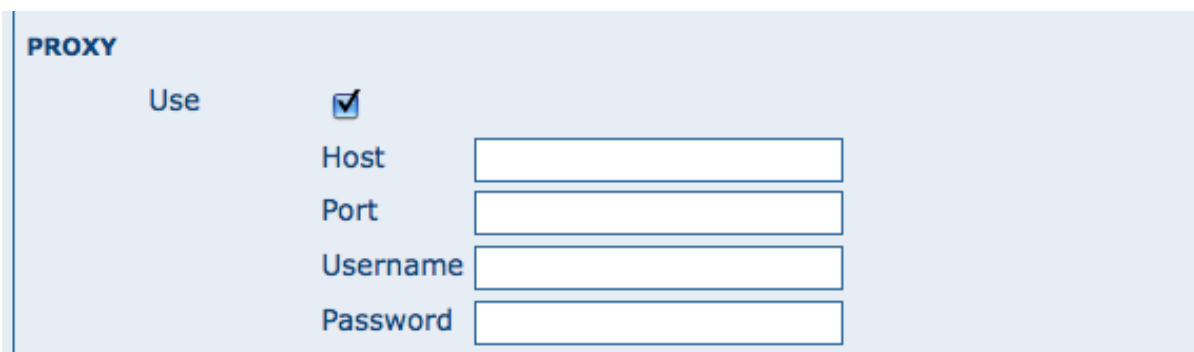
Proxy: In some occasions (like harvesting) GeoNetwork must be able to connect to remote sites and this may be denied if an organisation uses proxy servers. In this cases, GeoNetwork must be configured to use the proxy server in order to route outgoing requests.

Host: The proxy's name or address to use (usually an IP address).

Port: The proxy's port to use.

Username (optional): a username should be provided if the proxy server requires authentication.

Password (optional): a password should be provided if the proxy server requires authentication.

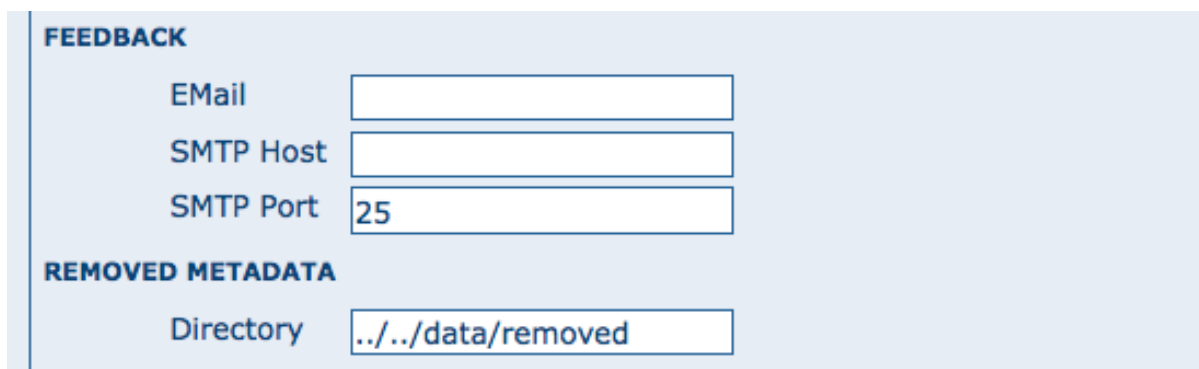


The screenshot shows a configuration panel titled "PROXY". It contains a "Use" checkbox which is checked. Below it are four input fields: "Host", "Port", "Username", and "Password", all of which are currently empty.

Figure 3.3: *The proxy configuration options*

Email & notification

Feedback GeoNetwork can sometimes send email, for example if a metadata is downloaded or if a user provides feedback using the online form. You have to configure the mail server GeoNetwork should use in order to enable it to send email.



The screenshot shows two configuration sections. The "FEEDBACK" section has three input fields: "Email", "SMTP Host", and "SMTP Port". The "Email" and "SMTP Host" fields are empty, while the "SMTP Port" field contains the value "25". Below this is the "REMOVED METADATA" section, which has one input field labeled "Directory" containing the value "../..data/removed".

Figure 3.4: *The mail server configuration options*

Email: This is the email address that will be used to send the email (the From address).

SMTP host: the mail server address to use when sending email.

SMTP port: the mail server SMTP port (usually 25).

Removed metadata

Defines the directory used to store a backup of metadata and data after a delete action. This directory is used as a backup directory to allow system administrators to recover metadata and possibly related data after erroneous deletion. By default the removed directory is created under the data folder

Authentication

In this section you define the source against which GeoNetwork will authenticate users and passwords.

By default, users are authenticated against info held in the GeoNetwork database. When the GeoNetwork database is used as the authentication source, the user self-registration function can be enabled.

AUTHENTICATION

Login uses:

☒ GeoNetwork Database

☐ LDAP

Enable User Self-Registration ☐

Allow other users to login from:

☐ Shibboleth

Figure 3.5: *Authentication configuration options*

You may choose to authenticate logins against either the GeoNetwork database tables or LDAP (the lightweight directory access protocol) but not both. The next section describes how to authenticate against LDAP.

In addition to either of these options, you may also configure other authentication sources. At present, Shibboleth is the only additional authentication source that can be configured. Shibboleth is typically used for national access federations such as the Australian Access Federation. Configuring shibboleth authentication in GeoNetwork to use such a federation would allow not only users from a local database or LDAP directory to use your installation, but any user from such a federation.

LDAP Authentication

The section defines how to connect to an LDAP authentication system.

AUTHENTICATION

Login uses:

☐ GeoNetwork Database

☒ LDAP

Host

Port

Default profile

Distinguished names

Base

Users

User's attributes

Name

Profile

Figure 3.6: *The LDAP configuration options*

Typically all users must have their details in the LDAP directory to login to GeoNetwork. However if a user is added to the GeoNetwork database with the Administrator profile then they will be able to login

without their details being present in the LDAP directory.

Shibboleth Authentication

When using either the GeoNetwork database or LDAP for authentication, you can also configure shibboleth to allow authentication against access federations.

The screenshot shows the 'AUTHENTICATION' section of the GeoNetwork configuration interface. Under 'Login uses:', the 'GeoNetwork Database' radio button is selected, and the 'Enable User Self-Registration' checkbox is checked. Under 'Allow other users to login from:', the 'Shibboleth' checkbox is checked. Below this, the 'Path' is set to '/geonetwork/srv/en/shib.user.login'. The 'Shibboleth attribute mapping' section contains four text input fields: 'Username' with the value 'REMOTE_USER', 'Surname' with 'Shib-Person-surname', 'Firstname' with 'Shib-InetOrgPerson-givenName', and 'Profile' with 'Shib-EP-Entitlement'.

Figure 3.7: The Shibboleth configuration options

Shibboleth authentication requires interaction with Apache web server. In particular, the apache web server must be configured to require Shibboleth authentication to access the path entered in the configuration. The apache web server configuration will contain the details of the shibboleth server that works out where a user is located (sometimes called a ‘where are you from’ server).

The remainder of the shibboleth login configuration describes how shibboleth authentication attributes are mapped to GeoNetwork user database fields as once a user is authenticated against shibboleth, their details are copied to the local GeoNetwork database.

3.2 User and Group Administration

GeoNetwork uses the concept of Users, Groups and User Profiles. A User can be part of several Groups. A User also has a User Profile

A User can only have one User Profile associated. The combination of User Profile and Group defines what tasks the User can perform on the system or on specific metadata records.

3.2.1 Creating new user Groups

The administrator can create new groups of users. User groups can correspond to logical units within an organisation. For example groups for Fisheries, Agriculture, Land and Water, Health etcetera.

To create new groups you should be logged on with an account that has administrative privileges. To log in, simply go to the home page and enter your username and password in the top right corner fields, then click on the login button.

Warning: New installations of GeoNetwork use *admin* for both username and password. It is important to change this from the Administration page once you logged on!

Figure 3.8: *Login form*

1. Select the Administration button in the menu. On the Administration page, select Group management.

Figure 3.9: *Administration page*

2. Select *Add a new group*. You may want to rename or remove the *Sample* group;
3. Fill out the details. The email address will be used to send feedback on data downloads when they occur for resources that are part of the Group.
4. Click on *Save*

Warning: The Name should *NOT* contain spaces! You can use the Localisation functions to provide localised names for groups.

GROUP MANAGEMENT

Important! This form allows you to add a Key value to the database. The key can not have spaces. After adding your key values, use the "Localization" form in the Administration panel to provide the actual name you want to be displayed on the website for the different languages.

Name	Description	Operation
sample		Edit Delete

Figure 3.10: Group management

ADD A NEW GROUP

Important! This form allows you to add a Key value to the database. The key can not have spaces. After adding your key values, use the "Localization" form in the Administration panel to provide the actual name you want to be displayed on the website for the different languages.

Name

Description

Download Email

Figure 3.11: Group edit form

Access privileges can be set per metadata record. You can define privileges on a per Group basis. Privileges that can be set relate to visibility of the Metadata (*Publish*), data Download, Interactive Map access and display of the record in the Featured section of the home page.

Editing defines the groups for which editors can edit the metadata record.

Notify defines what groups are notified when a file managed by GeoNetwork is downloaded.

Below is an example of the privileges management table related to a dataset.

Groups	Publish	Download	Interactive Map	Featured	Editing	Notify
All	☒	☒	☒	☒		
Intranet	☒	☒	☒	☒		
Guest	☐	☐	☐	☐		
Sample group	☒	☒	☒	☒	☒	☒

Figure 3.12: *Privilege settings*

3.2.2 Creating new Users

To add a new user to the GeoNetwork system you do the following:

1. Select *User Management* from the Administration link in the toolbar;
2. Click the button *Add a new user*;
1. Provide the *information* required for the new user;
 1. Assign the correct *profile*;
 2. Assign the user to a *group*;
 3. Click on *Save*.

3.2.3 User Profiles

Users can have different profiles depending on their role in the GeoNetwork system. A profile defines what tasks the user can perform.

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					

Figure 3.13: User administration form

INSERT	
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
Back Save	

Figure 3.14: User information form

User profiles are hierarchical and based on inheritance. This means that a user with an Editor profile can create and modify new metadata records, but can also use all functions a Registered user can use.

Rights associated with the profiles are illustrated in detail in the list below:

1. Administrator Profile

The Administrator has special privileges that give access to all available functions. These include:

- Full rights for creating new groups and new users
- Rights to change users/groups' profiles
- Full rights for creating/editing/deleting new/old metadata
- Perform system administration and configuration tasks.

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 authorising its publication

4. Editor Profile

The editor works on metadata with following privileges:

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

5. Registered User Profile

The Registered User has more access privileges than non-authenticated Guest users:

- Right to download protected data

3.3 OGC CSW Server configuration

When using Open Geospatial Catalogue Service for the Web (OGC-CSW) service, a client will ask for a description of the service. This description, provided in the form of a GetCapabilities document, describes the main service's properties.

The CSW server section allows configuration of the following CSW properties:

- *Enable*: This option allows you to start or stop the CSW services. If this option is disabled, other catalogues cannot connect to the node using CSW protocol.
- *Inserted metadata is public*: By default, metadata inserted with CSW Transaction operation is not public viewable unless a user with proper rights, sets later the metadata permissions to be public viewable. If this option is checked all metadata inserted with CSW Transaction is public viewable by default.

ADMINISTRATION

Metadata

[New metadata](#)

Adds a new metadata into geonetwork copying it from a template

[Metadata insert](#)

Import metadata record in XML or MEF format

[Batch Import](#)

Import all XML formatted metadata from a local directory

[Search for Unused](#)

Search for unused or empty metadata

[My Metadata](#)

my metadata

[Transfer ownership](#)

Transfer metadata ownership to another user

Template

[Sort Templates](#)

Sort your templates

Add templates

Add default templates : ☐ iso19139/119 ☐ iso19110 ☐ dublin-core ☐ fgdc-std ☐ all [Add templates](#)

Personal info

[Change password](#)

Allow current user to change password

[Change user information](#)

Allow current user to change user information

Administration

[User management](#)

Add/modify/delete and show users

[Group management](#)

Add/modify/delete and show groups

[Category management](#)

Add/modify/delete and show categories

[Manage thesauri](#)

Add/modify/delete and show thesauri

[Harvesting management](#)

Add/modify/delete/start/stop harvesting tasks

[System configuration](#)

Allows to change some system's parameters

[notifications](#)

remote updates

[Localization](#)

Allows to change localized entities, like groups, categories etc...

[Stopwords](#)

You can define the languages for which stopwords are used.

[CSW server](#)

CSW Server configuration

Rebuild Lucene index

[Rebuild](#)

Optimize Lucene index

[Optimize](#)

[Test i18n](#)

This service should help GeoNetwork opensource developers to have up to date localized files for the GUI.

[CSW ISO Profile test](#)

Test interface for the CSW ISO Profile catalog interface

Sample metadata

[Add sample metadata](#)

CSW SERVER CONFIGURATION

Enable ☒

Inserted ☒

metadata is
public
(Transaction)

Contact [admin \(admin admin \)](#)

[English](#)

Title

Abstract

Fees

Access constraints

[Back](#)

[Save](#)

- *Contact*: The main contact who is defined in the GetCapabilities document of the CSW service. This contact is one user of the catalogue.
- *Title*: The title of your CSW service.
- *Abstract*: The abstract of your CSW service.
- *Fees*
- *Access constraints*

The properties *Title*, *Abstract*, *Fees* and *Access constraints* can be configured in the languages supported by GeoNetwork GUI. When the user asks for the Capabilities document the values are returned in the language used in the URL:

- `http://SERVER/geonetwork/srv/en/csw?request=GetCapabilities&...` , returns the Capabilities document with english values
- `http://SERVER/geonetwork/srv/**fr**/csw?request=GetCapabilities&...` , returns the Capabilities document with french values

When INSPIRE is enabled and is provided the language parameter in the Capabilities URL it is used the value of this parameter. For example:

- `http://SERVER/geonetwork/srv/fr/csw?request=GetCapabilities&...&language=eng` , returns the Capabilities document with english values

The service description also contains the main keywords of the catalogue. The list of keywords is generated by the catalogue based on metadata content.

3.4 Import facilities

3.4.1 File import

The file import facility allows you to import metadata records in XML format or MEF format or copy/paste XML metadata to insert. In order to use this facility, you have to be logged in as an editor. After the login step, go to the administration page and select the Metadata insert link.

Clicking the link, you will open the metadata import page. You have to specify a set of parameters to make the import working. Depending on the insert type you will perform:

XML file import

For both, XML and MEF file import, you could choose actions to be performed at import. Import actions options are: *No action on import* (nothing done during import process), *Overwrite metadata with same UUID* (this option will delete existing metadata with the same UUID, and add the new one), *Generate UUID for inserted metadata* (this option will force a new UUID for each metadata inserted).

