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EbRim implementation with GeoNetwork and Omar

GEONETWORK OPENSOURCE SOFTWARE Acceptance Test Plan

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1. INTRODUCTION

1.1. Purpose

This document is the Acceptance Test Plan (ATP) for the ERGO GeoNetwork Catalogue Service, and represents a formal deliverable of work package 4100.

The objectives of this plan are to:

- Define the validation approach;
- Describe the activities needed for the preparation and execution of testing;
- Define the testing environment;
- Define the sequence of the validation/acceptance tests;
- Serve as a guide in the definition of the test procedures.

1.2. Glossary

1.2.1. Abbreviations

<i>Acronym</i>	<i>Extended Form</i>
ATC	Abstract Test Case
ATP	Acceptance Test Plan
ATS	Abstract Test Suite
ATR	Acceptance Test Report
EO	Earth Observation
FAT	Factory Acceptance Test
GMES	Global Monitoring for Environment and Security
HMA	Heterogeneous Mission Accessibility
HTTP	Hypertext Transfer Protocol
HW	Hardware
I/F	Interface

Acronym	Extended Form
ICD	Interface Control Document
NA	Not Applicable
OGC	Open Geospatial Consortium
SOAP	Simple Object Access Protocol
SR	Software Requirements
SRD	Software Requirements Document
SSD	Software Specification Document
SSE	Service Support Environment
SSL	Secure Sockets Layer
SUM	Software User Manual
SW	Software
TBC	To Be Confirmed
TBD	To Be Defined
TBW	To Be Written
TN	Technical Note
UML	Unified Modeling Language
URD	User Requirements Document
URL	Universal Resource Locator
WSDL	Web Services Description/Definition Language
XML	Extensible Mark-up Language
XSD	XML Schema Definition

Acronym	Extended Form
XSLT	Extensible Style Language Transformation

1.2.2. Definition of Terms

1.3. References

1.3.1. Normative References

In case of conflict between two or more applicable documents, the higher document will prevail.

- [NR1] ERGO-TEC-PROP-354-07-SP-PI, issue 1.0, 05/02/2008.
- [NR2] ERGO Geonetwork Opensource Software Requirement Document, Id: ERG-SRD-2100-GCT, issue 1, Revision 1, 06/06/2008.
- [NR3] ERGO Project Management Plan, Id: ERG-PMP-1000-INT, Issue 1, Revision 1, date 30/04/2009
- [NR4] ERGO Project Assurance Plan, Id: ERGO-PAP-1000-INT, Issue 1, Revision 1, date 30/04/2009
- [NR5] OGC compliance Test Language (CTL), Id: OGC 06-126r2, version 0.6, 31/03/2009
- [NR6] CSW-ebRIM Registry Service - Part 3: Abstract Test Suite, Id: OGC 08-103r2, issue 1.0.1, 07/11/2008.
- [NR7] OGC CSW-ebRIM Extension Package CIM - Abstract Test Suite, Id: HMA-TN-1005-CON-CSW-CIM-BASE-INSPIRE-ATS, issue 1.0.1, 09/02/2009, http://wiki.services.eoportal.org/tiki-download_wiki_attachment.php?attId=218&page=HMA-T%20Deliverables&download=y
- [NR8] OGC CSW-ebRIM Extension Package CIM - Abstract Test Suite, Id: HMA-TN-1005-CON-CSW-CIM-BASE-INSPIRE-ATS, issue 0.7, 23/03/2009, http://wiki.services.eoportal.org/tiki-download_wiki_attachment.php?attId=287&page=HMA-T%20Deliverables&download=y
- [NR9] ISO 19115:2003, Geographic Information - Metadata
- [NR10] ISO 19115:2003/Cor 1 2006, Geographic information - Metadata - Corrigendum 1
- [NR11] ISO/TS 19139:2007, Geographic information -- Metadata -- XML schema

implementation

- [NR12] OGC™ Cataloguing of ISO Metadata (CIM) using the ebRIM profile of CS-W, Id: OGC 07-038r2, version 0.1.9, 05/02/2007
- [NR13] ebXML Registry Information Model, version 3.0, Id: regrep-rim-3.0-os, 02/05/2005.
- [NR14] ebXML Registry Services and Protocols, version 3.0, Id: regrep-rs-3.0-os, 02/05/2005.

