



**e•nventory**

The European  
eInfrastructures  
Observatory  
[www.enventory.eu](http://www.enventory.eu)

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Research Infrastructures  
e•nventory - European eInfrastructures Observatory  
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## Deliverable D4.1

### Indicators visualisation and representation modelling and techniques

**Abstract:** Deliverable D4.1 “Indicators visualisation and representation modelling and techniques” compiles and describes several information visualisation and representation techniques for data indicators, in accordance with reference/good examples implemented internationally. Although primarily a “technical” deliverable, it is meant to assist the e•nventory consultation activities with a selection of appropriate visualisation engines and interface front-ends for the European eInfrastructures Observatory.

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## Acronyms

3D	Three dimensional
ECO	European Cluster Observatory
GIS	Geographic Information Systems
HCI	Human Computer Interaction
HDI	Human Development Index
InfoVis	Information Visualisation
NYT	New York Talk Exchange
UCD	User-Centred Design
WEF	World Economic Forum
WWW	World Wide Web

## Preface

The e•nventory project targets the formation of the **European eInfrastructures Observatory**, a single-entry-point and one-stop-shop data warehouse, capable of representing multiple primary and convoluted indicators and benchmarks, and a yardstick tool for progress monitoring, impact assessment, post-mortem analysis and ex-ante evaluation of eInfrastructures at regional and national levels across the European Union and beyond.

The aim of the e•nventory project is to carry out a design study that will set the grounds towards the **European eInfrastructures Observatory**; through the collection and utilisation of appropriate indicators, the project will be able to monitor the status quo and evolution over time of eInfrastructures development and communicate all findings to related stakeholders but also to the public-at-large, in a seamless and impartial way.

The e•nventory project will carry out extensive consultation with eInfrastructures stakeholders and research and innovation indicator experts and will extend prior benchmarking efforts (e.g. EARNEST) by including an extensive set of eInfrastructures components (i.e., computing, communication and services), eventually deploying a prototype web platform dealing with a critically-selected subset of indicators, through intuitive, interactive and user-friendly mappings, plots and graphics.

The project action plan is structured so that it can achieve:

- identification of a core set of **benchmarking indicators** for the **European eInfrastructures Observatory** that will be the baseline for **monitoring** eInfrastructures development progress,
- eInfrastructures **stakeholders' feedback and consensus** on the proposed structure and functionality of the **European eInfrastructures Observatory**, and
- **European eInfrastructures Observatory** functionality **demonstration through a prototype web platform** that will be available to all eInfrastructure communities and to the general public.

The e•nventory project responds to the need of eInfrastructure stakeholders by delivering a prototype tool to aid impact assessment of related eInfrastructure initiatives and programmes. In that respect, the **user communities** that will effectively use the **European eInfrastructures Observatory** as a yardstick tool and translate the project outputs into a real influence on eInfrastructure policy, are the **eInfrastructure stakeholders** themselves, including:

- the **European Parliament**, the **European Commission** and **National Governments** that are sponsoring eInfrastructure initiatives and place a high value in their policy agenda on the impact assessment, post-mortem analysis and ex-ante evaluation, to help design better and more successful future eInfrastructure programmes;
- **research funding bodies** that plan the development of strategies to address the digital divide and digital opportunity issues and need to utilise and assess the impact of eInfrastructures contributing to this goal;
- **eInfrastructure policy bodies** that have a clear mandate of supporting the development and the sustainability of eInfrastructures and need an impact assessment tool to monitor the progress of achieving their objectives;
- **eInfrastructure projects** that carry out specific eInfrastructure activities and need to monitor their impact during deployment as well as retrospectively;
- **scientific/research communities** that are empowered by eInfrastructures and are eager to comprehend their strengths and weaknesses that influence their everyday work.

High utilisation of the **European eInfrastructures Observatory** from the broad eInfrastructure community is a **key measure of the project's impact**; therefore, the **entire project workplan has been designed to maximize stakeholders' engagement** and awareness.

The e•nventory project kicked-off in September 2010 and is planned to be completed by August 2012. The project is co-financed by the European Commission's Seventh Framework Programme for Research Infrastructures.



## Executive summary

What is the focus of this Deliverable?

The objective of WP4 is to create the necessary tool/web platform, albeit at a pilot/prototype level, through which access will be given to the [European eInfrastructures Observatory](#). The portal will allow for various representation and statistical data aggregation methods, including graphs, distributions, and other visualisation means that will enable accurate and user-friendly utilisation of the e•nventory data repository.