Stylesheet option: This is a powerful option because allows you to specify a stylesheet for an XSL transformation. The drop down control is filled with files taken from the web/xsl/conversion/import folder: all XSL files you put there will be made available. This is a dynamic process so you don't have to restart GeoNetwork. The purpose of this option is to allow the conversion of a metadata into a suitable format that is supported by GeoNetwork. Validate option: This is a simple validation step that you can choose to perform. The metadata is validated against its schema. Group option: You have to select a group to associate to the imported metadata. Usually the group is the creator of the metadata

ADMINISTRATION	
Metadata	
New metadata	Adds a new metadata into geonetwork copying it from a template
Metadata insert	Import metadata record in XML or MEF format
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
Template	
Sort Templates	Sort your templates
Add templates	Add default templates : ☐ iso19139/119 ☐ iso19110 ☐ dublin-core ☐ fgdc-std ☐ all Add templates
Personal info	
Change password	Allow current user to change password
Change user information	Allow current user to change user information
Administration	
User management	Add/modify/delete and show users
Group management	Add/modify/delete and show groups
Category management	Add/modify/delete and show categories
Manage thesauri	Add/modify/delete and show thesauri
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...
Rebuild Lucene index	Rebuild
Optimize Lucene index	Optimize
Test i18n	This service should help GeoNetwork opensource developers to have up to date localized files for the GUI.
CSW ISO Profile test	Test interface for the CSW ISO Profile catalog interface
Sample metadata	Add sample metadata

Insert mode:	☒ File Upload ☐ Copy/Paste
File type:	☒ Single File (XML, SLD, WMC...) ☐ MEF file
Metadata	Browse...
Type	Metadata
Import actions:	☒ No action on import ☐ Overwrite metadata with same UUID ☐ Generate UUID for inserted metadata
StyleSheet	none
Validate	☐
Group	Sample group
Category	none
Back Insert	

Figure 3.15: The XML file import options

set. Category option: You can specify one category to associate to your metadata in order to simplify the search.

MEF file import

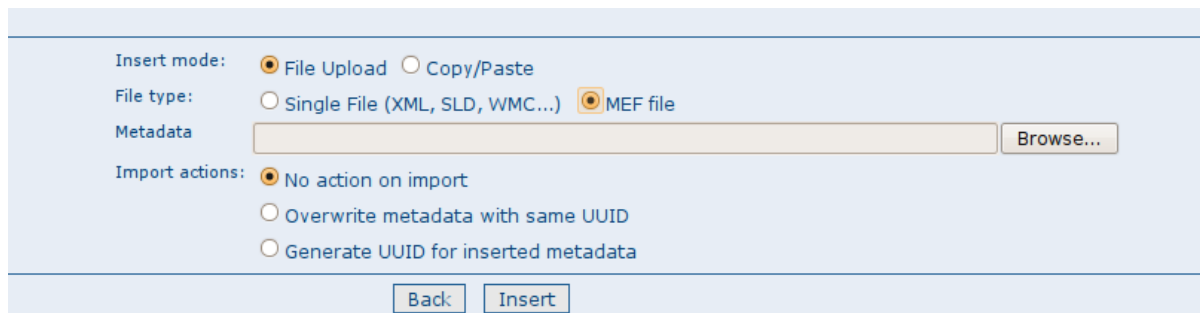
The screenshot shows a web form for MEF file import. It has four sections: 'Insert mode' with radio buttons for 'File Upload' (selected) and 'Copy/Paste'; 'File type' with radio buttons for 'Single File (XML, SLD, WMC...)' and 'MEF file' (selected); 'Metadata' with a text input field and a 'Browse...' button; and 'Import actions' with radio buttons for 'No action on import' (selected), 'Overwrite metadata with same UUID', and 'Generate UUID for inserted metadata'. At the bottom are 'Back' and 'Insert' buttons.

Figure 3.16: *The MEF file import options*

As presented before, only actions options could be selected during a MEF import.

XML metadata insert

Choosing the radio button Copy/Paste, you could perform an XML insert, directly copy/pasting your metadata record. Please refer to XML import for options you could use.

3.4.2 Batch import

The batch import facility allows you to import a set of metadata into the system all at once. In order to use this facility, you have to be logged in as an administrator. After the login step, go to the administration page and select the batch import's link.

Clicking the link will open the batch import page. You have to specify a set of parameters to make the import working. They are:

Directory This is the full path on the server's file system of the directory to scan. GeoNetwork will look for and try to import all XML or MEF files present into this directory. It is important to notice that this is the directory on the *server* machine and *not* on the client of the user that is doing the import. **Import actions options** are also available from batch import (please refer to XML import for options you could use). **Validate** This is a simple validation step that you can choose to perform. The metadata is validated against its schema. **Group** You have to select a group to associate to the imported metadata. Usually the group is the creator of the metadata set. **Category** You can specify one category to associate to your metadata in order to simplify the search. **Stylesheet** This is a powerful option because allows you to specify a stylesheet for an XSL transformation. The drop down control is filled with files taken from the web/xsl/conversion/import folder: all XSL files you put there will be made available. This is a dynamic process so you don't have to restart GeoNetwork. The purpose of this option is to allow the conversion of a metadata into a suitable format that is supported by GeoNetwork. Therefore, it is important that the result of the transformation matches the schema format selected above.

Below the page, there are the following buttons:

Back Goes back to the administration form. **Upload** Starts the import process. When the process ends, the total count of imported metadata will be shown. Please notice that the import is transactional: the

Insert mode: ☐ File Upload ☒ Copy/Paste

Metadata

Type: Metadata

Import actions: ☒ No action on import
☐ Overwrite metadata with same UUID
☐ Generate UUID for inserted metadata

StyleSheet: none

Validate: ☐

Group: Sample group

Category: none

Back Insert

Figure 3.17: The XML insert options

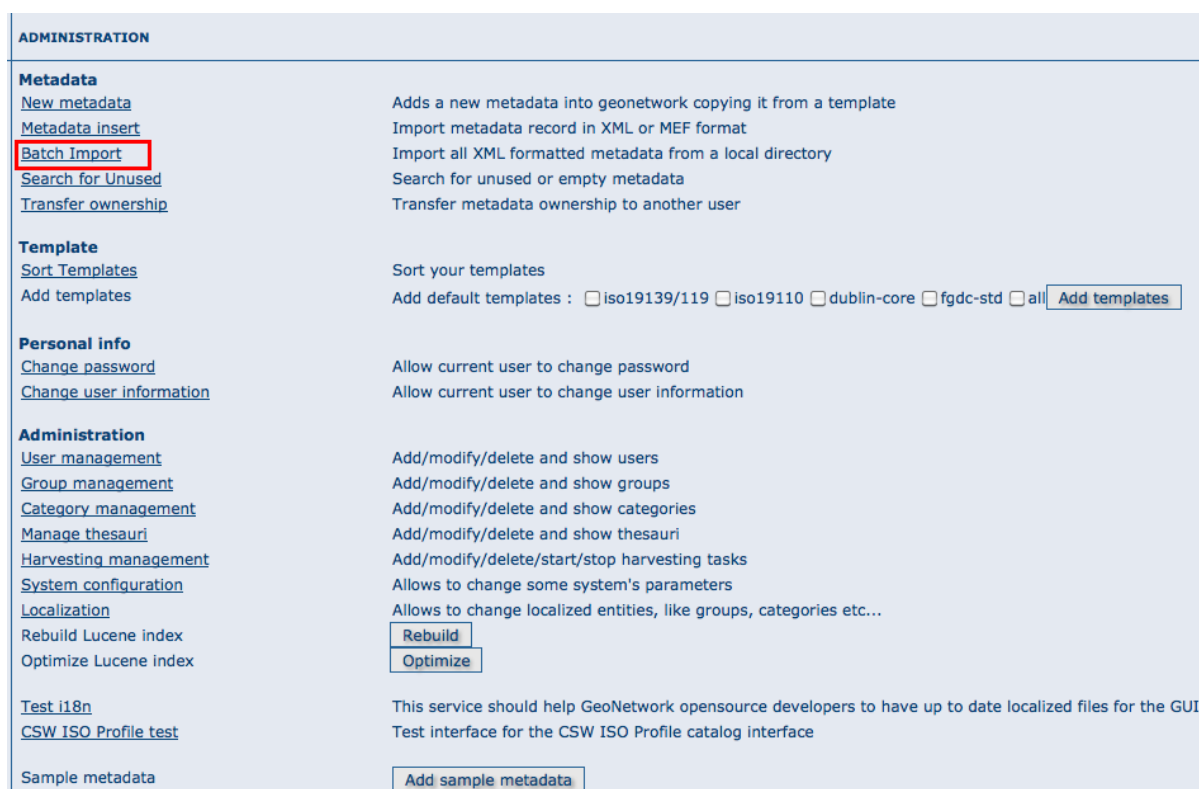


Figure 3.18: How to reach the batch import page

metadata set will be fully imported or fully discarded (there are no partial imports). Files that starts with '.' or that do not end with '.xml' are ignored.

Structured import

An hidden feature of the batch import is the possibility to specify some import parameters in more detail. This feature is triggered when the specified folder contains the import-config.xml file. When this happen, this file is read and the standard import switches to the structured one.

The import-config.xml file has a config root element with the following children:

1. categoryMapping [1]: this element specifies the mapping of directories to categories.
 - (a) mapping [0..n]: This element can appear 0 or more times and maps one directory name to a category name. It must have a dir attribute that indicates the directory and a to attribute that indicates the category name.
 - (b) default [1]: This element specifies a default mapping of categories for all directories that do not match the other mapping elements. It must have only the to attribute.
2. schemaMapping [1]: this element specifies the mapping of directories to metadata schemas.
 - (a) mapping [0..n]: This element can appear 0 or more times and maps one directory to the schema name that must be used when importing. The provided schema must match the one used by the metadata contained into the specified directory, which must all have the same schema. It must have a dir attribute that indicates the directory and a to attribute that indicates the schema name.

Figure 3.19: The batch import options

- (b) default [1]: default behaviour to use when all other mapping elements do not match. It must have only the to attribute.

Here is an example of the import-config.xml file:

```
<config>
  <categoryMapping>
    <mapping dir="1" to="maps" />
    <mapping dir="3" to="datasets" />
    <mapping dir="6" to="interactiveResources" />
    <mapping dir="30" to="photo" />
    <default to="maps" />
  </categoryMapping>
  <schemaMapping>
    <mapping dir="3" to="fgdc-std" />
    <default to="dublin-core" />
  </schemaMapping>
</config>
```

The import procedure starts by scanning the provided directory. This can contain, beside the import-config.xml file, only subdirectories which name will be ignored but used only as a container. Inside each directory, there is another level made only by directories that represent a metadata grouping for categories. Each directory name will be used as the dir attribute in the mapping scheme previously described.

3.5 Harvesting

3.5.1 Introduction

Since the beginning of the project, there has been the need to share metadata among several GeoNetwork nodes. Usually, each node takes care of a region of interest so it is important to be able to perform a search over all these nodes at the same time. This is called distributed search and exploits the Internet

connectivity. In our cases, this distributed search can be heavy to perform if there are many maps with associated thumbnails. Furthermore, GeoNetwork is usually employed in areas (like Africa, Asia) where the connectivity can be limited, making the use of distributed search not feasible.

Harvesting is the process of collecting remote metadata and storing them locally for a faster access. This is a periodic process to do, for example, once a week. Harvesting is not a simple import: local and remote metadata are kept aligned. Using some *magic*, one GeoNetwork node is capable of discovering metadata that have been added, removed or updated in the remote node.

GeoNetwork is able to harvest from the following sources (for more details see below):

1. Another GeoNetwork node (version 2.1 or above).
2. An old GeoNetwork 2.0 node.
3. A WebDAV server.
4. A CSW 2.0.1 or 2.0.2 catalogue server.
5. An OAI-PMH server.
6. An OGC service using its GetCapabilities document. These include WMS, WFS, WPS and WCS services.
7. An ArcSDE server.

3.5.2 Mechanism overview

The harvesting mechanism is based on the concept of a *universally unique identifier (UUID)*. This is a special id because it is not only unique locally to the node that generated it but it is unique across all the world. It is a combination of the network interface's MAC address, the current date/time and a random number. Every time you create a new metadata in GeoNetwork, a new UUID is generated and assigned to it.

Another important concept behind the harvesting is the *last change date*. Every time you change a metadata, its last change date is updated. Just storing this parameter and comparing it with a new one allows any system to find out if the metadata has been modified since last update.

These two concepts allow GeoNetwork to fetch a remote metadata, check if it has been updated and remove it locally if it has been removed remotely. Furthermore, thanks to UUIDs, a hierarchy of harvesting nodes can be built where B harvests from C and A harvests from B. Even loops can be created because harvested metadata cannot be modified.

3.5.3 Harvesting life cycle

When a harvesting node is set, there is no harvested metadata. During the first run, all remote matching metadata are retrieved and stored locally. After the first run, only changed metadata are retrieved. Harvested metadata are not editable for the following reasons:

1. The harvesting is periodic so any local change to harvested metadata will be lost during the next run.
2. The change date is used to keep track of changes so if it gets changed outside the originator site, the harvesting mechanism is compromised.

Beside the metadata itself, this implies that users cannot change all other metadata properties (like categories, privileges etc...).

The harvesting process goes on until one of the following situations arises:

1. An administrator stops (deactivates) the node.
2. An exception arises. In this case the node is automatically stopped.

When a harvesting node is removed, all harvest metadata are removed too.

3.5.4 Multiple harvesting and hierarchies

Catalogues that provide UUIDs for metadata (for example GeoNetwork and a CSW server) can be harvested several times without having to take care about metadata overlap. This allows the possibility to perform a thematic search and a metadata belonging to multiple searches is harvested only once and not duplicated.

This mechanism allows the GeoNetwork harvesting type to be combined with other GeoNetwork nodes to perform hierarchical harvesting. This way a metadata can be harvested from several nodes. For example, consider this scenario:

1. Node (A) has created metadata (a)
2. Node (B) harvests (a) from (A)
3. Node (C) harvests (a) from (B)
4. Node (D) harvests from both (A), (B) and (C)

In this scenario, Node (D) will get the same metadata (a) from all 3 nodes (A), (B), (C). The metadata will flow to (D) following 3 different paths but thanks to its UUID only one copy will be stored. When (a) will be changed in (A), a new version will flow to (D) but, thanks to the change date, the copy in (D) will be updated with the most recent version.

3.5.5 General notes and issues

General

1. The harvesting engine does not store harvesting results. This implies that if the server is restarted the last results are lost.
2. Changes to the harvesting parameters (for example privileges and categories) are taken into account in the next harvesting run.

GeoNetwork harvesting type

1. During harvesting, site icons are harvested and local copies updated. Icons are propagated to new nodes as soon as these nodes harvest from this one.
2. The metadata UUID is taken from the info.xml file of the MEF bundle. Any UUID stored inside the metadata will be overwritten with this one.

WebDAV harvesting type

1. The same metadata could be harvested several times by different harvesting nodes. Anyway, this is not a good practise because every copy of the metadata will have a different UUID and the system will fill with different copies of the same metadata.

CSW harvesting type

1. If the dct:modified element is missing from the GetRecords response the metadata will be always harvested.
2. Any exception during getRecordById operation is discarded and the metadata skipped.

