
GET-IT Documentation

Release 1.3

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Welcome to GET-IT documentation!

The Geoinformation Enabling ToolKIT starterkit® (GET-IT) is an Open Source software for geospatial data and meta-data management. It allows the user to upload, store, visualize and share data on the Web through Open Geospatial Consortium (OGC) standard services. GET-IT users can manage traditional geographic data (layers, maps) and observations from sensors using simple web form accessible through a single graphic user interface (GUI). GET-IT also include EDI to create metadata according to international profiles (INSPIRE, RNDT, SensorML).

How To Use The Documentation

The documentation is geared toward three distinct types of users:

- **Users:** are people who log into GET-IT web form and use its functionalities.
- **Administrators:** are people who install and deploy GET-IT for their Users.
- **Developers:** are people who write code to add functionalities, integrate with other systems, fix bugs, and potentially help an Administrator to setup a server and deploy a GET-IT instance.

The documentation is divided into three sections:

- *About GET-IT:* a short presentation of GET-IT features and its functionalities.
- *Tutorials for users:* step-by-step instructions in workshop format that help different users to accomplish a set of tasks.
- *Publications by GET-IT team:* information about the project, how to contribute, links, resources, other info.

CHAPTER 2

Table of contents

It contains step-by-step tutorials that are oriented around performing particular sets of tasks, like adding data or publishing data, setting up and maintaining a server, or setting up a project to extend from GET-IT.

3.1 About GET-IT

GET-IT is a software package developed by SP7 researchers - working in different CNR Institutes - expert in Data infrastructure and geospatial services. The software was developed for RITMARE SP7 project. This documentation wants to help researchers to provide web services to share spatial and observation data following national and international standards. In particular the documentation is usefull for researcher team and/or institutes of RITMARE project that don't have an adequate data infrastructure.

The application was developed starting from open source packages with the addition of packages developed for project needs. It offers an interface for **data management, sharing, visualisation and** (optionaly) **download** through [OGC](#) standard web services for the following data categories:

1. **maps or layers** (spatial data). It permits to public and visualize spatial data (vector or raster). It use the web application GeoNode with customization for project needs. It provides the principal operations: upload data, data storing, styling and sharing data through standard services (WMS, WFS, WCS).
2. **observations** coming from different sensor types (buoys, glider, mooring, meteorological sensors, etc.). It uses an open-source solution based on Sensor Web Enablement (SWE) specifications, like implemented by 52° North (52N) project. It provides the operations to upload observation data, data storing and data management on a Data Base Management System, sharing observation on the web (through standard SOS interface).
3. **documents** (text files, spreadsheet, images, etc.).

One of the main function of GET-IT is the **metadata editing tool** named EDI that permits to create, edit and read metadata about uploaded data (spatial data, observation data and documents) to describe data in a national and international standard way (Repetorio Nazionale dei Dati Territoriali -RNDT-, INSPIRE and SensorML). Metadata (compiled by this tool) are improved in semantic to increase discovery operations.

GET-IT also permits to manage (for every data type uploaded) permission for registered users to:

- visualize
- edit
- download data

GET-IT is distributed with an open-source license ([GPL v.3.0](#)) and distributed through a ready to use virtual machine. After installation it provides a user friendly interface, the tools and services that compose a local infrastructure with above-mentioned features.

The About GET-IT section gives an overview of GET-IT and it is targeted at a non-technical audience to present its functionalities and its main work environment who just want to and will come back later to the complete documentation

The Tutorials section contains step-by-step instructions that are oriented around performing particular sets of tasks, like adding data or publishing maps, setting up and maintaining a server, or setting up a project to extend from GET-IT. These tutorials are written in a workshop like format and are broken into two groups:

4.1 Tutorials

4.1.1 Tutorials for users

4.1.1.1 Accounts and users

This section will guide you through account registration, updating your account information, and viewing other user accounts.

Learn how to [register and manage an account](#).

4.1.1.2 Managing layers

Read the [GeoNode](#) documentation to learn how to [manage layers](#).

4.1.1.2.1 Load layers from the back-office in a Docker environment

It is supposed the Starterkit stack has been already started and all containers are up and running. Let's imagine we want to load a shapefile already bundled as zip file, for example namely *ne_50m_admin_0_countries.zip*.

