

# Reportnet

# Introduction to environmental reporting using Reportnet

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# **Document History**

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## 1 Introduction

#### 1.1 Background

The reporting of environmental data and information, agreed between the EU or regional and international bodies and countries, has a history of more than 40 years. Already back in the 1970's, it was agreed that wetlands should be conserved and wisely used in order to maintain the ecological character of "Wetlands of International Importance". This resulted in the Convention on Wetlands (Ramsar, Iran, 1971) called the "Ramsar Convention" 1971. Following the 2nd Meeting of the Conference of the Contracting Parties, the recommendation 2.1 (1984) urged Parties to submit detailed National Reports to the Secretariat at least six months before each ordinary meeting of the Conference, and this tradition has continued unbroken to this day.

In the following years, numerous reporting obligations were established involving a great variety of national, regional and international institutions. The related reporting procedures are usually complex, making it difficult for both countries and institutions to know exactly what the obligations are, when the deadlines fall and in which formats the data and information should be submitted. It became more and more difficult to have an up-to-date overview of the requirements and the deliveries. In some cases duplicate work was being carried out to satisfy similar obligations.

In order to assist member countries in their data reporting tasks, the European Environment Agency (EEA) has developed an infrastructure for supporting and improving the environmental data and information flows. This reporting platform is referred to as Reportnet (https://www.eionet.europa.eu/reportnet). Reportnet was initially used for reporting environmental data to the EEA, but now also hosts some of the reporting tasks of DG Environment and other regional and international organisations (e.g. United Nations Economic Commission for Europe, UNECE). The open system permits deliveries to various national, regional and international organisations in a very transparent way.

This document builds on the earlier documents "Reportnet for beginners" (2008) and "Intro to Reportnet – ENPI" (2013) and presents a general introduction to Reportnet in view of the environmental reporting process.

#### 1.2 Roles and actors

The main body when it comes to environmental reporting in the context of Reportnet is the European Environment Information and Observation Network (**Eionet**), which is a partnership network of the **European Environment Agency** (EEA) and its member and cooperating countries. It consists of the EEA itself, six **European Topic Centres** (ETCs) and a network of around 1000 experts from 39 countries in up to 400 national bodies dealing with environmental information. These experts are the **National Focal Points** (NFPs) and the **National Reference Centres** (NRCs).

#### 1.2.1 European Environment Agency

The European Environment Agency (EEA) is an agency of the European Union whose task is to provide sound, independent information on the environment. The EEA's mandate is to help the Community and member countries make informed decisions about improving the environment, and to coordinate the European environment information and observation network (Eionet).

#### 1.2.2 European Topic Centres

The European Topic Centres (ETCs) are centres of thematic expertise contracted by the

EEA to undertake specific tasks identified in the EEA work programme. Naturally the ETCs play an important role in the data reporting process, often with a strong emphasis on the quality analysis of delivered data.

#### 1.2.3 National Focal Points

The National Focal Points (NFPs) are the main contact points for the EEA in the member countries. They are in charge of cooperation with the EEA and the ETCs and organise the national coordination of activities. NFPs maintain and develop the national network and coordinate requests and deliveries between the national and the EU level. In terms of Eionet data flows, NFPs sometimes submit the requested data, acting hence as the national data provider. However, the actual delivery of data is often delegated to the National Reference Centres (NRCs).

#### 1.2.4 National Reference Centres

National Reference Centres (NRCs) are nationally appointed experts, which are providers of environmental data to the European and international level. Like NFPs, the activities of NRCs are funded by member countries. NRCs are established in specific environmental areas.

# 2 The reporting process

#### 2.1 Overview

To establish foundation for understanding how the Reportnet platform enables the process of reporting and dissemination of environmental information, it is useful to first look at this process seen from the perspective of Reportnet. To illustrate this view, Figure 1: Reporting process shows a breakdown of the process into a set of high-level activities.



Figure 1: Reporting process

# 2.2 Define reporting requirements

In a larger view, this activity can be seen as the long process of drafting the legal directives and implementing regulations, although from the perspective of Reportnet it is rather about transferring these legal texts into concrete specifications that can be implemented in the different Reportnet components to facilitate the reporting.

Responsible for transferring this information, often laid out in an implementing regulation or directive, into concrete specifications that can be implemented in Reportnet is the EEA in cooperation with the relevant ETC and European Commission Directorate-General.

The main questions that this activity needs to provide answers for are:

- 1. Who needs to report?
- 2. When is the report due?
- 3. To whom should it be reported?
- 4. Who are the reporters nominated to facilitate the actual reporting?