OAI-PMH harvesting type

1. The id of the remote server must be a UUID. If not, metadata can be harvested but during hierarchical propagation id clashes could corrupt harvested metadata.
2. During harvesting, GeoNetwork will try to auto detect the schema of each metadata. If the schema is not supported the metadata is skipped.

OGC service harvesting type

1. Every time the harvester runs, it will remove previously harvested information and create new ones. GeoNetwork will generate the id for all metadata (both service and datasets). Therefore, for datasets, if the metadata is created using a remote XML document (ie. if a MetadataUrl tag is in the GetCapability document), the UUID of the document is used.
2. Thumbnails are generated only for Web Map Service (WMS). The service should also support the WGS84 projection

3.5.6 The main page

To access the harvesting main page you have to be logged in as an administrator. From the administration page, click the link shown below with a red rectangle.

The figure above shows the harvesting main page. The page shows a list of harvesting nodes that have been created so far. On the bottom side there is a set of buttons to manage these nodes. The meaning of each column is as follows:

1. *Select* This is just a check box to select one or more nodes. The selected nodes will be affected by the first row of buttons (start, stop, run, remove). For example, if you select 3 nodes and press the Remove button, these 3 nodes will be removed.
2. *Name* This is the node's name provided by the administrator.
3. *Type* The node's harvesting type chosen when the node was created (GeoNetwork, web folder etc...).
4. *Status* This is an icon that reflects the node's current status. See *admin_harvesting_status* for all different icons and status description.

ADMINISTRATION

Metadata
[New metadata](#) Adds a new metadata into geonetwork copying it from a template
[Metadata insert](#) Import metadata record in XML or MEF format
[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

Template
[Sort Templates](#) Sort your templates
Add templates Add default templates : ☐ iso19139/119 ☐ iso19110 ☐ dublin-core ☐ fgdc-std ☐ all [Add templates](#)

Personal info
[Change password](#) Allow current user to change password
[Change user information](#) Allow current user to change user information

Administration
[User management](#) Add/modify/delete and show users
[Group management](#) Add/modify/delete and show groups
[Category management](#) Add/modify/delete and show categories
[Manage thesauri](#) Add/modify/delete and show thesauri
[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...
Rebuild Lucene index [Rebuild](#)
Optimize Lucene index [Optimize](#)

[Test i18n](#) This service should help GeoNetwork opensource developers to have up to date localized files for the GUI.
[CSW ISO Profile test](#) Test interface for the CSW ISO Profile catalog interface

Sample metadata [Add sample metadata](#)

Figure 3.20: How to access the harvesting main page

5. *Errors* This column reflects the status of the last harvesting run, which could have succeeded or not. The result is reflected on this icon and a tool tip will show detailed information.
6. *Every* The time (in days, hours, minutes) between two consecutive harvesting from this node.
7. *Last run* The date, in ISO 8601 format, of the most recent harvesting run.
8. *Operation* A list of buttons for all possible operations on a node.
9. Selecting *Edit* will allow you to change the parameters for a node.

HARVESTING MANAGEMENT

Select	Name	Type	Status	Errors	Every	Last run	Operation
☐	Dav test	Web DAV			0:5:5		Edit
☐	FAO site	GeoNetwork			0:1:30		Edit
☐	CSW	CSW/2.0			0:1:30		Edit

[Activate](#) [Deactivate](#) [Run](#) [Remove](#)
[Back](#) [Add](#) [Refresh](#)

Figure 3.21: The harvesting main page

The bottom side of the page contains two rows of buttons. The first row contains buttons that can operate on a set of nodes. You can select the nodes using the check box on the first column and then press the proper button. When the button finishes its action, the check boxes are cleared. Here is the meaning of each button:

1. *Activate* When a new harvesting node is created, it's status is *inactive*. Use this button to make it *active* and thus to start harvesting from the remote node.
2. *Deactivate* Stops harvesting from a node. Please notice that this does not mean that a currently running harvesting will be stopped but it means that this node will be ignored during future harvesting.
3. *Run* This button simply tells the harvesting engine to start harvesting immediately. This is useful for testing during the harvesting setup.
4. *Remove* Remove all currently selected nodes. A dialogue will ask the user to confirm the action.

The second row contains general purpose buttons. Here is the meaning of each button:

1. *Back* Simply returns to the main administration page.
2. *Add* This button allows to create new harvesting nodes.
3. *Refresh* Refreshes the current list of nodes querying the server. This can be useful to see if the harvesting list has been altered by someone else or if any harvesting process started.

Icon	Status	Description
	In-active	The harvesting from this node is stopped.
	Active	The harvesting engine is waiting for the timeout specified for this node. When the timeout is reached, the harvesting starts.
	Running	The harvesting engine is currently running, fetching metadata from remote nodes. When the process will be finished, the status will be switched to active.

Possible status icons

Icon	Description
	The harvesting was OK, no errors were found. In this case, a tool tip will show some harvesting results (like the number of harvested metadata etc...).
	The harvesting was aborted due to an unexpected condition. In this case, a tool tip will show some information about the error.

Possible error icons

Harvesting result tips

If the harvesting succeeds, a tool tip will show detailed information about the harvesting process. This way you can check if the harvester worked as expected or if there is something to fix to the harvesting parameters or somewhere else. The result tip is like a table, where each row refers to

Total This is the total number of metadata found remotely. Metadata with the same id are considered as one. Added Number of metadata added to the system because they were not present locally. Removed Number of metadata that have been removed locally because they are not present in the remote server anymore. Updated Number of metadata that are present locally but that needed to be updated because their last change date was different from the remote one. Unchanged Local metadata left unchanged. Their remote last change date did not change. Unknown schema Number of skipped metadata because their format was not recognised by GeoNetwork. Unretrievable Number of metadata that were ready to be retrieved from the remote server but for some reason there was an exception during the data

transfer process. Bad Format Number of skipped metadata because they did not have a valid XML representation. Does not validate Number of metadata which did not validate against their schema. These metadata were harvested with success but skipped due to the validation process. Usually, there is an option to force validation: if you want to harvest these metadata anyway, simply turn it off.

Result vs harvesting type	GeoNetwork	WebDAV	CSW	OAI-PMH	OGC Service
Total	✓	✓	✓	✓	✓
Added	✓	✓	✓	✓	✓
Removed	✓	✓	✓	✓	✓
Updated	✓	✓	✓	✓	
Unchanged	✓	✓	✓	✓	
Unknown schema	✓	✓	✓	✓	✓
Unretrievable	✓	✓	✓	✓	✓
Bad Format		✓		✓	
Does Not Validate		✓		✓	
Thumbnails / Thumbnails failed					✓
Metadata URL attribute used					✓

Result information supported by harvesting types

3.5.7 Adding new nodes

The Add button in the main page allows you to add new harvesting nodes. It will open the form shown in *admin_harvesting_add*. When creating a new node, you have to choose the harvesting protocol supported by the remote server. The supported protocols are:

1. **GeoNetwork 2.1 remote node** This is the standard and most powerful harvesting protocol used in GeoNetwork. It is able to log in into the remote node, to perform a standard search using the common query fields and to import all matching metadata. Furthermore, the protocol will try to keep both remote privileges and categories of the harvested metadata if they exist locally. Please notice that since GeoNetwork 2.1 the harvesting protocol has been improved. This means that it is not possible to use this protocol to harvest from version 2.0 or below.
2. **WebDAV server** This harvesting type uses the webDAV (Distributed Authoring and Versioning) protocol to harvest metadata from a DAV server. It can be useful to users that want to publish their metadata through a web server that offers a DAV interface. The protocol allows to retrieve the contents of a web page (a list of files) with their change date.
3. **Catalogue Services for the Web 2.0** The Open Geospatial Consortium Catalogue Services for the Web and it is a search interface for catalogues developed by the Open Geospatial Consortium. GeoNetwork implements version 2.0 of this protocol.
4. **GeoNetwork v2.0 remote node** GeoNetwork 2.1 introduced a new powerful harvesting engine which is not compatible with GeoNetwork version 2.0 based catalogues. Old 2.0 servers can still harvest from 2.1 servers but harvesting metadata from a v2.0 server requires this harvesting type. This harvesting type is deprecated.
5. **Z3950 Remote search** Not implemented. This is a placeholder.

6. **OAI Protocol for Metadata Harvesting 2.0** This is a good harvesting protocol that is widely used among libraries. GeoNetwork implements version 2.0 of the protocol.
7. **ArcSDE** This is a harvesting protocol for metadata stored in an ArcSDE installation.

The drop down list shows all available protocols. Pressing the Add button you will reach an edit page whose content depends on the chosen protocol. The Back button will go back to the main page.



Harvesting management

Type Geonetwork remote node ▼

Back Add

Figure 3.22: Adding a new harvesting node

Adding a GeoNetwork node

This type of harvesting allows you to connect to a GeoNetwork node, perform a simple search as in the main page and retrieve all matched metadata. The search is useful because it allows you to focus only on metadata of interest. Once you add a node of this type, you will get a page like the one shown below. The meaning of the options is the following:

- **Site** - Here you put information about the GeoNetwork's node you want to harvest from (host, port and servlet). If you want to search protected metadata you have to specify an account. The name parameter is just a short description that will be shown in the main page beside each node.
- **Search criteria** - In this section you can specify search parameters: they are the same present in the GeoNetwork homepage. Before doing that, it is important to remember that the GeoNetwork's harvesting can be hierarchical so a remote node can contain both its metadata and metadata harvested from other nodes and sources. At the beginning, the Source drop down is empty and you have to use the **Retrieve sources** button to fill it. The purpose of this button is to query GeoNetwork about all sources which it is currently harvesting from. Once you get the drop down filled, you can choose a source name to constrain the search to that source only. Leaving the drop down blank, the search will spread over all metadata (harvested and not). You can add several search criteria for each site through the **Add** button: several searches will be performed and results merged. Each search box can be removed pressing the small button on the left of the site's name. If no search criteria is added, a global unconstrained search will be performed.
- **Options** - This is just a container for general options.
 - *Every* - This is the harvesting period. The smallest value is 1 minute while the greatest value is 100 days.
 - *One run only* - If this option is checked, the harvesting will do only one run after which it will become inactive.
- **Privileges** - Here you decide how to map remote group's privileges. You can assign a copy policy to each group. The Intranet group is not considered because it does not make sense to copy its privileges.
 - The **All** group has different policies from all the others:
 1. Copy: Privileges are copied.

HARVESTING MANAGEMENT

SITE

Name	Crisalis
Host	www.crisalis-tech.com
Port	8080
Servlet	geonetwork
Use account	☒
Username	myser
Password	*****

SEARCH CRITERIA

☒ **Criteria**

Free text	africa
Title	
Abstract	
Keywords	
Digital	☒
Hardcopy	☐
Source	

OPTIONS
Every : : (days : hours : minutes)
One run only ☐

PRIVILEGES

Remote group	Copy policy
all	Copy to Intranet group
sample	Copy

CATEGORIES

Interactive resources

Applications

Case studies, best practices

Conference proceedings

Photo

Audio/Video

Directories

Other information resources

Figure 3.23: Adding a GeoNetwork node

2. Copy to Intranet: Privileges are copied but to the Intranet group. This way public metadata can be made protected.
 3. Don't copy: Privileges are not copied and harvested metadata will not be publicly visible.
- For all other groups the policies are these:
 1. Copy: Privileges are copied only if there is a local group with the same (not localised) name as the remote group.
 2. Create and copy: Privileges are copied. If there is no local group with the same name as the remote group then it is created.
 3. Don't copy: Privileges are not copied.

Adding a WebDAV node

In this type of harvesting, metadata are retrieved from a remote web page. The available options are shown below and have the following meaning:

- **Site** - This contains the connection information.
 - *Name* - This is a short description of the node. It will be shown in the harvesting main page.
 - *URL* - The remote URL from which metadata will be harvested. Each file found that ends with .xml will indicate a metadata and will be retrieved, converted into XML and imported.
 - *Icon* - Just an icon to assign to harvested metadata. The icon will be used when showing search results.
 - *Use account* - Account credentials for a basic HTTP authentication towards the remote URL.
- **Options** - General harvesting options.
 - *Every* - This is the harvesting period. The smallest value is 1 minute while the greatest value is 100 days. One run only If this option is checked, the harvesting will do only one run after which it will become inactive.
 - *Validate* - If checked, the metadata will be validate during import. If the validation does not pass, the metadata will be skipped.
 - *Recurse* - When the harvesting engine will find folders, it will recursively descend into them.
- **Privileges** - Here it is possible to assign privileges to imported metadata.
 - *Groups* - Groups area lists all available groups in GeoNetwork. Once one (or more) group has been selected, it can be added through the **Add** button (each group can be added only once). For each added group, a row of privileges is created at the bottom of the list to allow privilege selection.
 - *Remove* - To remove a row simply press the associated Remove button on its right.
- **Categories** - Here you can assign local categories to harvested metadata.

Adding a CSW node

This type of harvesting is capable of connecting to a remote CSW server and retrieving all matching metadata. Please, note that in order to be harvested metadata must have one of the schema format

HARVESTING MANAGEMENT

SITE

Name

URL

Icon **REMOTE**

Use account ☒

Username

Password

OPTIONS

Every : : (days : hours : minutes)

One run only ☐

Validate ☐

Recurse ☐

PRIVILEGES

Groups

Group View Interactive map Featured

All ☒ ☐ ☐

CATEGORIES

Figure 3.24: Adding a WebDAV node

handled by GeoNetwork.

The figure above shows the options available:

- **Site** - Here you have to specify the connection parameters which are similar to the web DAV harvesting. In this case the URL points to the capabilities document of the CSW server. This document is used to discover the location of the services to call to query and retrieve metadata.
- **Search criteria** - Using the Add button, you can add several search criteria. You can query only the fields recognised by the CSW protocol.
- **Options** - General harvesting options:
 - *Every* - This is the harvesting period. The smallest value is 1 minute while the greatest value is 100 days.
 - *One run only* - If this option is checked, the harvesting will do only one run after which it will become inactive.
- **Privileges** - Please, see WebDAV harvesting.
- **Categories** - Please, see WebDAV harvesting.

Adding an OAI-PMH node

An OAI-PMH server implements a harvesting protocol that GeoNetwork, acting as a client, can use to harvest metadata. If you are requesting the oai_dc output format, GeoNetwork will convert it into its Dublin Core format. Other formats can be harvested only if GeoNetwork supports them and is able to autodetect the schema from the metadata.