Move the layer to the GeoServer container

Use the following command from the machine where the Docker daemon is running:

```
docker cp ne_50m_admin_0_countries.zip geoserver4starterkit:/geoserver_data/data/data/
↳geonode/
```

Organize your layers in sub-folders

It is not mandatory but highly suggested to store your layers in different sub-folders each with the same name of the layer:

```
docker exec -it django4starterkit /bin/bash -c "/usr/bin/unzip -d /geoserver_data/
↳data/data/geonode/ne_50m_admin_0_countries /geoserver_data/data/data/geonode/ne_50m_
↳admin_0_countries.zip
```

Publish the layer in GeoServer

Login as administrator and perform the following operations:

```
- load the shapefile as new store in the `geonode` workspace to GeoServer
- publish the layer within the `geonode` workspace from the previously create store
- create a new style in the `geonode` workspace with the same name of that,
↳assigned to the layer
```

Run the updatelayers command

Run the following command from the machine where the Docker daemon is running:

```
docker exec -it django4starterkit /bin/bash -c "/usr/src/app/scripts/docker/misc/
↳docker_geonode_updatelayers.sh"
```

4.1.1.3 Managing observations

An Observation is an action whose result is an estimate of the value of some property of the feature-of-interest (i.e. station, animals or tissue), at a specific point in time, obtained using a specified procedure or sensor (After Cox 2008 cited by INSPIRE Cross Thematic Working Group on Observations & Measurements, 2011). An observation can be associated with a specific sensor that have collected the observation, it may be associated with metadata.

In this section, you will learn how to add new sensor info (metadata of the sensors), to upload new observations, and share these through specific web services: Sensor Observation Services (SOS).

In the GET-IT home page Sensor section is dedicated to managing observation and sensors, the figure below show the different interaction parts for managing observations and sensors.

Two tabs, **Explore SOS** and **Upload Observations**, are dedicated respectively to:

- show the list of the sensors within local repository and a link with sensor details in order to improve knowledge, provided in XML and in HTML (clicking on Sensor Details green button). More information in [How to create Sensors Metadata](#) or [How to check Sensors Metadata](#);
- upload observations by friendly user interface. More information in [How to upload Observations](#)

Two buttons, in the header, provides to register new sensor and get capabilities of the local Sensors Observations Services (SOS).

All the functionality making SWE pure requests.

The screenshot shows the GET-IT web application interface. At the top, there is a search bar and a navigation menu with options like HOME, LAYERS, SENSORS, DOCUMENTS, VIEWS, PEOPLE, SEARCH, and SERVICES. Below the navigation menu, there are two main buttons: 'EXPLORE SOS' and 'UPLOAD OBSERVATIONS'. The 'EXPLORE SOS' section is active, displaying two columns of information:

- Identification:**
 - Title: demo1.get-it.it
 - Abstract: None
 - Keywords: None
- Provider:**
 - Name: Alessandro Oggioni
 - Organization: None
- Sensors / Procedures:**
 - Number of sensors: 1
 - Name: None
 - descriptione
 - URL: http://sp7.irea.cnr.it/sensors/noSK/procedure/noManufacturerDeclared/noModelDeclared/noSerialNumberDeclared/20160308113618955_49008
 - Buttons: Sensor details, Upload observations, Delete sensor

4.1.1.3.1 How to create Sensors Metadata

In order to discover, integrate, and exploit sensor data (and also to preserve them for future needs), we need to accurately record sensor information.

The [Sensor Model Language \(SensorML\)](#) has been adopted by OGC for developing the SWE framework.

SensorML provides a definition language that supports all details of sensors and sensor-to-platform constellations.

Sensor meta-data creation has been performed by GET-IT metadata editor, called [EDI](#), which allows ease and friendly instrument registration (SensorML editing version v1.0 and v2.0) through graphical user interfaces (GUI) and auto completion facilities linked to vocabularies. Some sections of SensorML have been borrowed from the terms present in RDF, in order to harmonize and semantically enrich the metadata. In particular for the SensorML templates implemented in the EDI:

- Parameters: [P01](#) and [P02](#) NERC vocabularies or [EnvThes](#)
- Units of measure: [P06](#) NERC vocabulary or [EnvThes](#)
- Sensor types: [P07](#) NERC vocabulary
- Manufacturers: [FOAF \(Friends Of A Friend\)](#) graph version of [Esonet Yellow Pages](#).
- Operators, and owners: [FOAF \(Friends Of A Friend\)](#) graph. In this case the graph changed independently from the project to which it refers.