- 5. What is the specification of the information to report, looking at the fields and their potential values? What reference data should be used for code lists?
- 6. What is the process to ensure high quality reports? Where in the reporting workflow does quality control need to take place, and what is the definition of those rules?

The main Reportnet modules supporting this step are the Reporting Obligations Database, the Data Dictionary and the Eionet Directory.

### 2.3 Implement delivery mechanism

With the requirements defined, the next step is to implement those in the respective Reportnet components. Reportnet is agnostic to the format of the information delivered in the sense it allows delivery in any file format. When the contents of the reports have to be automatically processed, for example to perform quality control or to produce a European dataset, the underlying format needs to be XML though. While exchanging information in XML-format is a widely used practice, the nature of the reporting obligation and the capability of the reporting entities can sometimes lead to that supplementary tools are provided for the practical reporting. Such tools commonly provided are web questionnaires and Excel templates. Abstracted away from the reporter is the fact that these tools themselves, or using a conversion service, generate the XML required.

Given most reporting obligations consist of structured information that should be automatically processed, the first task is often to design an XML-schema. This schema has a dual use, for the reporting entity it provides a detailed specification of the data to report, and in Reportnet it allows for assessing that the reports delivered follows the specification. Next other activities follow; the data model definition for the European dataset, reference data code-lists are produced, an eventual supplementary reporting tool is produced, a reporting workflow to steer the reporter through the process is set up, quality control rules are implemented and set to run at desired stages of the workflow, and finally a guidance document for the reporting is produced.

Stakeholders involved in this step are mainly the EEA business- and IT project managers, the ETC, and EEA contractors for IT. The main Reportnet modules supporting this step are the Data Dictionary, the Central Data Repository and the QA and conversion service.

### 2.4 Collect & quality control data

As soon as the reporting opens, the reporters can begin deliver their data. The general procedure is that, following the steps in the reporting guide, they take their prepared delivery, access the Central Data Repository Reportnet component, upload their data and submit it to the EEA. Upon submitting the data the automatic quality control is initiated, and the reporter is then presented with feedback from the tests. Depending on the outcome, the reporter can either finish their delivery successfully, or in case of quality issues, restart the workflow by uploading a corrected delivery. With the different reporting obligations having different needs, this workflow can be customised to a large extent. Common variations are on the quality level threshold for accepting a delivery, and inserting a manual feedback step where the ETC can review the delivery more carefully before the reporter can finish the reporting.

Stakeholders involved in this step are mainly the NRCs and NFPs performing the reporting, the EEA project manager and the ETC overseeing the process and quality control. Questions arising from the reporters are handled by the Eionet helpdesk or a specialised helpdesk for the reporting obligation. The main Reportnet modules supporting this step are the Central Data Repository and the QA and conversion service.

#### 2.5 Create European dataset

If the previous steps in the reporting process have been successfully completed, there will be a delivery of data, with the quality level mandated, from each country uploaded and available on Reportnet. Due to the transparent nature of Reportnet, these deliveries are generally available for all interested parties unless the reporter has explicitly chosen to make it hidden, except to the required stakeholders. Still, most assessments and information products produced from these deliveries are built upon a dataset containing an aggregation of the deliveries into a European dataset, which also is a product of its own. Therefore the main task in this process step is collecting the respective delivery in Reportnet and transforming those into a database.

Stakeholders involved in this step are mainly the EEA IT-department in co-operation with its contractors. The main Reportnet components supporting this step are Central Data Repository and the Common Workspace.

#### 2.6 Create and disseminate data products

In a closer look, this activity is in fact many activities spread over time that originates from the availability of high quality data dataset produced by the reporting process outlined above. In the more immediate perspective, one of the key products is the analysis of the data, often provided by the EEA and its ETCs, for the institution having requested the reporting obligation. Other products that follow could be policy evaluation reports, indicators, maps and data visualisations.

As indicated in the diagram Figure 1: Reporting process, the creation and dissemination of the diverse set of products that are built upon these datasets is not part of the Reportnet platform. Instead a variety of tools are used depending on the type of product to be produced. Generally, and unless it contains restricted information, the product is published on the <a href="EEA data and maps">EEA data and maps</a> (http://www.eea.europa.eu/data-and-maps) website.

# 3 Reportnet

#### 3.1 Overview

Reportnet the Eionet infrastructure for supporting, improving and streamlining environmental data and information flows. Technically, a number of independent components, each providing its distinct functionality, together form what is referred to as the Reportnet platform. The founding principles for the design of these components and their interaction are service orientation and the use of web technology. Service orientation enables the different components to be updated or replaced independently, ensuring cost effectiveness and continuity of the service as new technologies and demands need to be incorporated. The use of web technology provides for a highly interactive user experience on any web-enabled device without the need to install any application.