Deliverable D4.1 compiles and describes several information visualisation and representation techniques for data indicators, in accordance with reference/good examples implemented internationally. Although **primarily a “technical” deliverable, it is meant to assist the e•nventory consultation activities with a selection of appropriate visualisation engines and interface front-ends for the [European eInfrastructures Observatory](#).**

What are the deliverable contents?

Deliverable 4.1 provides the foundation on information visualisation, including its definition but more importantly its principle features: representation and interaction. Chapter 2 presents selected representation techniques related to the e•nventory work. Chapter 3 presents the most notable interaction techniques. Then, Chapter 4 reviews reference case-studies of information visualisation available on the web. The choice of the reference case-studies has been made to reveal interactive visualisation features adopted by data observatories that exhibit certain similarities to the e•nventory approach.

What are the deliverable main conclusions?

Several international data observatories have adopted information visualisation techniques that provide their global users with multiple interactive options. In some cases, the visualisation tools available on-line are highly interactive and visually appealing. However, many of these tools are also too complex for a broader public and, consequently, suffer from usability problems. Furthermore, the interactive visualisation of eInfrastructures-related data, i.e. of data concerning grids and supercomputers, is sparse.

This document is the first pillar of e•nventory towards creating the necessary tool/web platform through which access will be given to the [European eInfrastructures Observatory](#). The review of international data observatories representation and interaction techniques and usability will help shape the design and development (i.e. the functional specifications) of the [European eInfrastructures Observatory’s pilot](#) application in visualising eInfrastructure indicators online. This document provides a smooth transition to the follow-up e•nventory web platform specifications.

How does this deliverable contribute to the project quality metrics?

This deliverable sets the ground for achieving the following project quality metrics:

- *At least 2 use cases supported by the prototype web platform, i.e. at least 2 different user-group needs addressed through the interactive visualisation of indicators developed.*

How does this deliverable contribute to the avoidance/mitigation/exploitation of the project risks?

This deliverable contributes to the avoidance, mitigation or exploitation of the following project risks:

- *Project high-level objectives not clear and/or agreed within the consortium*
- *Not accomplishing effective interactive web visualisation of the information space*
- *The on-line interactive visualisation tool not being user-friendly enough*

What is next in the process to deliver the e•nventory results?

- Deliverable D2.2 (M06) documents the first set of the [European eInfrastructures Observatory](#) benchmarking indicators that will be used as input for the next phases of the project, especially as the baseline for discussion for the consultation activities in WP3.

- Deliverable D3.2 (M09) will collect the **European eInfrastructures Observatory Advisory Board's** initial assessment and directions upon concluding a first round of consultation process with the Advisory Board. This will serve as an intermediate input for the e•nventory workplan.
- Deliverable D4.2 (M12) will document the first set of draft specifications for the prototype implementation of the web platform, namely its architecture, web engine, data collection, storing, and updating mechanisms, as well as its visualisation and representation methodology.
- Deliverable D5.2 (M12) will report (mid-project) on the implementation of dissemination and outreach activities, including assessment of their impact on the targeted eInfrastructure groups
- Deliverable D5.3 (M14) will present an update of the dissemination plans for the project as well as a potential revision of the project communication package.
- Deliverable D3.3 (M15) will document, after concluding the entire consultation process, with the **European eInfrastructures Observatory Advisory Board**, the final reflections that will serve as a key milestone and final input for the e•nventory workplan.
- Deliverable D2.3 (M16) will provide the final set of the **European eInfrastructures Observatory** benchmarking indicators after the finalization of consultation activities in WP3.
- Deliverable D4.3 (M20) will document the final set of specifications for the prototype web platform dealing with a critically-selected subset of indicators and relevant repositories, its functionality and the **user's guide. It will further include the results of the usability and accessibility** tests that will be conducted with the platform. This deliverable will also serve as a technical reference for any follow-up (production-level) version of the portal after the completion of the project.
- Deliverable D5.4 (M23) will take the form of an inauguration workshop that will demonstrate the **European eInfrastructures Observatory** to representatives of the eInfrastructures community at large.
- Deliverable D5.5 (M24) will provide a final report on the implementation of dissemination and outreach activities, including assessment of their impact on the targeted eInfrastructure groups.