Within EDI template, implemented in GET_IT, we adopted the sensor profile suggested in the OGC document titled “[OGC® Best Practice for Sensor Web Enablement Lightweight SOS Profile for Stationary In-Situ Sensors](#). To be compliant to this profile every sensors will be modeled as a [PhysicalSystem](#) and the following metadata items are mandatory:

- gml:description - short textual description of the sensor or sensor system;
- gml:identifier - unique identifier of the sensor system.
- sml:keywords - terms which help to describe the sensor system and serve for discovery purposes;

- sml:identification - this element contains identifiers of the sensor system;
- sml:classification - this element contains classifiers for the sensor system;
- sml:contacts - this element contains contact information about the operator of the sensor;
- sml:featuresOfInterest - this element contains the real world entity, the feature of interest, which is observed by the sensor system. In case of this profile, the feature of interest is a station and modelled as a SamplingPoint;
- sml:outputs - the outputs of the sensors attached to the sensor system.

Within EDI user interface items in bold are the mandatory ones.

Before insert any observations is necessary to create SensorML by EDI template.

The figure below show the EDI user interface for OGC SensorML v2.0 Lightweight SOS Profile for Stationary In-Situ Sensors.

The screenshot shows the EDI user interface for OGC SensorML v2.0 Lightweight SOS Profile for Stationary In-Situ Sensors. The interface is divided into two main sections: 'Output signals' and 'Position Properties'. The 'Output signals' section includes fields for 'Date and time of phenomena', 'Output signals', 'Output signal', 'Unit of measurement', and 'Allowed values'. The 'Position Properties' section includes a 'Reference system' dropdown menu. A sidebar on the left contains navigation links for various metadata elements.

The video allows to have a idea about the interaction between user and EDI user interface.

4.1.1.3.2 How to check Sensors Metadata

4.1.1.3.3 How to upload Observations

For other options to insert real time (RT) or near real time (NRT) observations, within GET-IT, should be read the part of documentation about that insert observations.

4.1.1.4 Managing views

Views (also called maps) are comprised of various layers and their styles. Layers can be both local layers as well as remote layers either served from other WMS servers or by web service layers such as Google or MapQuest.

In this section, we'll create a view based on the layers uploaded in the previous section, combine them with some existing layers and a remote web service layer, and then share the resulting view for public viewing. You will also learn how to create standard metadata for views.

- Learn how to [manage views](#)
- Learn how to [manage metadata](#)

4.1.1.5 Managing metadata

Learn how to manage metadata.

Welcome to the GET-IT Users Tutorial documentation.

This tutorial documentation will teach how to use the [GET-IT](#) going in depth into what we can do with the software application. The available sections are:

1. *Accounts and users*: this section will guide you through account and users management. At the end of this section you will know how to register new accounts with different activity profiles, update your account information, and view other user accounts.
2. *Managing layers*: this section will guide you to create, delete, manage and share layers.
3. *Managing observations*: this section will guide you to register sensors and to create, delete, manage and share sensor observations.
4. *Managing views*: this section will guide you to create, delete, manage and share views (maps).
5. *Managing metadata*: this section will guide you to compile metadata for layers, sensors and views through the EDI metadata editor.

Prerequisites

Before proceeding with the reading, it is strongly recommended to be sure having clear the following concepts:

1. [GeoNode](#) basic concepts.
2. What is a geospatial server and a basic knowledge of the geospatial web services.
3. What is [Open Geospatial Consortium](#) (OGC) and its standards
4. What is a metadata and a catalog.
5. What is a map and a legend.
6. What is a sensor and a observation ([Sensor Observation System](#), OGC standard).