The development of Reportnet started in 2000 and it has been operational since 2002. All tools and interfaces of Reportnet are in English. It was initially used for reporting environmental data to the EEA, but as mentioned previously now also hosts some of the reporting tasks of DG Environment and other regional and international organisations. Reportnet aim to improve the harmonisation and standardisation of the management of all Eionet data flows by covering all activities inside them.

The following sections will cover the different Reportnet components in more detail.

#### 3.2 Reporting Obligations Database (ROD)

The Reporting Obligations Database (http://rod.eionet.europa.eu) holds information on legal and moral environmental reporting obligations that countries have agreed to in the framework of EU legislation, regional and international bodies. It is maintained by the EEA and makes information on the around 400 reporting obligations available to the relevant stakeholders, providing them with easy access to information on who needs to report what, when and to whom.

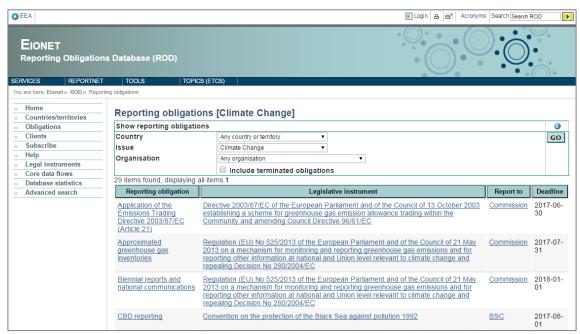


Figure 2: Reporting Obligations Database

ROD holds obligations for institutions such as UNECE (e.g. CLRTAP), UNEP/MAP (i.e. Barcelona Convention), other relevant conventions (e.g. CBD, UNFCCC), Eurostat, OECD, as well as the EEA itself (e.g. WISE-SoE). Reporting obligations contain links to the official documents describing how the obligations are to be fulfilled.

## 3.3 Data Dictionary (DD)

The Data Dictionary (http://dd.eionet.europa.eu) supports the production and publishing of detailed specifications for the data to be submitted under the different reporting obligations. In more detail, this includes the specification of fields and data types in different tables that make up datasets, and also the reference data set as allowed values for fields. Such reference data can be common vocabularies like the Eurostat NUTS codes, or more specific ones like E-PRTR activities. The possibility to re-use vocabularies across different data flows is one of ways that DD and Reportnet can support the harmonisation of data flows.

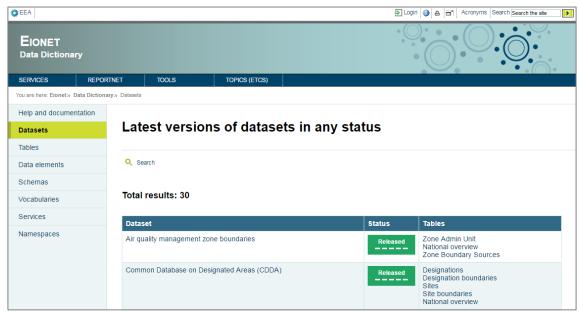


Figure 3: Data Dictionary

With the data specifications defined in DD, it can automatically produce XML-schemas and data reporting templates, for example in Excel-format. Data Dictionary follows the common standards, technologies and recommendations in data semantics field as much as concrete business needs make it possible. The main standard of those is ISO 11179.

#### 3.4 Central Data Repository (CDR)

The <u>Central Data Repository</u> (http://cdr.eionet.europa.eu) is the main component the reporter will interact with during their reporting process. It provides a web interface for guiding the reporter through the reporting workflow, with key steps such as uploading files and presenting quality control feedback. Due to the different characteristics of the different reporting obligations, as previously mentioned, a tailored workflow can be configured for each. These workflow configurations often refer to how and when quality control and formal acceptance is done. Since many reporting obligations require the reporter to provide more than one file, each delivery is organised into a folder ("envelope"). These folders are further organised in parent folders ("collections"), that builds up a structure from the delivery to the reporting obligation, and at the top to the country.



Figure 4: Central Data Repository

Besides supporting the reporting process itself, CDR also acts as a catalogue of data and reports delivered by the countries and related metadata. The catalogue can be the reports are made available to the institution having requested the reporting obligation (e.g. EEA, DG Environment, UNECE, UNEP/MAP), but also to the public. Services helpful to these users include search functionality to find reports based on parameters such as country and reporting obligation, as well as automatic conversions of the reports into different formats for easier viewing (e.g. Excel). Under some reporting obligations the designated reporting entities are not the countries themselves, but instead different companies that need to report directly, e.g. companies reporting on their production and import/export of ozone depleting substances. Due to issues around competitive advantages and similar factors, such reporting is often confidential in nature. CDR therefore have a sibling component called Business Data Repository (BDR), which is designed to meet these demands for confidentiality.

