



DELIVERABLE

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D6.4.2 – Technical Validation Report 2

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Executive Summary

The present deliverable D6.4.2 presents the progress of the technical validation performed during the second year of the Natural Europe project. Based on the approach presented in D6.4.1 “Technical Validation Report 1”, the technical infrastructure was tested in order to discover eventual changes and additions concerning the technical requirements for the Natural Europe tools and services.



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1 Introduction

1.1 Scope

This deliverable presents the progress of the technical validation plan presented in D6.4.1. In this deliverable we describe on-going validation test of the Natural Europe infrastructure. More specifically we have focused on the evaluation of the service components in the middle and backend layers.

1.2 Audience

This report is addressed to the developers of the Natural Europe infrastructure as well as the project manager and coordinator that use the found results for project advancements and planning purposes.

1.3 Definitions

Cultural Heritage Object (CHO): In Natural Europe, the term cultural heritage object represents any object originating from a natural history museums' collections. A CHO typically consists of a digital object and its descriptive metadata. The object itself may be born digital (for example a Microsoft Powerpoint presentation or an Adobe PDF document), or it may be a digitized version of an analogue object (like a photo of an exhibit or a scanned text page).

Educational Pathway (EP): An educational pathway in Natural Europe is a complex activity mostly in an educational context. Such an activity is composed of several consecutive steps, representing either phases in a learning process, or an actual pathway through the museum, providing navigational assistance for thematically connected exhibits.

Educational Pathway Template (EPT): The educational pathways applied by educators in a teaching scenario will mostly follow educational models for inquiry-based and informal learning activities. These educational models are represented in the Natural Europe system through educational pathway templates, providing a framework for the implementation of educational pathways that can be filled with the respective contents for various topics.

Europeana Semantic Elements (ESE): The Europeana digital library has developed the metadata standard "Europeana Semantic Elements" has been developed, which defines a set of metadata fields and their usage for the description of cultural heritage object metadata.

1.4 Structure

Chapter 1: contains an overview of this document, providing its Scope, Audience, and Structure.



Chapter 2: describes the approach used for the validation of the technical infrastructure.

Chapter 3: provides an overview of the testing infrastructure.

Chapter 4: describes the implemented test cases in relation to the architectural components targeted with these tests.

Chapter 5: gives a short depiction of the impact of this deliverable on the Natural Europe vision.



2 Approaches to technical validation and evaluation

This chapter describes the methods and approaches used to assess the quality of our technical infrastructure. As the Natural Europe infrastructure consists of several layers, we need different assessment methods for each layer: frontend services, middleware services and backend components. In this deliverable, we discuss the validation of middleware services and backend components

In the scope of Natural Europe, we will use the product-based approach for services and backend components. We will use two methods for assessing the quality of our work, evaluation and validation. The middle and backend layer will be evaluated by experts and developers. Validation is more technically oriented and is based on quantifiable results. To validate e.g. a web service, we will define criteria and threshold values, then run tests and record results to compare these against the thresholds. This helps us to assess whether a service component works as intended or is compliant to a standard.

For the services and backend components of the Natural Europe infrastructure the technical evaluation will focus on measures of performance, reliability, interoperability, modifiability, portability, testability and scalability. A more detailed description of these measures can be found in D6.2.1.

In order to keep up to date with emerging test results and new test cases this document will be updated after a period of six months.



3 Testing Infrastructure

In this chapter we want to present the infrastructure and the overall approach used for the validation process. In order to test continuously and discover problems as soon as possible the following infrastructure was set up:

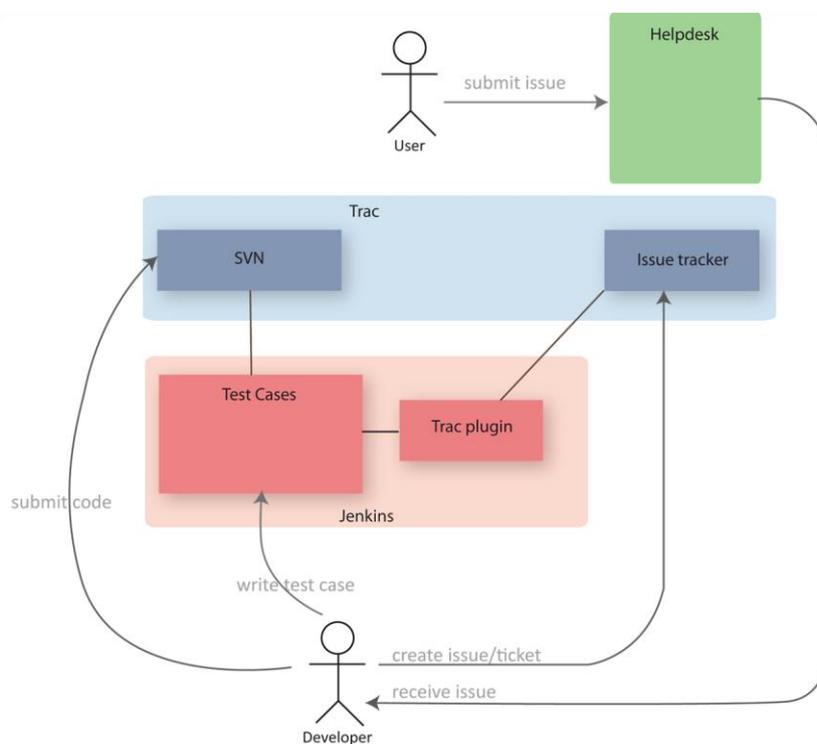


Figure 3-1 - Testing Infrastructure

Users can submit their issues to the helpdesk which in turn leads the developers to create a new ticket in the issue tracker and assign it. The assignee addresses the ticket, submits new code and, if needed, writes the corresponding test cases. To ensure the stability of the infrastructure even with a changing codebase the Jenkins continuous integration system runs the integrated test cases periodically and creates new issues when a test fails.

3.1 Helpdesk

The helpdesk enables users to submit feedback or report issues directly. The tools being monitored with the helpdesk are the PAT and the MMAT. The helpdesk system is implemented as a web interface where users have the possibility to communicate their problems. This system is reachable under the following URL: <http://www.natural-europe.eu/en/helpdesk>.

The screenshot shows a web browser window with a dark brown header bar containing the breadcrumb navigation: 'Home > Helpdesk > Helpdesk for Multimedia Authoring Tool'. Below the header, there is a small house icon and a paragraph of text: 'Please use this form to provide any feedback related to your experience with the Natural Europe Multimedia Annotation Tool. Our programmers will look into this as soon as they receive your request.' The form itself is on a light beige background and contains four input fields: 'Enter your Name:' (a single-line text box), 'E-mail address:' (a single-line text box), 'Message Subject:' (a single-line text box), and 'Enter your Message:' (a large multi-line text area with a small cursor icon in the bottom right corner).

Figure 3-2 - Helpdesk for the MMAT

In the past year no issues were recorded at the helpdesk.

3.2 Trac

Trac is a web-based tool used for software project management (1). Its main feature is an issue tracking system, but it also offers a wiki and an interface for subversion or other version control systems. Within the Natural Europe project the Trac system is used for version control of the codebase and issue tracking. The issue tracker as well as the SVN repository are connected to the Jenkins continuous integration server (see section 3.3). The SVN also contains all test cases integrated into Jenkins.

3.3 Jenkins

Jenkins is an application for continuous integration and testing (2). It allows the monitoring of repeatedly executed jobs such as building and running pieces of code. This also includes the periodical execution of test cases which can be integrated into Jenkins either directly or by connecting it to a SVN repository. For our testing process we opted for the later, connecting the SVN integrated into the Trac system with the Jenkins CI. This way we can ensure all changes in the codebase to immediately show effect in the execution of the test cases.



Trac tickets are also being integrated into the Jenkins test cases using the Trac publisher plugin¹. This way, developers using the Jenkins CI have an additional overview of arising issues.

¹ <https://github.com/jenkinsci/trac-publisher-plugin>





4 Architecture and Test Cases

In this chapter we want to focus on the unit tests integrated into the Jenkins CI which target various architectural components of the Natural Europe infrastructure. For a more detailed description of the Natural Europe architecture we would like to refer to deliverables D4.2 “Specification of Natural Europe Platform & Tools” and D4.4. “Deployment of Natural Europe Platform & Tools”. In order to test the stability and functionality of the infrastructure we decided to rely mainly on unit testing. Unit testing is performed at the code level with the purpose of testing particular functions or code modules (Fowler). The unit test cases are devised by the developers themselves in order to assess the validity of the programs functionalities.

4.1 Natural Europe NHM Cultural Environment (NECE)

The Natural Europe NHM Cultural environment NECE is composed of a set of services and tools deployed individually for each NHM in order to ingest and curate CHOs, CHO collections and their metadata. The central cultural repository contains all harvested metadata and also represents the access point for the contribution to Europeana. The MMAT allows the creation and management of CHOs and their metadata.

4.1.1 Cultural repository uptime

The central cultural repository contains all CHOs, CHO collections and their metadata. It can be access via web service using either SOAP or REST binding. The goal of this test is to determine if the service is running and reachable.

Description	Test the availability of the NE cultural repository service.
Resources	Natural Europe federated repository: http://83.212.96.219:8080/cultural/services/
Pre conditions	None
Post conditions	Resource is available
Flow of events	Query the repository Wait for answer
Inclusion/Exclusion points	None



Special requirements	None
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Table 4-1 - Cultural repository uptime test

4.1.2 Central Database Connection

The central database is access by the cultural service. All data retrieved by this service is stored in this database. This test ensures the availability of this database.

Description	Test the connectivity of the database underlying the NE cultural repository.
Resources	Exist DB RPC Connector http://147.27.41.103/exist/xmlrpc
Pre conditions	None
Post conditions	All resources are available
Flow of events	Try to connect to database
Inclusion/Exclusion points	None
Special requirements	None

Table 4-2 - DB connectivity test

4.1.3 MMAT availability

Each NHM has its own instance of the MMAT running on a server. This test case targets the availability of each MMAT instance.