Configuration options:

- **Site** - All options are the same as WebDAV harvesting. The only difference is that the URL parameter here points to an OAI-PMH server. This is the entry point that GeoNetwork will use to issue all PMH commands.
- **Search criteria** - This part allows you to restrict the harvesting to specific metadata subsets. You can specify several searches: GeoNetwork will execute them sequentially and results will be merged to avoid the harvesting of the same metadata. Several searches allow you to specify different search criteria. In each search, you can specify the following parameters:
 - *From* - You can provide a start date here. All metadata whose last change date is equal to or greater than this date will be harvested. You cannot simply edit this field but you have to use the icon to popup a calendar and choose the date. This field is optional so if you don't provide it the start date constraint is dropped. Use the icon to clear the field.
 - *Until* - Works exactly as the from parameter but adds an end constraint to the last change date. The until date is included in the date range, the check is: less than or equal to.
 - *Set* - An OAI-PMH server classifies its metadata into hierarchical sets. You can request to return metadata that belong to only one set (and its subsets). This narrows the search result. Initially the drop down shows only a blank option that indicate *no set*. After specifying the connection URL, you can press the **Retrieve Info** button, whose purpose is to connect to the remote node, retrieve all supported sets and prefixes and fill the search drop downs. After you have pressed this button, you can select a remote set from the drop down.
 - *Prefix* - Here prefix means metadata format. The oai_dc prefix is mandatory for any OAI-PMH compliant server, so this entry is always present into the prefix drop down. To have

HARVESTING MANAGEMENT

SITE

Name

Capabilities URL

Icon 

Use account ☒

Username

Password

SEARCH CRITERIA

☒ **Search criteria**

Free text

Title

Abstract

Subject

OPTIONS

Every : : (days : hours : minutes)

One run only ☐

PRIVILEGES

Groups

Group	View	Interactive map	Featured	
All	☒	☐	☐	Remove
Sample group	☐	☒	☒	Remove

CATEGORIES

Figure 3.25: Adding a Catalogue Services for the Web harvesting node

HARVESTING MANAGEMENT

SITE

Name

URL

Icon **REMOTE**

Use account ☒

Username

Password

SEARCH CRITERIA

 **Criteria**

From  

Until  

Set

Prefix

OPTIONS

Every : : (days : hours : minutes)

One run only ☐

Validate ☐

PRIVILEGES

Groups

Group	View	Interactive map	Featured	
Sample group	☒	☐	☒	Remove
All	☒	☐	☐	Remove

CATEGORIES

Figure 3.26: Adding an OAI-PMH harvesting node

this drop down filled with all prefixes supported by the remote server, you have to enter a valid URL and press the Retrieve Info button.

- You can use the Add button to add one more search to the list. A search can be removed clicking the icon on its left.
- **Options** - Most options are equivalent to WebDAV harvesting.
 - *Validate* - The validate option, when checked, will validate each harvested metadata against GeoNetwork's schemas. Only valid metadata will be harvested. Invalid one will be skipped.
- **Privileges** - Please, see WebDAV harvesting.
- **Categories** - Please, see WebDAV harvesting.

Please note that when you edit a previously created node, both the *set* and *prefix* drop down lists will be empty. They will contain only the previously selected entries, plus the default ones if they were not selected. Furthermore, the set name will not be localised but the internal code string will be displayed. You have to press the retrieve info button again to connect to the remote server and retrieve the localised name and all set and prefix information.

Adding an OGC Service (ie. WMS, WFS, WCS)

An OGC service implements a GetCapabilities operation that GeoNetwork, acting as a client, can use to produce metadata. The GetCapability document provides information about the service and the layers/feature types/coverages served. GeoNetwork will convert it into ISO19139/119 format.

The screenshot shows the 'HARVESTING MANAGEMENT' interface. The 'SITE' section includes fields for Name (wms), Type of OGC webservice (OGC Web Map Service (WMS) Version 1.1.1 - preferred), Service URL (http://services.sandre.eaufrance.fr), Metadata language (eng), ISO topic category (InlandWaters), and Type of import (checked for Create metadata for layer elements using GetCapabilities information, Create metadata for layer elements using metadataURL attributes, and Create thumbnails for WMS layers). The 'OPTIONS' section has a frequency of Every 0 days, 1 hour, 30 minutes, and a checkbox for One run only. The 'PRIVILEGES' section shows a list of Groups (Intranet, All, Sample group) with an Add button and a note: 'You can choose the privileges to harvested metadata.' The 'CATEGORY FOR SERVICE' is set to Interactive resources, and the 'CATEGORY FOR DATASETS' is set to Datasets. Buttons for 'Bad' and 'Save' are at the bottom.

Figure 3.27: Adding an OGC service harvesting node

Configuration options:

- **Site**
 - *Name* - The name of the catalogue and will be one of the search criteria.
 - *Type* - The type of OGC service indicates if the harvester has to query for a specific kind of service. Supported type are WMS (1.0.0 and 1.1.1), WFS (1.0.0 and 1.1.0, WCS (1.0.0) and WPS (0.4.0 and 1.0.0).

- *Service URL* - The service URL is the URL of the service to contact (without parameters like “REQUEST=GetCapabilities”, “VERSION=”, ...). It has to be a valid URL like http://your.preferred.ogcservice/type_wms.
- *Metadata language* - Required field that will define the language of the metadata. It should be the language used by the web service administrator.
- *ISO topic category* - Used to populate the metadata. It is recommended to choose on as the topic is mandatory for the ISO standard if the hierarchical level is “datasets”.
- *Type of import* - Defines if the harvester should only produce one service metadata record or if it should loop over datasets served by the service and produce also metadata for each datasets. For each dataset the second checkbox allow to generate metadata for the dataset using an XML document referenced in the MetadataUrl attribute of the dataset in the GetCapability document. If this document is loaded but it is not valid (ie. unknown schema, bad XML format), the GetCapability document is used.

For WMS, thumbnails could be created during harvesting. - *Icon* - The default icon displayed as attribution logo for metadata created by this harvester.

- **Options** - Please, see WebDAV harvesting.
- **Privileges** - Please, see WebDAV harvesting.
- **Category for service** - Metadata for the harvested service is linked to the category selected for the service (usually “interactive resources”).
- **Category for datasets** - For each dataset, the “category for datasets” is linked to each metadata for datasets.

Adding an ArcSDE server

The ArcSDE harvester allows harvesting metadata from an ArcSDE installation. ArcSDE java API libraries are required to be installed by the user in GeoNetwork (folder `INSTALL_DIR/web/geonetwork/WEB-INF/lib`), as these are proprietary libraries not distributed with GeoNetwork:

- `jpe_sdk.jar`
- `jsde_sdk.jar`

Note: `dummy-api-XXX.jar` must be removed from `INSTALL_DIR/web/geonetwork/WEB-INF/lib`

The harvester identifies the ESRI metadata format: ESRI ISO, ESRI FGDC to apply the required xslts to transform metadata to ISO19139

Configuration options:

- **Site**
 - *Name* - This is a short description of the node. It will be shown in the harvesting main page.
 - *Server* - ArcSde server IP or name
 - *Port* - ArcSde service port (typically 5151)

HARVESTING MANAGEMENT

SITE

Name

ArcSDE server

Server

127.0.0.1

Port

5151

Username

sde

Password

Database

esri_sde

Icon

default.gif



OPTIONS

Every

0

:

1

:

30

(days : hours : minutes)

One run only

☐

HARVESTED CONTENT

Validate

☐

PRIVILEGES

Groups

Guest

All

Intranet

Sample group

Add

Group	View	Interactive map	Featured	
All	☒	☐	☐	Remove
Sample group	☒	☒	☒	Remove

CATEGORIES

Applications

Audio/Video

Case studies, best practices

Datasets

Directories

Interactive resources

Maps & graphics

Other information resources

Back

Save

Figure 3.28: Adding an ArcSDE harvesting node

- *Username* - Username to connect to ArcSDE server
- *Password* - Password of the ArcSDE user
- *Database name* - ArcSDE instance name (typically esri_sde)
- **Options** - Please, see WebDAV harvesting.
- **Privileges** - Please, see WebDAV harvesting.
- **Category for service** - Metadata for the harvested service is linked to the category selected for the service (usually “interactive resources”).
- **Category for datasets** - For each dataset, the “category for datasets” is linked to each metadata for datasets.

3.6 Metadata ownership

3.6.1 Introduction

Starting from release 2.1.0, GeoNetwork has a new metadata access policy. The old edit and admin privileges have been removed and the concept of reviewer has been introduced. The purpose of this new profile is to control when a metadata can be published outside or not. In previous releases, all users belonging to a group with edit privileges could edit the same metadata. Now, a metadata is only visible to its creator, to a reviewer which has access to the group owner and to an administrator.

3.6.2 Access policy

A public metadata is a metadata that has the view privilege for the group named all.

Visualisation

An administrator can view any metadata.

A reviewer can view a metadata if:

1. The metadata owner is member of one of the groups assigned to the reviewer.
2. She/he is the metadata owner.

A user administrator or an editor can view:

1. All metadata that has the view privilege selected for one of the groups she/he is member of.
2. All metadata created by her/him.

A registered user can view:

1. All metadata that has the view privilege selected for one of the groups she/he is member of.

Public metadata can be viewed by any user (logged in or not).

Editing

An administrator can edit any metadata.

A reviewer can edit a metadata if:

1. The metadata owner is member of one of the groups assigned to the reviewer.
2. She/he is the metadata owner.

A User Administrator or an Editor can only edit metadata she/he created.

3.6.3 Privileges

The Privileges administration page is accessible only by:

1. All Administrators
2. All Reviewers that are member of one of the groups assigned to the metadata owner.
3. The Owner of the metadata

Privileges for the All and Intranet groups can only be edited by Administrators and Reviewers.

3.6.4 Transfer Ownership

When metadata ownership needs to be transferred from one user to another for all or specific metadata records, the Transfer Ownership option is available. It is located in the Administration page and once selected, leads to the following page.

ADMINISTRATION	
Metadata	
New metadata	Adds a new metadata into geonetwork copying it from a template
Metadata insert	Import metadata record in XML or MEF format
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
Template	
Sort Templates	Sort your templates
Add templates	Add default templates : ☐ iso19139/119 ☐ iso19110 ☐ dublin-core ☐ fgdc-std ☐ all Add templates
Personal info	
Change password	Allow current user to change password
Change user information	Allow current user to change user information
Administration	
User management	Add/modify/delete and show users
Group management	Add/modify/delete and show groups
Category management	Add/modify/delete and show categories
Manage thesauri	Add/modify/delete and show thesauri
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...
Rebuild Lucene index	Rebuild
Optimize Lucene index	Optimize
Test i18n	This service should help GeoNetwork opensource developers to have up to date localized files for the GUI.
CSW ISO Profile test	Test interface for the CSW ISO Profile catalog interface
Sample metadata	Add sample metadata

Figure 3.29: How to open the Transfer Ownership page

Initially, the page shows only a dropdown for a Source editor (the current metadata owner). The dropdown is filled with all GeoNetwork Users that have the Editor role and own some metadata. Selecting an Editor will select all metadata that is managed by that Editor. An empty dropdown means that there are no Editors with metadata associated and hence no transfer is possible.

Note The drop down will be filled with all Editors visible to you. If you are not an Administrator, you will view only a subset of all Editors.

Source group	Target group	Target editor	Operation
Sample group	Sample group	Bob Brady	Transfer

Figure 3.30: *The Transfer Ownership page*

Once a Source Editor has been selected, a set of rows is displayed. Each row refers to the group of the Editor for which there are privileges. The meaning of each column is the following:

1. *Source group*: This is a group that has privileges in the metadata that belong to the source editor. Put in another way, if one of the editor's metadata has privileges for one group, that group is listed here.
2. *Target group*: This is the destination group of the transferring process. All privileges relative to the source group are transferred to the target group. The target group drop down is filled with all groups visible to the logged user (typically an administrator or a user administrator). By default, the Source group is selected in the target dropdown. Privileges to groups All and Intranet are not transferable.
3. *Target editor*: Once a Target group is selected, this drop down is filled with all editors that belong to that Target group.
4. *Operation*: Currently only the Transfer operation is possible.

By selecting the Transfer operation, if the Source group is different than the Target group, the system performs the Transfer of Ownership, shows a brief summary and removes the current row because now there are no privileges to transfer anymore.

3.7 Templates

The templates options allows to manage the metadata templates in the catalog. In order to use these facilities, you have to be logged in as an administrator. After the login step, go to the administration page.

3.7.1 Sort templates

This option allows to set the order of the templates available when creating a new metadata.

In the administration panel, select Sort Templates option:

The list of available templates is shown with the current display order. To change the position of a template click on its name and drag it to move it to the new position.

ADMINISTRATION	
Metadata	
New metadata	Adds a new metadata into geonetwork copying it from a template
Metadata insert	Import metadata record in XML or MEF format
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
Template	
Sort Templates	Sort your templates
Add templates	Add default templates : ☐ iso19139/119 ☐ iso19110 ☐ dublin-core ☐ fgdc-std ☐ all Add templates
Personal info	
Change password	Allow current user to change password
Change user information	Allow current user to change user information
Administration	
User management	Add/modify/delete and show users
Group management	Add/modify/delete and show groups
Category management	Add/modify/delete and show categories
Manage thesauri	Add/modify/delete and show thesauri
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...
Rebuild Lucene index	Rebuild
Optimize Lucene index	Optimize
Test i18n	This service should help GeoNetwork opensource developers to have up to date localized files for the GUI.
CSW ISO Profile test	Test interface for the CSW ISO Profile catalog interface
Sample metadata	Add sample metadata

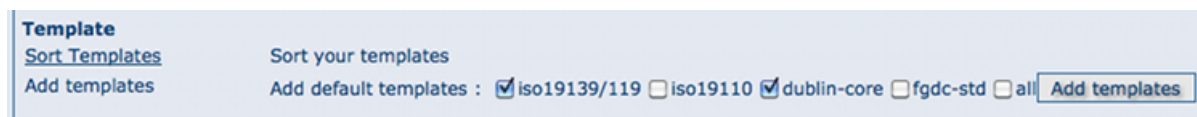
METADATA CREATION	
Template	Template for Vector data in ISO19139 (multilingual) Template for Vector data in ISO19139 (multilingual) Template for Vector data in ISO19139 (preferred!) Template for Raster data in ISO19139 Template for WMS service in ISO19139/119 Template for Dublin Core Geoserver WFS Fragments Country Boundaries Test Template Deegree22 WFS Fragments Philosopher Database Test Template
Group	

SORT TEMPLATES	
Template for Vector data in ISO19139 (preferred!)	
Template for Vector data in ISO19139 (multilingual)	
Template for Raster data in ISO19139	
Template for WMS service in ISO19139/119	
Template for Dublin Core	
Geoserver WFS Fragments Country Boundaries Test Template	
Deegree22 WFS Fragments Philosopher Database Test Template	
Save Back	

Once the order of templates is configured, click on Save button to save the changes. To cancel the changes and return to the administration form click on Back button.

3.7.2 Add templates

This option allows the user to select the metadata templates to add in the catalog to create new metadata records.



Mark the metadata templates to import and click Add templates button to import them in the catalog and make them available when creating new metadata records.

3.8 Thesaurus

3.8.1 Introduction

Thesaurus support in GeoNetwork allows:

- *Metadata editing*: controlled vocabulary on the metadata editing interface for ISO and Dublin Core
- *Administration interface* allows import/export/creation/browse thesaurus
- *Search interface*: a list of keyword is proposed for the keyword criteria

On a node, thesaurus types could be defined as:

- *External*: When a thesaurus is imported, it is flagged to "external" which means that users are not allowed to edit the thesaurus. This thesaurus is managed by an external organisation.
- *Local*: When a thesaurus is created, it is flagged to "local" which means that users are allowed to edit the thesaurus.