4.1.2 Tutorials for administrators

Welcome to the GET-IT Administrators Workshop!

scratch Learn how to install GET-IT from scratch step by step.

uninstall Learn how to uninstall GET-IT from terminal.

server Minimum server requirements.

advanced Advanced administration

security_issue Customize important setting for security.

domain_name Learn how to choose and change the domain name of your server.

bing_maps_issue Bing Maps Issue

The tutorials are based around performing tasks, like adding data or publishing maps. The tutorials are written in a workshop like format and are broken into two groups *Users* and *Administrators*.

Tutorials for users In the user workshop you will learn how to create an account on GET-IT, add layers, maps, sensors and observations to your account as well as publishing those.

Tutorials for administrators The administrator workshop will guide you through the installation and configuration of GET-IT, as well as explore further possibilities with GET-IT.

Publications by GET-IT team

The Activities by GET-IT team section scientifically summarize the history and the progression of GET-IT development. It contains links to papers, articles, use cases and the most updated materials produced by GET-IT team.

5.1 Publications by GET-IT team

Here is a list of publications and other activities of the GET-IT team.

5.1.1 Publications on Journals

- C.Fugazza, A. Oggioni, P. Carrara, “RITMARE: Linked Open Data for Italian Marine Research”, ERCIM-News (Issn: 0926-4981), No. 96 (January 2014), pp. 17-18, [Online] <http://ercim-news.ercim.eu/en96/special/ritmare-linked-open-data-for-italian-marine-research>
- F.Pavesi, A. Basoni, C. Fugazza, S. Menegon, A. Oggioni, M. Pepe, P. Tagliolato, P. Carrara, “EDI - A template-driven metadata editor for research data”, JORS, 2016, doi: 10.5334/jors.106
- C.Fugazza, M. Pepe, A. Oggioni, P. Tagliolato, F. Pavesi, and P. Carrara. “Describing geospatial assets in the web of data: A metadata management scenario”. ISPRS International Journal of Geo-Information, 5(12):229, 2016, doi: 10.3390/ijgi512022
- C.Fugazza, P. Tagliolato, L. Frigerio, and P. Carrara. Web-scale normalization of geospatial metadata based on semantics-aware data sources. ISPRS International Journal of Geo-Information, 2017, doi: 10.3390/ijgi6110354
- S.Lanucara, C. Fugazza, P. Tagliolato, and A. Oggioni. Information systems for precision agriculture: Monitoring computation of prescription maps. ERCIM News (Issn: 0926-4981), 2018(113), 2018.

5.1.2 International Conferences

- P.Carrara, A. Sarretta, A. Giorgetti, M. Ribera D’Alcalà, A. Oggioni, E. Partescano, “An interoperable infrastructure for the Italian Marine Research”, IMDIS 2013 (Int. Conf. on Marine Data and Information Systems), ISSN 0006-6729, Lucca (Italia), September 23-25, 2013, pp. 186-190