#### 3.5 Web Questionnaires service (WebQ)

The Web Questionnaires service (http://webforms.eionet.europa.eu) provides the reporters with a user-friendly web questionnaire for filling out the information requested by the reporting obligation. These questionnaires are seamlessly integrated in the CDR reporting workflow, meaning instead of uploading files, the reporter is transferred to the questionnaire, which the reporter can save and return to later as many times as required. Behind the scenes the questionnaire produces the XML-file directly in the reporter's envelope as requested for further processing (e.g. additional quality control and the production a European dataset).

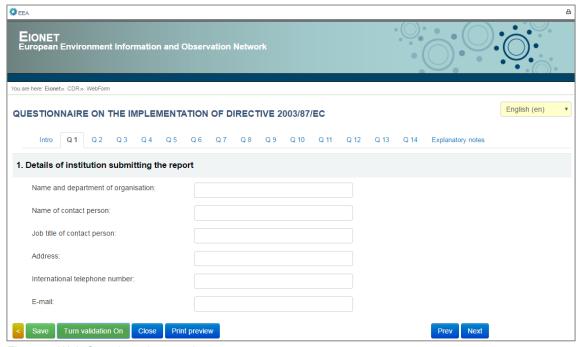


Figure 5: Web Questionnaires service

The Web Questionnaires service also allows for any stakeholder to access the questionnaires directly, without being a nominated reporter and going through the reporting workflow on CDR, then saving the filled in questionnaire on their own computer. This has proven helpful in situations where regional authorities can provide their respective information, which the national reporter then can assemble into the final delivery from the country.

### 3.6 Quality Assessment and Conversion service (XMLCONV)

The Quality Assessment and Conversion service (http://converters.eionet.europa.eu) provides the reporting workflow with services for quality control and conversion of reports between different formats (e.g. XML to Excel). At its base is a registry that holds all quality control- and conversion scripts and their relation to the respective reporting obligations. In order to execute these scripts it has a number of quality control- and conversion engines built in, but can also call other services to perform the job.

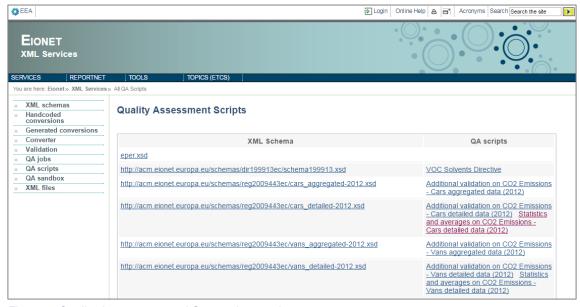


Figure 6: Quality Assessment and Conversion service

This component mainly acts as a service that other components call to utilise its services, e.g. during the reporting workflow CDR will call this service to run quality control of the delivery, receive the feedback, and present it to the reporter. So similarly to the Web questionnaires, this service is largely transparent to the reporter, although it has a web user interface where any stakeholder can run a conversion or quality control of a file without being a nominated reporter or going through the reporting workflow on CDR.

### 3.7 Common Workspace

Indicated by its name, the Common Workspace is not so much a typical Reportnet component, but a working space for the tasks of manual quality control and aggregation of all deliveries made for a reporting obligation into a European dataset. To facilitate these tasks, it is made up of three main tools – a database, a data processing tool, and a data visualisation and analysis tool. For each reporting obligation that requires data processing, a job will be implemented that collects all related deliveries from CDR, transforms them and inserts them into the database together with metadata such as when the report was submitted. Using the data visualisation and analysis tool, manual quality control be then be performed on the report data added in the database. When the reporting is completed, the data processing tool is used to harmonise the reports, adjusting number formats for example, and then assemble the European dataset.