3.8.2 Thesaurus / SKOS format

The Simple Knowledge Organisation Systems (SKOS) <http://www.w3.org/2004/02/skos/> is an area of work developing specifications and standards to support the use of knowledge organisation systems (KOS) such as thesauri, classification schemes. This format is used by GeoNetwork to store thesaurus information.

A concept is defined by an identifier, a preferred label, a definition and links with other concepts. Labels and definitions could be stored in multiple languages (using the xml:lang attributes). Three type of links between concepts have been defined in the SKOS format:

- related terms
- broader terms
- narrower terms

For example, a concept "ABLETTE" could be defined as follow with a label in French and English, linked to broader concept:

```
<skos:Concept rdf:about="http://www.oieau.org/concept#c4fc54576dc00227b82a709287ac3681">
  <skos:prefLabel xml:lang="fr">ABLETTE</skos:prefLabel>
  <skos:prefLabel xml:lang="en">BLEAK</skos:prefLabel>
  <skos:broader rdf:resource="http://www.oieau.org/concept#9f25ece36d04776e09492c6662">
</skos:Concept>
```

GeoNetwork support multilingual thesaurus (e.g. Agrovoc). Search and edition are made based on current user interface language (i.e. if the interface is in English, when editing metadata, GeoNetwork will only search for concept in English).

3.8.3 Thesaurus administration

To reach the thesaurus administration page you have to be logged in as an administrator. From the administration page, click the link "Manage thesauri". The page shows a list of thesaurus that have been created or imported. The upper part of the page allows user to edit/add/modify/consult thesaurus. The lower part allows upload of thesaurus in SKOS format.

Creation of a new thesaurus

To create a new thesaurus, click the "+" sign in the category you want your thesaurus to be in. Once created, the thesaurus could be updated through the edit interface. The meaning of each column is as follows:

- **Type** - The type allows to classify thesaurus according to its type. First, is defined the type of the thesaurus following ISO category list, then the type indicates if the thesaurus is a local one or an external one.
- **Name** - This is the thesaurus's name provided by the administrator on creation or filename on upload. When creating a thesaurus, the name of the thesaurus will be the filename of the thesaurus.



Figure 3.31: Administration interface for thesaurus

For each thesaurus the following buttons are available:

- **Download** - Link to the RFD file.

- **Delete** - Remove thesaurus from the current node.
- **View** - If type is external, the view button allows to search and view concepts.
- **Edit** - If type is local, the edit button allows to search, add, remove and view concepts.

Import existing thesaurus

GeoNetwork allows thesaurus import in SKOS format. Once uploaded, an external thesaurus could not be updated. Select the category, browse for the thesaurus file and click upload. The file is located in /web/xml/codelist/external/thesauri/category/.

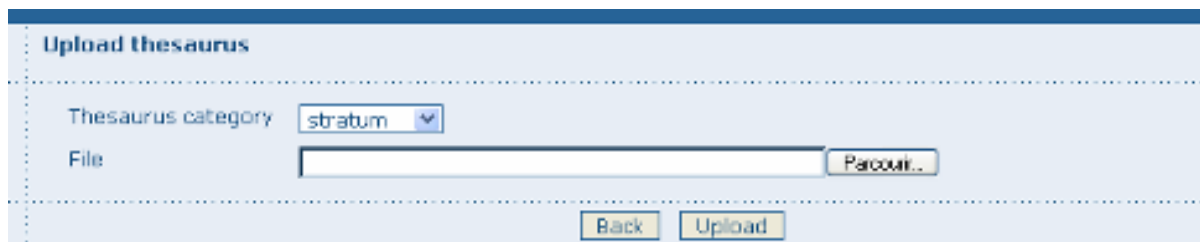


Figure 3.32: *Upload interface for thesaurus*

At the bottom of the page there are the following buttons:

1. *Back*: Go back to the main administration page.
2. *Upload*: Upload the selected RFD file to the node. Then it will list all thesaurus available on the node.

3.8.4 Editing/browsing thesaurus: add/remove/browse keywords

From the thesaurus administration interface, click on the edit button for a local thesaurus or the view button for an external thesaurus. This interface allows:

- keywords search
- add/remove keywords for local thesaurus.

Use the textbox and the type of search in order to search for keywords.

3.8.5 Metadata editing: adding keywords

When editing metadata in ISO, it allows editors to: - do one or more searches in all thesaurus registered in the catalogue. - select one or more keywords added to the selected items list (using arrows or drag & drop) on the right. - add the selected keywords directly into metadata, grouping keywords by thesaurus.

The search interface allows editors to choose the maximum number of keywords to returns, and the thesaurus to search into (default is all).

3.8.6 Search criteria: keywords

In the advanced search interface, search for keyword is available.



Figure 3.33: Browse interface for thesaurus

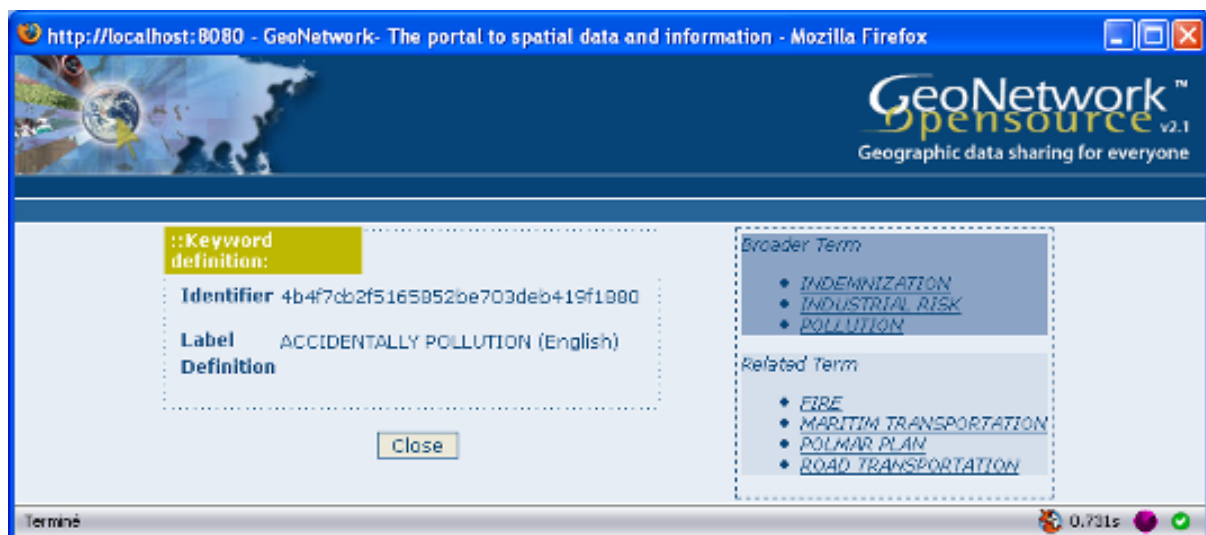


Figure 3.34: Keyword description

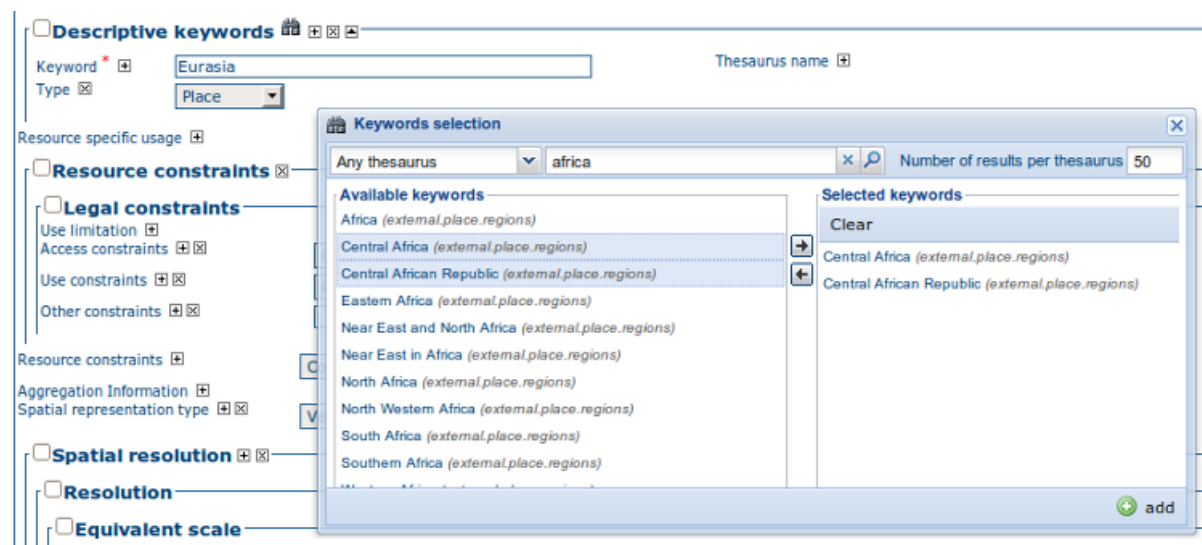


Figure 3.35: Keyword selection interface (editing mode)

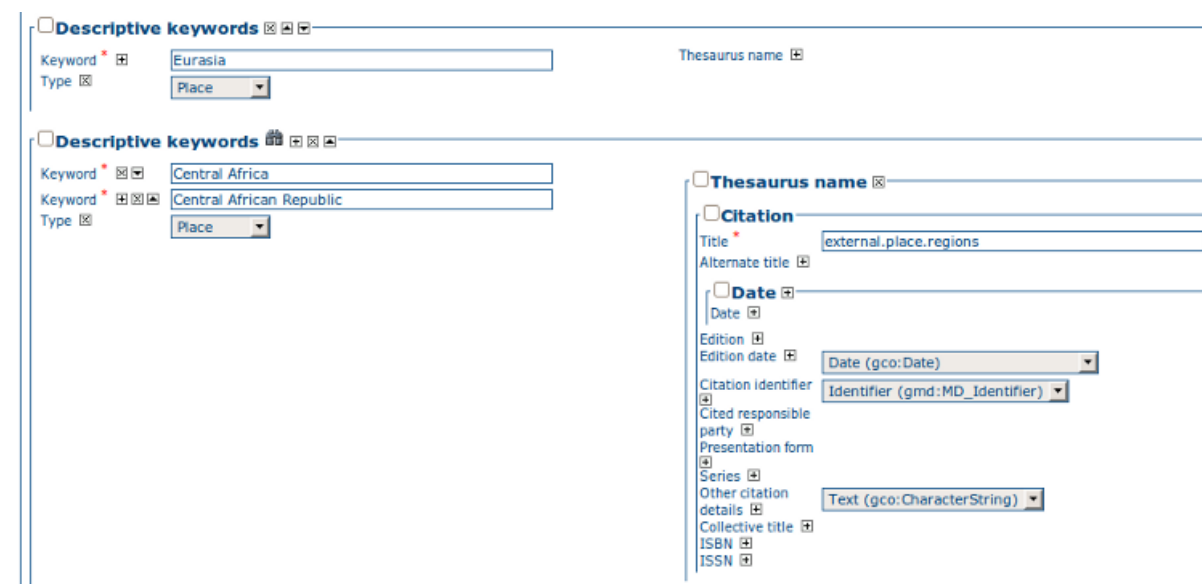


Figure 3.36: Keyword selection (view mode)

By default, the keyword field will proposed all keywords used in the metadata. These keywords are indexed by Lucene on creation/update of metadata. The number of metadata linked to all keywords available in the index are display. User could type in the keyword field or click the icon to get the list of keywords available.

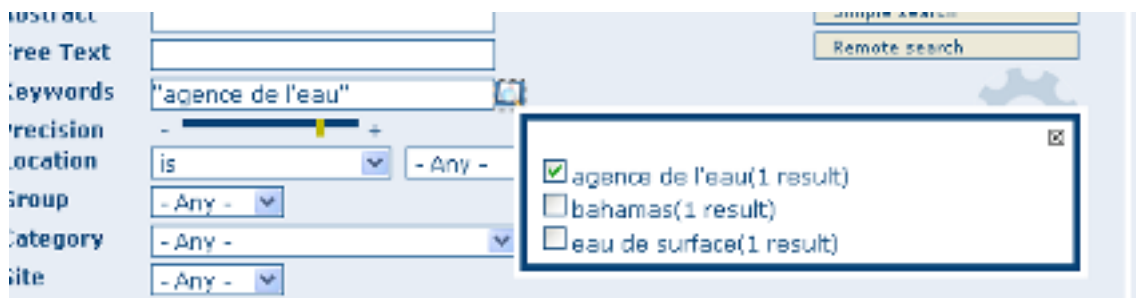


Figure 3.37: Thesaurus search interface

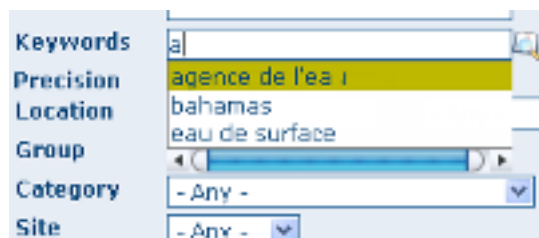


Figure 3.38: Auto-complete function in thesaurus search interface

By configuring the *config-gui.xml* file in the WEB-INF directory, search for keyword using the advanced keyword selection panel is available as in the metadata editor:

```
<search>
  <!-- Display or not keyword selection panel in advanced search panel
  <keyword-selection-panel/>
  -->
</search>
```

3.9 GeoNetwork's Administrator Survival Tool - GAST

3.9.1 What is GAST?

GAST stands for GeoNetwork's Administrator Survival Tool and is a standalone application whose purpose is to simplify some low level tasks like change of the servlet, configuration of the JDBC account, setup the database and so on. Most of the GAST's facilities work only for the GeoNetwork's installation where GAST is in. This implies that if you are using a servlet container other than Jetty (like Tomcat) you will not be able to change some options (like the servlet's name). Other facilities work for any servlet container but you have to specify the GeoNetwork's URL into the GAST's configuration dialogue.

3.9.2 Starting GAST

GAST belongs to the core components so it is installed by default.

On Windows computers, simply select the Start GAST option under the GeoNetwork opensource program group under *Start → Programs → GeoNetwork opensource*

Other options to start GAST are either to use a Java command **from a terminal window** or just click its jar's icon. To issue the Java command you have to:

1. change directory to the GeoNetwork installation folder
2. issue the command `java -jar gast/gast.jar`

GAST will be in current system language if any translation is available. If you want to force GAST GUI language, you could start GAST using the `-Duser.language` option (e.g. `./gast.sh -Duser.language=fr` or `java -Duser.language=fr -jar gast/gast.jar`).

You can also try to simply open the GeoNetwork installation folder, go to the `gast` folder and double click on the `gast.jar` file. If you have Java installed, GAST should start in a few seconds.

To run, GAST requires Java 1.5. It will not work on Java 1.4 and it should run on Java 1.6.

3.9.3 Operating modes

On the left side you have a panel with the tools you can use. After selecting a tool, on the right side you get the tool's options panel.