- M.Pepe, A. Basoni, M. Bastianini, C. Fugazza, S. Menegon, A. Oggioni, F. Pavesi, A. Sarretta, P. Carrara, “Bottom-up capacity building for data providers in RITMARE”, Geophysical Research Abstracts, Vol. 16, EGU2014-10536, 2014, EGU General Assembly 28-30 April 2014, ESS11.2, 30 April 2014
- C.Fugazza, A. Basoni, S. Menegon, A. Oggioni, F. Pavesi, M. Pepe, A. Sarretta, P. Carrara, “RITMARE: Semantics-aware Harmonisation of Data in Italian Marine Research, Current Research Information Systems 2014 (CRIS2014)”, Rome 13-15 May 2014, Proceedings published in Procedia Computer Science 33 (2014) 261 – 265, doi: 10.1016/j.procs.2014.06.041, available online at www.sciencedirect.com
- C.Fugazza, S. Menegon, A., Oggioni, F. Pavesi, M. Pepe, P. Carrara, “The RITMARE Starter Kit: Bottom-up capacity building for geospatial data providers”, ICSOFT 2014 (9th International Conference on Software Paradigm Trends), Vienna 29-31 August 2014
- A.Oggioni, A. Basoni, M. Bastianini, C. Fugazza, T. Kliment, S. Menegon, M. Pepe, P. Tagliolato, and P. Carrara. “Bottom-up capacity building for observations and measurements providers in RITMARE”. In 17th AGILE Conference on Geographic Information Science, 2014
- A.Basoni, M. Bastianini, C. Fugazza, S. Menegon, T. Minuzzo, A. Oggioni, F. Pavesi, M. Pepe, A. Sarretta, P. Tagliolato and P. Carrara, “Fostering bottom-up capacity in managing and sharing marine observations: the RITMARE StarterKit”, accepted at EuroGOOS 2014, Lisbon 28-30 October 2014 (poster session)
- A.Basoni, G. Bordogna, P. Carrara, L. Criscuolo, L. Frigerio, C. Fugazza, T. Kliment, S. Lella, S. Menegon, E. Mangioni, A. Oggioni, F. Pavesi, M. Pepe, A. Rampini, S. Sterlacchini, and P. Tagliolato. “Personalization and contextualization of access to spatial data infrastructures”. In Convegno Nazionale “GIT- Geosciences and Information Technology”. GIT - Gruppo di Geologia Informatica, 2014.
- A.Oggioni, A. Basoni, M. Bastianini, C. Fugazza, S. Menegon, F. Pavesi, M. Pepe, A. Sarretta, P. Carrara, “Lo StarterKit RITMARE: uno strumento abilitante per la costruzione bottom-up di un’infrastruttura di dati marini”. 18a Conf. Naz. ASITA, Firenze 14-16 ottobre 2014, pp. 921-922, ISBN 978-88-903132-9-5
- P.Tagliolato, A. Oggioni, T. Kliment, P. Carrara, Ambienti di processing per la ricerca ecologica: bisogni e soluzioni, in Atti della Conferenza ASITA 2014, Firenze, 14-16 ottobre 2014, pp. 1157-1158. ISBN: 978-88-903132-9-5.
- M.Bastianini, F. Bernardi Aubry, F. Bianchi, A. Boldrin, E. Camatti, P. Carrara, A. Delazzari, S. Guerzoni, S. Menegon, A. Oggioni, A. Pugnetti, A. Sarretta, G. Socal, P. Tagliolato, A. Vianello, “The LTER site Gulf of Venice and the project RITMARE: a case study for the recovery, search, view and sharing of long term ecological marine research data”, XXII AIOL Congress [online] <http://aioltesoreria.altervista.org/joomla/depliant-xxii-congresso?download=476:volume-dei-riassunti>
- A.Oggioni, P. Tagliolato, C. Fugazza, I. Rosati, L. Criscuolo, P. Carrara, “On the opportunity of exploiting open Geospatial standard for biotic data management,” in 13th European Ecological Federation (EEF), 2015.
- C.Fugazza, M. Pepe, A. Oggioni, P. Tagliolato, F. Pavesi, A. Basoni, S. Menegon, and P. Carrara. “Ottimizzare i metadati geospaziali per il web semantico”. In Atti XIX Conferenza Nazionale ASITA, 29 Settembre-1 Ottobre 2015, Lecco, Italia, pp. 971–972, 2015. ISBN: 978-88-941232-2-7
- M.Pepe, A. Oggioni, C. Fugazza, P. Tagliolato, F. Pavesi, A. Basoni, M. Bastianini, S. Menegon, and P. Carrara. “Metadati di sensori: esemplari tipo precompilati ed editing assistito per generare sensorml corretti”. In Atti XIX Conferenza Nazionale ASITA, 29 Settembre-1 Ottobre 2015, Lecco, Italia, pp. 661–662, 2015. ISBN: 978-88-941232-2-7
- A.Oggioni, P. Tagliolato, C. Fugazza, M. Bastianini, F. Pavesi, M. Pepe, S. Menegon, A. Basoni, and P. Carrara. ”Assisted editing of sensorml with edi. a bottom-up scenario towards the definition of sensor profiles”. In EGU General Assembly Conference Abstracts, volume 17, page 13828, 2015. [online] <http://meetingorganizer.copernicus.org/EGU2015/EGU2015-13828-3.pdf>
- C.Fugazza, M. Pepe, A. Oggioni, P. Tagliolato, P. Carrara, 2016, “Streamlining geospatial metadata in the Semantic Web”. IOP Conference Series: Earth and Environmental Science, 34(1), 12009. doi:10.1088/1755-1315/34/1/012009