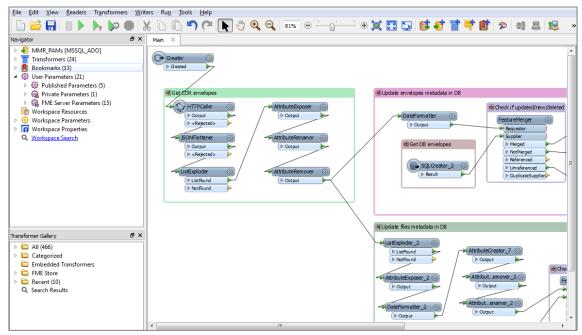


Figure 7: Common Workspace data processing

#### 3.8 Eionet Directory

The <u>Eionet Directory</u> (http://directory.eionet.europa.eu) is an authentication mechanism and catalogue that holds all user accounts ("Eionet accounts") and the roles assigned to each user within the Eionet network. With the Eionet account a user can access different services within Reportnet and other systems. One such example is when a person is nominated to deliver data under a reporting obligation, they will receive an Eionet account (if one doesn't exist already) and will be assigned the reporter role for this reporting obligation and country in the Eionet Directory. With the account and role set up, the reporter can login to the different Reportnet components (e.g. CDR) in order to perform their task.

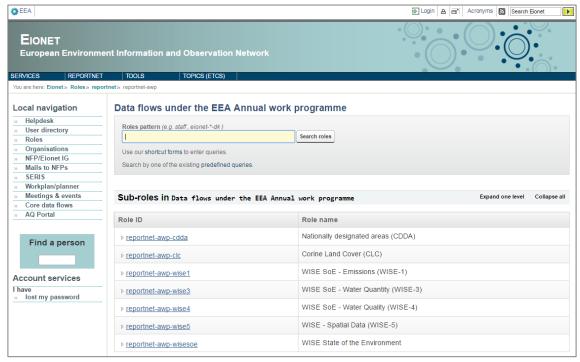


Figure 8: Eionet Directory

Part of each user account is an email address registered, which enables the account to be used also for communication in different forums within the Eionet network, as well as subscribing to notifications on different events from the Unified Notification Service. The directory maps the organisational structure of Eionet by linking national organisations with user accounts and by using the concept of the said roles. For example, there is a role named "Eionet" which contains all official nominated persons in Eionet groups such as NFPs, NRCs, and ETCs etc. The roles also function as mailing lists, with each role having its own email address. For finding out what roles exist and the users manning each role, the Eionet directory provides a search interface where this information can be queried.

The national level of the Eionet network consists first and foremost of a National Focal Point (NFP) who is an expert or group of experts nominated and funded by the country and authorised to be the main contact point for the EEA. The NFPs coordinate the national networks. The national network inter alia includes the experts or groups of experts in national organisations which are regular collectors or suppliers of environmental data and information at the national level and/or possess relevant knowledge of specific environmental issues, monitoring or modelling. These experts are nominated and funded by the country to work with the EEA in specific thematic areas particularly those relating to EU policy. In the Eionet context, these thematic experts are the NRCs.

# 3.9 Unified Notification System (UNS)

The <u>Unified Notification System</u> (http://uns.eionet.europa.eu) is a notification service where users registered in the Eionet Directory can subscribe to receive notifications for events in Reportnet and other connected systems. Such events might be on approaching deadlines from ROD, that a new report has been delivered in CDR for a certain reporting obligation, or news from the Eionet topic centres.

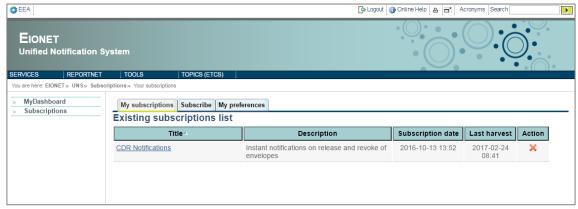


Figure 9: Unified Notification System

## 3.10 Content Registry (CR)

The <u>Content Registry</u> (http://cr.eionet.europa.eu) is a more advanced search engine for the Eionet content compared to the search interfaces many of the Reportnet components provides themselves. It is more advanced in the sense that it understands what for example a measuring station is, and can then show what measurements it has made. To facilitate this, underneath the surface the Content Registry uses linked data, often seen as a part of what is referred to as the Semantic Web, which is essentially a way to connect data across the web with meaningful relationships.

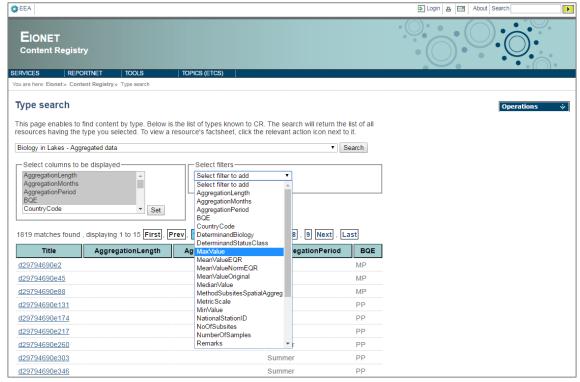


Figure 10: Content Registry