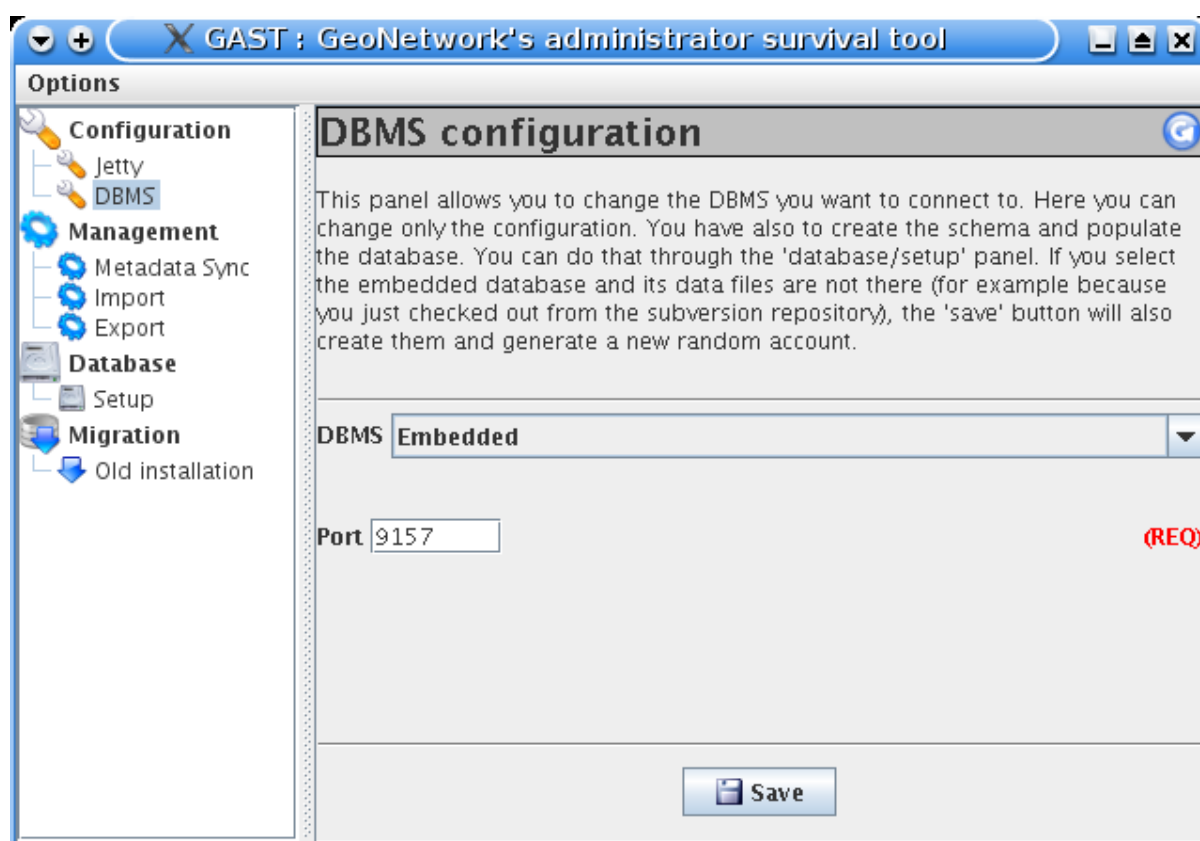


Figure 3.39: GAST's main window with a tool selected

Every function has an operating mode, which defines the condition under which the tool can be used. The tool's mode is shown with an icon on the right side of the tool's name. The operating modes, with their icons are summarised in the following table:

Mode	Icon	Description
Restart		The tool can be always used, but GeoNetwork must be restarted in order to make the change effective.
Run- ning		The tool can be used only if GeoNetwork is running.
Stopped		The tool can be used only if GeoNetwork is stopped. This is important because some tools change the database's account or create the database from scratch. These are sensitive operations that cannot be performed while GeoNetwork is running.

3.9.4 Tools subdivision

All GAST tools present into the left panel are logically subdivided into groups. Each group represents a GeoNetwork's aspect for which GAST allows you a graphic interface. The groups are:

Configuration You can change some configuration parameters, like the servlet's name, JDBC account etc... **Management** General purpose tools related to the site's administration. **Database Operations** that regard the database. Here you can find tools to create a database from scratch, creating the schema and filling it with proper data. **Migration Tools** that allow you to migrate metadata from old installation.

3.9.5 Server and Account configuration dialogue

Some of the GAST's tools access a running GeoNetwork application. Usually, GAST connects to GeoNetwork using the connection parameters it finds on the installation folder but you can specify other parameters in order to connect to other instances. This is required when the GeoNetwork instance is not running on the embedded Jetty server. In addition to that, some tools require authentication so account parameters must be provided.

To provide these parameters, you have to use the GAST's configuration dialogue. To open the dialogue, select `Options >> Config` from the menu bar. You will get the following dialogue:

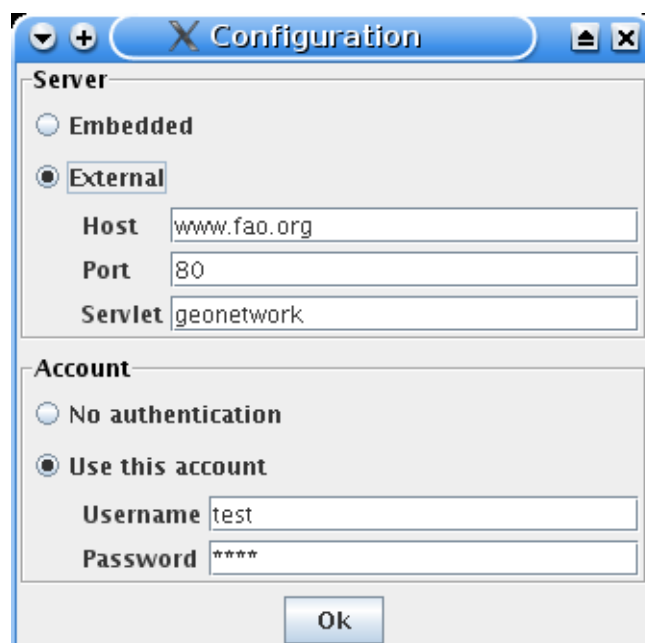


Figure 3.40: *The configuration dialogue*

The dialogue is subdivided into 2 areas:

- **Server** - Tells GAST how to connect to a running GeoNetwork. If you select the embedded option, GAST will get the connection parameters from the installation directory. Alternatively, if you use Tomcat or an external servlet container you have to choose the external option and provide the connection parameters yourself. Remember that this will work only for tools which operating mode is *Running*. For all the others, GAST will access the parameters from the installation directory.
- **Account** - Some tools require authentication. To authenticate, simply select the Use this account option and provide the username and password of a valid account. These parameters will work for both the embedded instance and for any external instance.

3.10 Localization

3.10.1 Localization of dynamic user interface elements

The user interface of GeoNetwork can be localized into several languages through XML language files. Beside static text, there is also more dynamic text that can be added and changed interactively. This text is stored in the database and is translated using the Localization form that is part of the administrative functions.

ADMINISTRATION	
Metadata	
New metadata	Adds a new metadata into geonetwork copying it from a template
Metadata insert	Import metadata record in XML or MEF format
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
Template	
Sort Templates	Sort your templates
Add templates	Add default templates : ☐ iso19139/119 ☐ iso19110 ☐ dublin-core ☐ fgdc-std ☐ all Add templates
Personal info	
Change password	Allow current user to change password
Change user information	Allow current user to change user information
Administration	
User management	Add/modify/delete and show users
Group management	Add/modify/delete and show groups
Category management	Add/modify/delete and show categories
Manage thesauri	Add/modify/delete and show thesauri
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...
Rebuild Lucene index	Rebuild
Optimize Lucene index	Optimize
Test i18n	This service should help GeoNetwork opensource developers to have up to date localized files for the GUI.
CSW ISO Profile test	Test interface for the CSW ISO Profile catalog interface
Sample metadata	Add sample metadata

Figure 3.41: *How to open the Localization form*

The form allows you to localize the following entities: *Groups*, *Categories*, *Operations* and *Regions*. The localization form is subdivided in a left and a right panel.

The left panel allows you to choose which elements you want to edit. On the top, a dropdown let you choose which entity to edit. All elements of the selected type are shown in a list.

When you select an element from the list, the right panel will show the text as it will be displayed in the user interface. The text in the source language is read only while you can update the text in the target language field.

Note: You can change the source and target languages to best suit your needs. Some users may for instance prefer to translate from French to Spanish, others prefer to work with English as the source language.

Use the Save button to store the updated label and move to the next element.

Warning: If the user changes a label and chooses another target language without saving, the label change is lost.

Figure 3.42: *The Localization form*

3.11 Import / export tools

3.11.1 Introduction

Using GAST, you can import and export metadata at will. It allows you to:

1. Create a *backup* of the entire metadata set. Each metadata has its own file, including maps and other data files. Once you have the backup, you can decide to import all or only some of them.
2. *Move your metadata* from one GeoNetwork catalogue to another. This can be done to mirror your metadata or to upgrade an old installation. In the last case, you export your metadata from your

old installation and then re-import them into the new one.

3. Fill the system with *test data*. Using the 'skip UUID' option, you can re-import the same metadata over and over again. This is useful, for example, if you want to perform stress tests.

Metadata are exported in the MEF format.

Warning: Ownership - Please, consider that the MEF format version 1.0 does not take into account user and group ownership. When exporting metadata, you loose this information. When importing metadata, the new owner becomes the user that is performing the import while the group ownership is set to null.

3.11.2 Import

This tool is located under Management tools on the left panel and allows you to import a set of metadata that have been previously exported using the export facility. Selecting the Import tool opens the option panel.

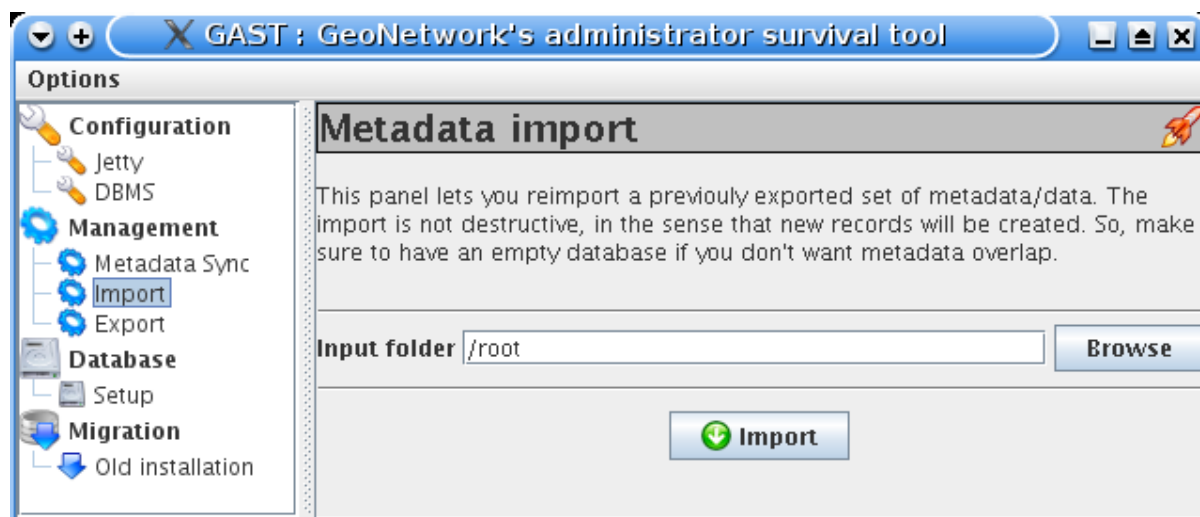


Figure 3.43: *The metadata import panel*

- **Input folder** - The source folder in your system that GAST will scan to collect metadata to import. GAST will try to import all files with the MEF extension.
- **Browse button** - Navigate through your file system to choose an output location or enter it manually into the text field.
- **Import** - This will start the process. A progress dialogue will be opened to show the import status.

Note: Sub-folders are not scanned.

3.11.3 Export

This tool is located under the Management tool on the left panel and allows you to export a set of metadata using the MEF format. Selecting the Export tool opens the option panel.

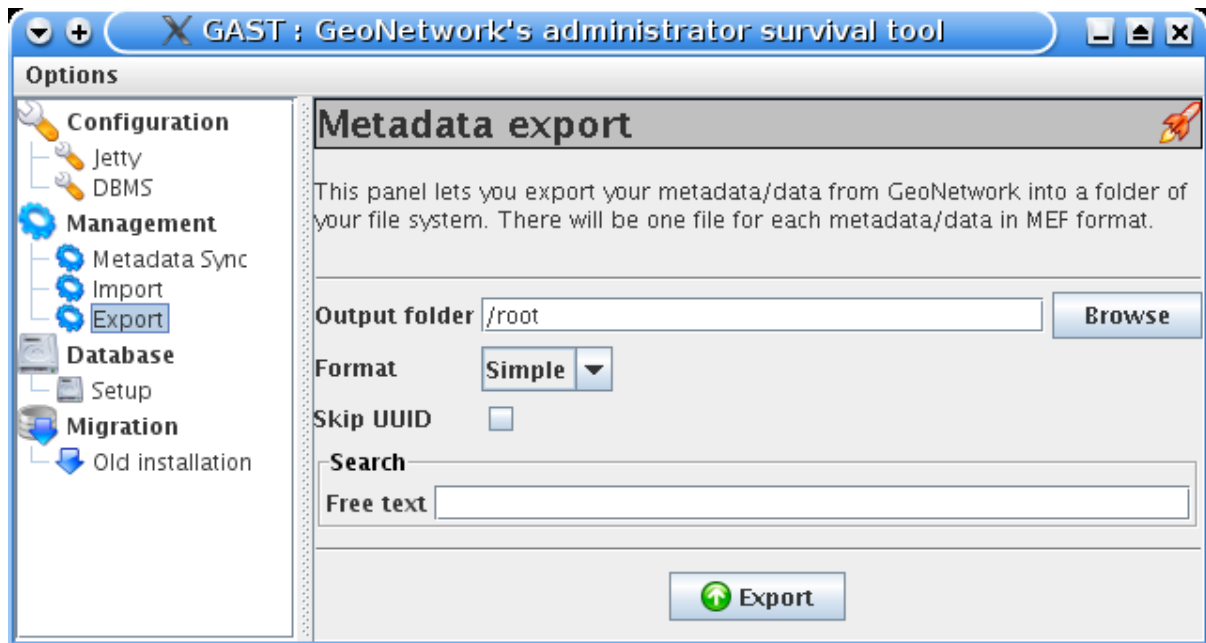


Figure 3.44: The metadata export panel

- **Output folder** - The target folder in your file system where GAST will put the exported metadata. You can either select the Browse button to navigate through your file system to choose a better location or enter it manually in the text field.
- **Format** - Here you can specify the metadata's output format. See the MEF specification for more information.
- **Skip UUID** - Normally this option is not required. If you select it, you will lose the metadata's unique identifier (UUID) but you will be able to re-import that metadata over and over again. This is useful to fill the system with test data.
- **Search** - Allows to specify free text search criteria to limit the set of exported records.
- **Export** - This will start the export process. A progress dialogue will be opened to show the export status.