Description	Test the availability of the local installations of the MMAT
Resources	http://nhmc.collections.natural-europe.eu/mmat/ http://ac.collections.natural-europe.eu/mmat/ http://mnhnl.collections.natural-europe.eu/mmat/ http://jme.collections.natural-europe.eu/mmat/ http://hnhm.collections.natural-europe.eu/mmat/ http://tnhm.collections.natural-europe.eu/mmat/
Pre conditions	None
Post conditions	All MMAT instances are available
Flow of events	Call site
Inclusion/Exclusion points	None
Special requirements	None

Table 4-3 - MMAT installation availability

4.2 Educational resources and tools

The educational tools and services are the backbone of the Natural Europe educational environment. Their main functionality is the creation and consumption of educational pathways. The educational environment consists mainly of the PAT which allows registered users to create and manage educational pathways based on existing templates devised by pedagogical experts. The interactive installations which will be set up at the NHMs in order to allow a broad audience to navigate and explore selected educational pathways also form a part of the educational environment. But considering the interactive installations are still in an early development stage, they are not incorporated into the testing agenda at this point.

4.2.1 PAT Availability

The PAT is also implemented as a web based tool. The goal of this test is to determine the availability of the PAT tool.



Description	Test the availability of the PAT
Resources	http://education.natural-europe.eu/natural_europe/
Pre conditions	None
Post conditions	The tool is available
Flow of events	Call site Await response
Inclusion/Exclusion points	None
Special requirements	None

Table 4-4 - PAT availability test

4.2.2 PAT CollectionBuilderTest

The central goal of the PAT is to create and manipulate educational pathways. This test ensures the ability to create an educational pathway with the PAT.

Description	Tests if a pathway can be created
Resources	-
Pre conditions	None
Post conditions	Pathway could be created



Flow of events	Sets up the environment Creates a pathway Try to set valid properties for collection Try to set invalid properties for collection Try to retrieve the created collection
Inclusion/Exclusion points	None
Special requirements	None

Table 4-5 - Pathway creation test

4.2.3 PAT User Test

The PAT is only accessible to registered users. This test tests the creation of a new user account for the PAT.

Description	Tests if a user account for the PAT can be created
Resources	-
Pre conditions	None
Post conditions	User account could be created and an email address could be added
Flow of events	Create a new user Set email Test if email was set
Inclusion/Exclusion points	None
Special requirements	None

Table 4-6 - PAT user creation test



4.3 Conclusion

All tests presented in this section are run periodically to detect eventual malfunctions of the tools and services immediately, thus allowing the developers to address these issues as soon as possible . To present a stable interpretation of the results of this testing process a collection of test results over a longer period is necessary. For this reasons we present no preliminary validation results in this version of this deliverable. As already exposed in chapter 2, after a period of six months an updated version of this document will be published to present a comprehensive analysis of the test results within this timeframe.



5 Impact on Natural Europe Vision

This chapter focuses on the impact that the specific deliverable has on the Natural Europe as this is defined in D2.1 White Paper on Natural Europe Vision. In the end of this chapter, specific points will be made, related to the revisions that will come from this deliverable, affecting D2.1 and being reflected in its next version. Ideas and guidance on how this part should report the impact on Natural Europe Vision, can be found in chapter 5 of “D2.1 White paper on Natural Europe Vision”.

- How is this deliverable affecting the services that Natural Europe is deploying?
 - *How is it going to affect access to cultural content from museums of natural history?*
 - *How is it going to affect access to educational pathways coming from educators of the museums?*
 - *How is it going to affect searching for content, both educational and cultural, through the museum websites and interfaces set up by the project?*
 - *How is it going to affect setting up interactive installations in the museum exhibition floors?*
- How is this deliverable affecting the outreach of Natural Europe to its audiences?
 - *How is this deliverable going to extend the audiences to which Natural Europe is targeted?*
 - *How is this deliverable going to affect Natural Europe outreach to specific audiences (teachers, parents, pupils, etc)*

The goal of the validation process described in this deliverable is to ensure the correct function of technical infrastructure of Natural Europe. Therefore the impact on the Natural Europe vision is limited to ensuring that the implemented architecture works as foreseen. Furthermore, the results provide indicators where urgent activities are required – might this be error correction or a redesign of parts of the architecture in order to accommodate the removal of errors and erroneous design decisions.

Looking at this from the point of the services that will be deployed, technical validation will surely help in collecting also input from the users of the tool that will lead to rethinking the envisaged services that the project can offer to its targeted audiences and thus refining them to serve the needs of the users in a more comprehensive way. In the same sense, technical validation can definitely provide some limited input to the categories of the envisaged audiences of the project as the results of the technical validation will allow for the creation/improvement of services and thus possibly to the inclusion of new audiences and stakeholders to the one that Natural Europe serves.





6 References

1. *Jenkins continous integration*. <http://jenkins-ci.org/>. Last viewed on 14. 10 2012.
2. *Trac*. <http://trac.edgewall.org/>. Last viewed on 15. 10 2012.
3. Fowler, M. <http://www.martinfowler.com/bliki/Xunit.html>. Last viewed on 15.10.2012