- A.Oggioni, P. Tagliolato, and F. Pavesi. “Ready, steady, go! bringing CS observations to interoperability standards. The adapter approach (and inaturalist)”. In Book of Abstract of the First ECSA Conference 2016, Berlin, May, 19-21 2016, p. 37. European Citizen Science Association. [Online] http://www.ecsa2016.eu/assets/book_of_abstracts_ecsa2016.pdf
- A.Oggioni, P. Tagliolato, K. Schleidt, P. Carrara, S. Grellet, and A. Sarretta. “Biodiversity data interoperability issues: on the opportunity of exploiting o&m for biotic data management”. In American Geophysical Union, Ocean Sciences Meeting 2016, abstract #OD34A-2487, 2016.[Online] <http://adsabs.harvard.edu/abs/2016AGUOSOD34A2487O>
- P.Tagliolato, A. Oggioni, C. Fugazza, M. Pepe, P. Carrara, 2016, “Sensor metadata blueprints and computer-aided editing for disciplined SensorML”. IOP Conference Series: Earth and Environmental Science, 34(1), 12036. doi:10.1088/1755-1315/34/1/012036
- P.Tagliolato, A. Oggioni, C. Fugazza, M. Pepe and P. Cararra, “Supporting provision of sensor metadata through multi-tenanted management of SensorML documents”, INSPIRE Conference 2016, Barcelona, 26-30 September 2016
- C.Fugazza, M. Pepe, A. Oggioni, P. Tagliolato and P. Carrara, “Streamlining INSPIRE metadata for the Semantic Web”, INSPIRE Conference 2016, Barcelona, 26-30 September 2016.
- S.Grellet, M. Beaufiles, K. Schleidt, A. Sarretta, P. Tagliolato, S. Jirka, A. Oggioni, J. M. R. Iglesias, and A. Kotsev. Workshop: Integration of o&m data in the inspire sdi-benefits, challenges and prospects. In INSPIRE Conference 2017, 2017. [Online] https://inspire.ec.europa.eu/events/conferences/inspire_2017/submissions/199.doc
- M.Zilioli, S. Lanucara, A. Oggioni and P. Carrara “Need Help? Designing and Implementing the RITMARE Help Desk to Support Research Data Management” Data Infrastructures for Open Science - Research Data Alliance Plenary 2017, Barcellona- Poster session
- M.Zilioli, S. Lanucara, A. Oggioni and P. Carrara , “A Help Desk to support Data Sharing in Environmental Research Communities” - From Science to Society: the Bridge provided by Environmental Informatics - EnviroInfo 2017, Proceedings (2017) ISSN 1616-0886
- S.Lanucara, M. Zilioli, A. Oggioni and P. Carrara “GET-IT, a software suite for easy, interoperable sharing of ecological data in the Long Term Ecological Research Network” - From Science to Society: the Bridge provided by Environmental Informatics - EnviroInfo 2017, Proceedings (2017) ISSN 1616-0886

5.1.3 Books

- A.Oggioni, P. Tagliolato, C. Fugazza, M. Pepe, S. Menegon, F. Pavesi, and P. Carrara, “Interoperability in marine sensor networks through SWE services,” in Oceanographic and Marine Cross-Domain Data Management for Sustainable Development, P. Diviacco, A. Leadbetter, and H. Graves, Eds. Hershey: IGI Global, 2017, p. in press.

5.1.4 IPR Protection of the suite software GET-IT

Action to protect IPR (Intellectual Property Rights) of the developers of the suite software GET-IT Starter Kit within the Italian flagship project RITMARE.

A trademark application request has been submitted on May 2015 to the Italian Patent and Trademark Office (UIB) to protect the Intellectual Property Right of the suite software developed during the RITMARE project, enabling researchers to create their services to disseminate observed and geographical data (and their metadata) in spatial data infrastructures compliant with OGC standards. The name registred is: GET-IT Geoinformation Enabling Toolkit Starter Kit.

CHAPTER 6

Need Help?

Having trouble? Can't find what you are looking for? We'd like to help!

- Write us an email to: infogetitsk@gmail.com
- Report bugs in GET-IT in our [ticket tracker](#).