Note: The result of the export will depend on the access privileges of the user. If you do not authenticate, you will get only public metadata.

Warning: Skipping the UUID on import or export can cause metadata to be duplicated. This should normally always be avoided

3.12 Advanced configuration

3.12.1 Database configuration

GeoNetwork has two options for pooled connections to the relational database:

1. Manage its own database configuration and pool directly using Apache Commons Database Connection Pool (DBCP)

2. Use database configuration and pool managed by the web application server (also known as the container) such as tomcat or jetty via the Java Naming and Directory Interface (JNDI).

Managing the database connection pool through Apache DBCP

This option is the one that most users would use as it is the default option for managing the database in GeoNetwork. A typical configuration in the resources element of *INSTALL_DIR/web/geonetwork/WEB-INF/config.xml* uses the *jeeves.resources.dbms.ApacheDBCPool* class and looks something like:

```
<resource enabled="true">
  <name>main-db</name>
  <provider>jeeves.resources.dbms.ApacheDBCPool</provider>
  <config>
    <user>www-data</user>
    <password>www-data</password>
    <driver>org.postgis.DriverWrapper</driver>
    <url>jdbc:postgresql_postGIS://localhost:5432/geonetwork</url>
    <poolSize>10</poolSize>
    <validationQuery>SELECT 1</validationQuery>
  </config>
</resource>
```

The parameters that can be specified to control the Apache Database Connection Pool are described at <http://commons.apache.org/dbcp/configuration.html>. You can configure a subset of these parameters in your resource element. The parameters that can be specified are:

Parameter	Description	Default
maxActive	pool size/maximum number of active connections	10
maxIdle	maximum number of idle connections	maxActive
minIdle	minimum number of idle connections	0
maxWait	number of milliseconds to wait for a connection to become available	200
validationQuery	sql statement for verifying a connection, must return a least one row	no default
timeBetweenEviction-RunsMillis	time between eviction runs (-1 means next three params are ignored)	-1
testWhileIdle	test connections when idle	false
minEvictableIdle-TimeMillis	idle time before connection can be evicted	30 x 60 x 1000 msecs
numTestsPerEviction-Run	number of connections tested per eviction run	3
defaultTransactionIsolation	see http://en.wikipedia.org/wiki/Isolation_%28database_systems%29	READ_COMMITTED

The following parameters are set by GeoNetwork and cannot be configured by the user:

- removeAbandoned - true
- removeAbandonedTimeout - 60 x 60 seconds = 1 hour
- logAbandoned - true
- testOnBorrow - true
- defaultReadOnly - false
- defaultAutoCommit - false

- `initialSize` - `maxActive`

Note: Some firewalls kill idle connections to databases after say 1 hour (= 3600 secs). To keep idle connections alive by testing them with the `validationQuery`, set `minEvictableIdleTimeMillis` to something less than timeout, interval (eg. 2 mins = 120 secs = 120000 millisecs), set `testWhileIdle` to true and set `timeBetweenEvictionRunsMillis` and `numTestsPerEvictionRun` high enough to visit connections frequently eg 15 mins = 900 secs = 900000 millisecs and 4 connections per test. For example:

```
<testWhileIdle>true</testWhileIdle>
<minEvictableIdleTimeMillis>120000</minEvictableIdleTimeMillis>
<timeBetweenEvictionRunsMillis>900000</timeBetweenEvictionRunsMillis>
<numTestsPerEvictionRun>4</numTestsPerEvictionRun>
```

Note:

- When GeoNetwork manages the database connection pool, PostGIS database is the only database that can hold the spatial index in the database. All other database choices hold the spatial index as a shapefile. If using PostGIS, two pools of database connections are created. The first is managed and configured using parameters in this section, the second is created by GeoTools and cannot be configured. This approach is now *deprecated*: if you want to use the database to hold the spatial index you *should* use the JNDI configuration described in the next section because it uses a single, configurable database pool through GeoTools as well as the more modern NG (Next Generation) GeoTools datastore factories.
- For more on transaction isolation see http://en.wikipedia.org/wiki/Isolation_%28database_systems%29.

Database connection pool managed by the container

A typical configuration in the resources element of `INSTALL_DIR/web/geonetwork/WEB-INF/config.xml` uses the `jeeves.resources.dbms.JNDIPool` class and looks something like:

```
<resource enabled="true">
  <name>main-db</name>
  <provider>jeeves.resources.dbms.JNDIPool</provider>
  <config>
    <context>java:/comp/env</context>
    <resourceName>jdbc/geonetwork</resourceName>
    <url>jdbc:oracle:thin:@localhost:1521:oracle-XE</url>
    <provideDataStore>true</provideDataStore>
  </config>
</resource>
```

The configuration parameters and their meanings are as follows:

Config Parameter	Description
<code>context</code>	The name of the context from which to obtain the resource - almost always this is <code>java:/comp/env</code>
<code>resourceName</code>	The name of the resource in the context to use
<code>url</code>	The URL of the database - this is needed to let GeoTools know the database type
<code>provideDataStore</code>	If set to true then the database will be used for the spatial index, otherwise a shapefile will be used

The remainder of the configuration is done in the container context. eg. for tomcat this configuration is in `conf/context.xml` in the resource called `jdbc/geonetwork`. Here is an example for the Oracle database:

```
<Resource name="jdbc/geonetwork"
    auth="Container"
    type="javax.sql.DataSource"
    username="system"
    password="oracle"
    factory="org.apache.commons.dbcp.BasicDataSourceFactory"
    driverClassName="oracle.jdbc.OracleDriver"
    url="jdbc:oracle:thin:@localhost:1521:XE"
    maxActive="10"
    maxIdle="10"
    removeAbandoned="true"
    removeAbandonedTimeout="3600"
    logAbandoned="true"
    testOnBorrow="true"
    defaultAutoCommit="false"
    validationQuery="SELECT 1 FROM DUAL"
    accessToUnderlyingConnectionAllowed="true"
    poolPreparedStatements="true"
    maxOpenPreparedStatements="400"
/>
```

The parameters that can be specified to control the Apache Database Connection Pool used by the container are described at <http://commons.apache.org/dbcp/configuration.html>.

The following parameters should be set to ensure GeoNetwork operates correctly:

- defaultAutoCommit="false"
- accessToUnderlyingConnectionAllowed="true"

For performance reasons you should set the following parameters:

- poolPreparedStatements="true"
- maxOpenPreparedStatements="300" (at least)

Notes:

- both PostGIS and Oracle will build and use a table in the database for the spatialindex if provide-DataStore is set to true. Other databases could be made to do the same if a spatialindex table is created - see the definition for the spatialIndex table in *INSTALL_DIR/web/geonetwork/WEB-INF/classes/setup/sql/create/create-db-postgis.sql* for example.
- you should install commons-dbc-1.3.jar and commons-pool-1.5.5.jar in the container class path (eg. *common/lib* for tomcat5) as the only supported DataSourceFactory in geotools is apache commons dbcp. Naturally you should always use the *factory="org.apache.commons.dbcp.BasicDataSourceFactory"* in the JNDI context as well.
- the default tomcat-dbc.jar version of apache commons dbcp appears to work correctly for geotools and PostGIS but does not work for those databases that need to unwrap the connection in order to do spatial operations (eg. Oracle).
- Oracle ojdbc-14.jar or ojdbc5.jar or ojdbc6.jar (depending on the version of Java being used) should also be installed in the container *common/lib* area (you may need to remove ojdbc-14.jar that appears in *INSTALL_DIR/web/geonetwork/WEB-INF/lib*.)
- advanced: you should check the default transaction isolation level for your database driver. READ_COMMITTED appears to be a safe level of isolation to use with GeoNetwork for commonly used databases. Also note that McKoi can only support SERI-

ALIZABLE (does anyone still use McKoi?). For more on transaction isolation see http://en.wikipedia.org/wiki/Isolation_%28database_systems%29.

3.12.2 Advanced configuration for larger catalogs

There are a number of steps you must consider if you are going to use GeoNetwork for catalogs with 20,000 or more metadata records:

1. **Consider the hardware you have available** GeoNetwork uses a database as a transactional store and does all metadata searches using Lucene. Lucene is very fast and scale for large catalogs if you supply fast disk (solid state disk is best by far), lots of memory/RAM (16Gb+) and multiple processors as part of a 64bit environment. Linux is probably the best operating system to take advantage of such an environment.
2. **Build the spatial index into your database ie. Use PostGIS (Postgres+PostGIS) or Oracle as your database** GeoNetwork has to build a spatial index containing all metadata bounding boxes and polygons, in order to support spatial queries for the Catalog Services Web (CSW) interface eg. select all metadata records that intersect a search polygon. By default GeoNetwork uses a shapefile but the shapefile quickly becomes costly to maintain during reindexing usually after the number of records in the catalog exceeds 20,000. If you select PostGIS or Oracle as your database via JNDI (see previous section), GeoNetwork will build the spatial index in a table (called spatialindex). The spatialindex table in the database is much faster to reindex. But more importantly, if appropriate database hardware and configuration steps are taken, it should also be faster to query than the shapefile when the number of records in the catalog becomes very large.
3. **Consider the Java heap space** Typically as much memory as you can give GeoNetwork is the answer here. If you have a 32bit machine then you are stuck below 2Gb (or maybe a little higher with some hacks). A 64bit machine is best for large catalogs. Jetty users can set the Java heap space in *INSTALL_DIR/bin/start-geonetwork.sh* (see the -Xmx option: eg. -Xmx4g will set the heap space to 4Gb on a 64bit machine). Tomcat users can set an environment variable JAVA_OPTS eg. export JAVA_OPTS="-Xmx4g"
4. **Consider the number of processors you wish to allocate to GeoNetwork** GeoNetwork 2.8 allows you to use more than one system processor (or core) to speed up reindexing and batch operations on large numbers of metadata records. The records to be processed are split into groups with each group assigned to an execution thread. You can specify how many threads can be used in the system configuration menu. A reasonable value for the number of threads is the number of processors or cores you have allocated to the GeoNetwork Java Virtual Machine (JVM) or just the number of processors on the machine that you have dedicated to GeoNetwork.
5. **Consider the number of database connections to be allocated to GeoNetwork** GeoNetwork uses and reuses a pool of database connections. This is configured in *INSTALL_DIR/web/geonetwork/WEB-INF/config.xml* or in the container via JNDI. To arrive at a reasonable number for the pool size is not straight forward. You need to consider the number of concurrent harvesters you will run, the number of concurrent batch import and batch operations you expect to run and the number of concurrent users you are expecting to arrive. The default value of 10 is really only for small sites. The more connections you can allocate, the less time your users and other tasks will spend waiting for a free connection.
6. **Consider the maximum number of files your system will allow any process to have open** Most operating systems will only allow a process to open a limited number of files. If you are expecting a large number of records to be in your catalog then you should change the default value to something larger (eg. 4096) as the lucene index in GeoNetwork will occasionally require large numbers of open files during reindexing. In Linux this value can be changed using the ulimit

command (ulimit -a typically shows you the current setting). Find a value that suits your needs and add the appropriate ulimit command (eg. ulimit -n 4096) to the GeoNetwork startup script to make sure that the new limit is used when GeoNetwork is started.

7. **Raise the stack size limit for the postgres database** Each process has some memory allocated as a stack. The stack is used to store process arguments and variables as well as state when functions are called. Most operating systems limit the size that the stack can grow to. With large catalogs and spatial searches, very large SQL queries can be generated on the PostGIS spatial index table. This can cause postgres to exceed the process stack size limit (typically 8192k on smaller machines). You will know when this happens because a very long SQL query will be output to the GeoNetwork log file prefixed with a cryptic message something along the lines of:

```
java.util.NoSuchElementException: Could not acquire  
feature:org.geotools.data.DataSourceException: Error Performing SQL query: SELECT .
```

In Linux the stack size can be changed using the ulimit command (ulimit -a typically shows you the current setting). You will need to choose a value and set it (eg. ulimit -s 262140) in the shell startup script of the postgres user (eg. .bashrc if using the bash shell). The setting may also need to be added to the postgres config - see “max_stack_depth” in the postgresql.conf file for your system. You may also have to enable to postgres user to change the stack size in */etc/security/limits.conf*. After this has been done, restart postgres.

8. **If you need to support a catalog with more than 1 million records** GeoNetwork creates a directory for each record that in turn contains a *public* and a *private* directory for holding attached data and thumbnails. These directories are in the GeoNetwork *data* directory - typically: *INSTALL_DIR/web/geonetwork/WEB-INF/data*. This can exhaust the number of inodes available in a Linux file system (you will often see misleading error reports saying that the filesystem is ‘out of space’ - even though the filesystem may have lots of freespace). Check this using *df -i*. Since inodes are allocated statically when the filesystem is created for most common filesystems (including extfs4), it is rather inconvenient to have to backup all your data and recreate the filesystem! So if you are planning a large catalog with over 1 million records, make sure that you create a filesystem on your machine with the number of inodes set to at least 5x (and to be safe 10x) the number of records you are expecting to hold and let GeoNetwork create its *data* directory on that filesystem.

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.

