

# Appendix D Guidelines for using the Reference Model

## Introduction

The development of the ENVRI Reference Model provides the ESFRI Environmental Research Infrastructures with a common ontological framework for description and characterisation of computational and storage infrastructures, and provides them a community standard to help achieve greater levels of interoperability between their heterogeneous resources.

The Reference Model defines a conceptual model that captures computational requirements and state-of-the-art design experiences. In a sense, the model reveals a snapshot of the existing landscape of the ESFRI environmental science research infrastructures at a high level of abstraction.

In order to help Reference Model users map the abstraction to concretions, so as to better apply the knowledge in their daily practices, we prepare this guideline that introduces our own experiments with the Reference Model, and in doing so reveal the principles of usage. These principles are neither bound nor enforced. They are not mandatory for users to follow. The intention is to provide users with a way of thinking, which may lead to exploration of the model itself and inspire the discovery of various way of using the model.

Rather than going through each model term and explaining the meaning of it, we use a set of practical examples, each of them illustrating some aspects of the usage of the reference model as well as introducing a number of model concepts.

Initially, examples are selected with the aim to serve **Intended Audience** within the community of ESFRI Environmental Research Infrastructures. We use scenarios that are familiar to our users, and include information that may be of interest to the community and perhaps benefit their work.

To collect these examples, we used a template with 5 questions:

1. What is this use case about? *Describe the purpose of the use case, and any background information.*
2. How can the reference model be used in this use case?
3. What are the results of using the reference model? *Evidence of usefulness/utility.*
4. What are the benefits of using the reference model? *Demonstrate specific cases of things that could not have been achieved without the RM.*
5. Are there any problems with using the reference model in this use case? *Feedback from users.*

These questions proved to be helpful in organising investigation activities. We encourage readers also to use this template to structure newly developed stories and share them with us so as to inspire others.

With limited resources, only few examples are included; these will be extended when more resources are available for future investigations.

## How to Use the Guideline

A collection of examples demonstrating usage of the ENVRI Reference Model is given below. Different examples may serve different purposes. Some of them merely illustrate a different way of using the reference model (e.g., Example 5), while others also intend to introduce model concepts where many terms are highlighted with clickable links. Please click those highlighted concepts that will re-locate you to the related definitions and specifications in the Reference Model. Be sure to go through all terms marked with  -- some of them, though repeated, will guide you to a different part of the model. By visiting all linked contents, you will have explored 90% of the most important model content. (Note, terms marked with  are also model concepts which link to content you might have visited before.)

## Examples of Using the Reference Model

[Example 1: Using the Reference Model to Guide Research Activities \(EISCAT 3D - EGI\)](#)

[Example 2: Using the Reference Model as an Analysis Tool \(EUDAT\)](#)

[Example 3: Using the Reference Model in documentation \(EMSO\)](#)

[Example 4: Using the Reference Model as design reference \(EPOS\)](#)

[Example 5: Using the Reference Model to drive implementations of common services \(WP4 practices\)](#)

## Conclusions

Using a number of examples, we have shown that by using the Reference Model, a ESFRI ENV RI could benefit from:

- **A set of ready-to-use terminology with a publicly-accessible reference base**, which can be used to describe requirements and architectural features of an infrastructure, and serve as a common language in communication materials; in particular, with an external community without any specific knowledge of the scientific domain being addressed.
- **A uniform framework with well-defined subsystems** of components specified from different complementary viewpoints (Science, Information and Computation), which promotes structural thinking in constructions of system architectures, and can be used as a research tool for comparison and analysis of heterogeneous infrastructures.
- **A knowledge base capturing existing requirements and state-of-the-art design experiences.** The information provided can be referred to in various system analysis tasks, to guide design and implementation activities, and to drive the development of common services.

When future resources become available, we will conduct more investigations, including:

- We will assist our users to get hand on the Reference Model and exploit new ways of using it.
- We will assist the development of the common services.
- We will use the Reference Model to bridge ESFRI ENV RIs with external communities (such as, RDA), projects (such as, GEOSS, DataOne, EUDAT and EGI), and standards (such as, INSPIRE, OGC, and the Digital Library Reference Model). These will provide ESFRI ENV RIs an overview of related technologies, and possible solutions for the integrations.
- We also have a plan to experiment with the Reference Model as a guide to train the next generation data scientists.

## Tutorials

- ENVRI Reference Model: an Overview. [[.pptx](#)]
- Main Processes of the ENVRI Reference Model – Corresponding Viewpoint [[.pptx](#)]