Access constraints Access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the resource

Abstract Brief narrative summary of the content of the resource(s)

Administrative area State, province of the location

Temporal extent - Begin date Formatted as 2007-09-12T15:00:00 (YYYY-MM-DDTHH:mm:ss)

Character set Full name of the character coding standard used for the metadata set

Grid spatial representation - Cell geometry Identification of grid data as point or cell

City City of the location

Reference System Info - Code Alphanumeric value identifying an instance in the namespace

Country Country of the physical address

Data quality info Provides overall assessment of quality of a resource(s)

Date Reference date and event used to describe it (YYYY-MM-DD)

Date stamp Date that the metadata was created (YYYY-MM-DDThh:mm:ss)

Date type Event used for reference date

Delivery point Address line for the location (as described in ISO 11180, annex A)

Equivalent scale - Denominator The number below the line in a vulgar fraction

Data Quality - Description Description of the event, including related parameters or tolerances

OnLine resource - Description Detailed text description of what the online resource is/does

Descriptive keywords Provides category keywords, their type, and reference source

Grid spatial representation - Dimension name Name of the axis i.e. row, column

Grid spatial representation - Dimension size Number of elements along the axis

Dimension size Resolution Number of elements along the axis

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

Geographic bounding box - East bound longitude Eastern-most coordinate of the limit of the dataset extent, expressed in longitude in decimal degrees (positive east)

Edition Version of the cited resource

Electronic mail address Address of the electronic mailbox of the responsible organisation or individual

Temporal extent - End date Formatted as 2007-09-12T15:00:00 (YYYY-MM-DDTHH:mm:ss)

Equivalent scale Level of detail expressed as the scale of a comparable hardcopy map or chart

Extent Information about spatial, vertical, and temporal extent

Facsimile Telephone number of a facsimile machine for the responsible organisation or individual

File identifier Unique identifier for this metadata file

Vector spatial representation - Geometric object type 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 - Resolution value Degree of detail in the grid dataset

Grid spatial representation - Transformation parameter availability Indication of whether or not parameters for transformation exists

Data Quality - Hierarchy level Hierarchical level of the data specified by the scope

Identification info Basic information about the resource(s) to which the metadata applies

Point of Contact - Individual name Name of the responsible person- surname, given name, title separated by a delimiter

Keyword Commonly used word(s) or formalised word(s) or phrase(s) used to describe the subject

Data Language Language used for documenting data

Metadata - Language Language used for documenting metadata

Data Quality - Lineage Non-quantitative quality information about the lineage of the data specified by the scope. Mandatory if report not provided

OnLine resource - Linkage Location (address) for on-line access using a Uniform Resource Locator address or similar addressing scheme such as <http://www.statkart.no/isotc211>

Maintenance and update frequency 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

Metadata standard name Name of the metadata standard (including profile name) used

Metadata standard version Version (profile) of the metadata standard used

OnLine resource - Name Name of the online resource

Geographic bounding box - North bound latitude Northern-most, coordinate of the limit of the dataset extent expressed in latitude in decimal degrees (positive north)

Grid spatial representation - Number of dimensions Number of independent spatial-temporal axes

Distribution Info - OnLine resource Information about online sources from which the resource can be obtained

Point of Contact - Organisation name Name of the responsible organisation

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 organisations(s) associated with the resource(s)

Point of contact - Position name 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 dataset-Data

Data Quality - Report Quantitative quality information for the data specified by the scope. Mandatory if lineage not provided

Grid spatial representation - Resolution value Degree of detail in the grid dataset

Point of contact - Role Function performed by the responsible party

Geographic bounding box - South bound latitude 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

Data Quality - Statement 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

Title Name by which the cited resource is known

Topic category code 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 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 - Transformation parameter availability 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 Unified Resource Locator

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 organisation or individual

Geographic bounding box - West bound longitude Western-most coordinate of the limit of the dataset extent, expressed in longitude in decimal degrees (positive east)

ISO Topic Categories

Iso Topic Categories and Keywords

Isotopic Category	Main Topic	Examples	Keywords
<i>Base Maps</i>	Base Maps, Scanned Maps, and Charts		Base Map
<i>Biota</i>	Biologic and Ecologic Information Flora and/or fauna in natural environment	wildlife, vegetation, biological sciences, ecology, wilderness, sea life, wetlands, habitat	
<i>Boundaries</i>	Administrative Legal land descriptions and Political Boundaries	political and administrative boundaries	Administrative boundaries,
<i>Climatology Meteorology Atmosphere</i>	cloud cover, weather, climate, atmospheric conditions, climate change, precipitation		<u>NDVI</u> , Drought, Floods
<i>Earth Cover</i>	Earth Surface Characteristics and Land Cover		Land Cover
<i>Economy</i>	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	
<i>Elevation</i>	Elevation and Derived Products, Height above or below sea level	altitude, bathymetry, digital elevation models, slope, derived products	Digital Elevation Model
<i>Environment</i>	Environmental Monitoring and Modelling, Environmental resources, protection and conservation	environmental pollution, waste storage and treatment, environmental impact assessment, monitoring environmental risk, nature reserves, landscape	
<i>Farming</i>	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
<i>Geoscientific Information</i>	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	
Health	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,
Imagery	Images and Photographs		
Imagery Base Maps Earth Cover	Base maps	land cover, topographic maps, imagery, unclassified images, annotations	
Inland Waters	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,
Intelligence Military	Military bases, structures, activities	barracks, training grounds, military transportation, information collection	
Location	Geodetic Networks Positional information and services and Control Points	addresses, geodetic networks, control points, postal zones and services, place names	Cartography
Oceans	Ocean and Estuarine Resources and Characteristics(excluding inland waters), Features and characteristics of salt water bodies	tides, tidal waves, coastal information, reefs	
Planning Cadastre	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	
Recreation	Tourism and Recreation		
Society	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
Structure	Facilities, Man-made construction, Buildings and Structures	buildings, museums, churches, factories, housing, monuments, shops, towers	
Transportation	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	
<i>Utilities Communication</i>	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	



Free and Open Source Software for Geospatial Information Systems

A range of related software packages can be used in addition to GeoNetwork opensource to deploy a full Spatial Data Infrastructure. These 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.

6.1 Web Map Server software

- [GeoServer](#) (All)
- [MapServer](#) (All)
- [MapGuide Open Source](#) (Windows & Linux)
- [Deegree](#) (All)

6.2 GIS Desktop software

- [GRASS](#) (All)
- [gvSIG](#) (All)
- [uDig](#) (All)
- [Quantum GIS](#) (All)
- [OSSIM](#) (Windows & OSX)

6.3 Web Map Viewer and Map Server Management

- [OpenLayers](#) (All)
- [MapBender](#) (All)

Note: All = The Windows, Linux and Mac OS X operating systems.

Frequently Asked Questions

This is a list of frequently encountered problems, suggestions that help to find the cause of the problem and possible solutions. The list is by no means exhaustive. Feel free to contribute by submitting new problems and their solutions to the developer mailinglist.

Note: <install directory> is a placeholder for the GeoNetwork installation directory.

<some file> should be read as some random file name.

Warning: Be very careful when issuing commands on the terminal! You can easily damage your operating system with no way back. If you are not familiar with using the terminal: **don't do it, contact an expert instead!** Make a backup of your data before you make any of the suggested changes below!

7.1 HTTP Status 400 Bad request

Check the availability and write permissions of the data and tmp directories.

See *The data and data/tmp directories*

7.2 Metadata insert fails

Inserting an XML or MEF file through the Metadata insert form fails silently. Verify if the data directory is available and writable.

See *The data and data/tmp directories*

7.3 Thumbnail insert fails

Nothing happens when inserting a thumbnail through the wizard in the metadata editor.

Error in your log file looks like:

```
HTTP Status 400 - Cannot build ServiceRequest Cause : <install directory>/data/tmp/<some
```

Then check *The data and data/tmp directories*

7.4 The data and data/tmp directories

On Linux or OS X systems verify from a terminal if the data directory is existing and is writable.

ls -la <install directory>/data

This should show the permissions on the data directory. For example:

```
total 0
drwxr-xr-x  6 tomcat  tomcat  204 19 jan 15:34 .
drwxr-xr-x  8 tomcat  tomcat  272 23 dec 19:30 ..
drwxr-xr-x 10 tomcat  tomcat  340 19 jan 15:47 00000-00099
drwxr-xr-x 21 tomcat  tomcat  714 23 dec 19:30 geoserver_data
drwxr-xr-x  3 tomcat  tomcat  102 23 dec 19:30 removed
drwxr-xr-x  3 tomcat  tomcat  102 19 jan 15:47 tmp
```

The above example shows that only the user tomcat has write access on the directories listed. All other users have read (and execute) rights only. See http://en.wikipedia.org/wiki/Filesystem_permissions for more details on file permissions.

Make sure your web server is running as user tomcat. Check this with the command:

ps aux | grep tomcat

You should see the processes that have tomcat in their description. Something like this:

```
bash-3.2# ps aux | grep tomcat
tomcat      22253    0,7  0,0  2435120    532 s000  S+   5:03pm   0:00.00 grep tomcat
tomcat      22251    0,0  1,9  2861960   80596 s000  S    5:03pm   0:03.85 /System/Library
```

If all is well, the user referred to at the start of this string (in this case tomcat) is the same user that has write permissions on the data and tmp directories.

You now have two possible solutions:

- Make the data and temporary directories writable to all users. You can change this using the command:

chmod -R a+w <install directory>/data

Your permissions should now look like this:

```
drwxrwxrwx  6 tomcat  tomcat  204 19 jan 15:34 .
etc..
```

Note: the 'w' refers to 'write' access

- The second solution is to ensure the user running the webserver is the same user that holds write access to the data directory (in this case tomcat). For this, you can (a) change the user running the process, or (b) change ownership of the directory using the chown command:

chown -R tomcat:tomcat <install directory>/data

Glossary

ebRIM Enterprise Business Registry Information Model..

CSW Catalog Service for the Web. The OGC Catalog Service defines common interfaces to discover, browse, and query metadata about data, services, and other potential resources.

ISO International Standards Organisation is an international-standard-setting body composed of representatives from various national standards organizations. <http://www.iso.org>

ISO TC211 ISO/TC 211 is a standard technical committee formed within ISO, tasked with covering the areas of digital geographic information (such as used by geographic information systems) and geomatics. It is responsible for preparation of a series of International Standards and Technical Specifications numbered in the range starting at 19101.

GeoNetwork GeoNetwork opensource is a standards based, Free and Open Source catalog application to manage spatially referenced resources through the web. <http://geonetwork-opensource.org>

GPL The GNU General Public License is a free, copyleft license for software and other kinds of works. GeoNetwork opensource is released under the GPL 2 license. <http://www.gnu.org/licenses/old-licenses/gpl-2.0.html>

Creative Commons GeoNetwork documentation is released under the Creative Commons Attribution-ShareAlike 3.0 Unported License. Find more information at <http://creativecommons.org/licenses/by-sa/3.0/>

XML Extensible Markup Language is a general-purpose specification for creating custom markup languages.

XSD XML Schema, published as a W3C recommendation in May 2001, is one of several XML schema languages. <http://en.wikipedia.org/wiki/XSD>

ebXML Enterprise Business XML.

DAO Data Access Object.

CRUD Create Read Update and Delete.

DB (or DBMS) A database management system (DBMS) is computer software that manages databases. DBMSes may use any of a variety of database models, such as the network model or relational model. In large systems, a DBMS allows users and other software to store and retrieve data in a structured way.

SOA Service Oriented Architecture provides methods for systems development and integration where systems package functionality as interoperable services. A SOA infrastructure allows different applications to exchange data with one another.

FGDC The Federal Geographic Data Committee (FGDC) is an interagency committee that promotes the coordinated development, use, sharing, and dissemination of geospatial data on a national basis in the USA. See <http://www.fgdc.gov>

JMS Java Messaging Service.

TDD Test Driven Development.

JIBX Binding XML to Java Code.

HQL Hibernate Query Language.

OO Object Oriented.

EJB Enterprise Java Beans.

SOAP Simple Object Access Protocol is a protocol specification for exchanging structured information in the implementation of Web Services in computer networks.

OGC Open Geospatial Consortium. A standards organization for geospatial information systems <http://www.opengeospatial.org>

OSGeo The Open Source Geospatial Foundation (OSGeo), is a non-profit non-governmental organization whose mission is to support and promote the collaborative development of open geospatial technologies and data. <http://www.osgeo.org>

FAO Food and Agriculture Organisation of the United Nations is a specialised agency of the United Nations that leads international efforts to defeat hunger. <http://www.fao.org>

WFP World Food Programme of the United Nations is the food aid branch of the United Nations, and the world's largest humanitarian organization. <http://www.wfp.org>

UNEP The UN Environment Programme (UNEP) coordinates United Nations environmental activities, assisting developing countries in implementing environmentally sound policies and encourages sustainable development through sound environmental practices. <http://www.unep.org>

OCHA United Nations Office for the Coordination of Humanitarian Affairs is designed to strengthen the UN's response to complex emergencies and natural disasters. <http://ochaonline.un.org/>

URL A Uniform Resource Locator specifies where an identified resource is available and the mechanism for retrieving it.

GAST GeoNetwork Administrator Survival Tool. A desktop application that allows administrators of a GeoNetwork catalog to perform a range of admin operations.

WebDAV Web-based Distributed Authoring and Versioning. WebDAV is a set of extensions to the Hypertext Transfer Protocol (HTTP) that allows users to edit and manage files collaboratively on remote World Wide Web servers.

OAI-PMH Open Archive Initiative Protocol for Metadata Harvesting. It is a protocol developed by the Open Archives Initiative. It is used to harvest (or collect) the metadata descriptions of the records in an archive so that services can be built using metadata from many archives.

WMS Web Map Service is a standard protocol for serving georeferenced map images over the Internet that are generated by a map server using data from a GIS database. The specification was developed and first published by the Open Geospatial Consortium in 1999.

WFS Web Feature Service provides an interface allowing requests for geographical features across the web using platform-independent calls. One can think of geographical features as the "source code" behind a map.

- WCS** Web Coverage Service provides an interface allowing requests for geographical coverages across the web using platform-independent calls. The coverages are objects (or images) in a geographical area
- WPS** Web Processing Service is designed to standardize the way that GIS calculations are made available to the Internet. WPS can describe any calculation (i.e. process) including all of its inputs and outputs, and trigger its execution as a Web Service.
- UUID** A Universally Unique Identifier (UUID) is an identifier standard used in software construction, standardized by the Open Software Foundation (OSF) as part of the Distributed Computing Environment (DCE).
- MAC address** Media Access Control address (MAC address) is a unique identifier assigned to most network adapters or network interface cards (NICs) by the manufacturer for identification, and used in the Media Access Control protocol sublayer. See also http://en.wikipedia.org/wiki/MAC_address on Wikipedia
- MEF** Metadata Exchange Format. An export format developed by the GeoNetwork community. More details can be found in this manual in Chapter Metadata Exchange Format.
- SKOS** The Simple Knowledge Organisation Systems (SKOS) is an area of work developing specifications and standards to support the use of knowledge organisation systems (KOS) such as thesauri, classification schemes. <http://www.w3.org/2004/02/skos/>
- Z39.50 protocol** Z39.50 is a client-server protocol for searching and retrieving information from remote computer databases. It is covered by ANSI/NISO standard Z39.50, and ISO standard 23950. The standard's maintenance agency is the Library of Congress.
- SMTP** Simple Mail Transfer Protocol is an Internet standard for electronic mail (e-mail) transmission across Internet Protocol (IP) networks.
- LDAP** Lightweight Directory Access Protocol is an application protocol for querying and modifying directory services running over TCP/IP.
- Shibboleth** The Shibboleth System is a standards based, open source software package for web single sign-on across or within organisational boundaries. It allows sites to make informed authorisation decisions for individual access of protected online resources in a privacy-preserving manner.
- DC** The Dublin Core metadata element set is a standard for cross-domain information resource description. It provides a simple and standardised set of conventions for describing things online in ways that make them easier to find.
- ESA** European Space Agency is an intergovernmental organisation dedicated to the exploration of space. <http://www.esa.int>
- FOSS** Free and Open Source Software, also F/OSS, FOSS, or FLOSS (free/libre/open source software) is software which is liberally licensed to grant the right of users to study, change, and improve its design through the availability of its source code. <http://en.wikipedia.org/wiki/FOSS>
- JDBC** The Java Database Connectivity (JDBC) API is the industry standard for database-independent connectivity between the Java programming language and a wide range of databases – SQL databases and other tabular data sources, such as spreadsheets or flat files. The JDBC API provides a call-level API for SQL-based database access. JDBC technology allows you to use the Java programming language to exploit “Write Once, Run Anywhere” capabilities for applications that require access to enterprise data. With a JDBC technology-enabled driver, you can connect all corporate data even in a heterogeneous environment.

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