1.3.2. Informative references

The following documents, although not a part of this test procedure, amplify or clarify its contents.

- [IR1] SOAP Simple Object Access Protocol 1.1, W3C Note 08 May 2000, <http://www.w3.org/TR/2000/NOTE-SOAP-20000508/>
- [IR2] SOAP Simple Object Access Protocol 1.2, Part 1 (Messaging Framework) <http://www.w3.org/TR/soap12-part1/>
- [IR3] SOAP Simple Object Access Protocol 1.2, Part 2 (Adjuncts) <http://www.w3.org/TR/soap12-part2/>
- [IR4] Hypertext Transfer Protocol -- HTTP/1.1, RFC 2616, U.C. Irvine, DEC W3C/MIT, DEC, W3C/MIT, W3C/MIT, January 1997, <http://www.normos.org/ietf/rfc/rfc2616.txt>
- [IR5] Web Services Description Language (WSDL) 1.1, W3C Note 15 March 2001, <http://www.w3.org/TR/wsdl>
- [IR6] XML Schema, <http://www.w3.org/TR/xmlschema-0/>, W3C Recommendation, 2 May 2001.
- [IR7] Extensible Mark-up Language (XML) 1.0, W3C Recommendation 10 February 1998, <http://www.w3.org/TR/REC-xml>.
- [IR8] XSL Transformations (XSLT) Version 1.0, W3C Recommendation 16 November 1999, <http://www.w3.org/TR/xslt>.
- [IR9] XSL Transformations (XSLT) Version 2.0, W3C Recommendation 23 January 2007, <http://www.w3.org/TR/xslt20/>



2. ORGANISATION OF TEST ACTIVITIES

This document defines the acceptance test plan for ERGO GeoNetwork software. The validation consists of Factory Acceptance (i.e. verification against software requirements) activities, as described in the following section.

2.1. Factory Acceptance Activities

2.1.1. Activity Definition

The objective of the Factory Acceptance Test is to check that ERGO GeoNetwork software satisfies all the requirements listed in the Software Requirement Document [NR2].

The FAT tests are run at INTECS premises. The following tasks are part of the factory acceptance:

- Installation of ERGO GeoNetwork software
- Execution of the formal acceptance tests
- Writing of the test execution report

2.1.2. Description of a Factory Acceptance Session

The Factory Acceptance Test session starts with the verification of the testing environment and the presence of all required people. During this "Test Readiness Review", it will be checked whether the software is ready to be submitted to the factory acceptance tests (e.g. open actions, open change requests, and state of documentation).

The next activity is the execution of the formal factory acceptance. If a difference is detected between the observed behavior of the software and the expected behavior described in the Test Procedures, then the test engineer raises a problem report. In case a blocking problem is encountered, the test case is skipped and testing continues with the next test case.

Finally at the end of the session, a Factory Acceptance Test Report is written. Depending on the number of major problems that are detected, a retest of some test cases may be appended to the testing activities, if a new release with a number of corrections is available.

2.1.3. Verification Method

The following verification methods are envisaged for test execution:



- **Analysis [A]** This verification method implies use of analytical techniques (such as system engineering analysis, statistics, mathematical modeling, simulations) and shall be used to verify such requirements.
- **Review of Design [D]** This verification method may be used when approved Design reports, technical descriptions, engineering drawings unambiguously show that the requirement is met.
- **Inspection [I]** Verification by inspection is only done when testing is insufficient or inappropriate. This method of verification is for those requirements that are normally performed by some form of visual inspection. This would include workmanship, labeling, envelope requirements etc.
- **Demonstration [M]** This verification method may be used when actual conduct can verify achievement of requirements such as service and access, transportability, human engineering features and processes hardware. A requirement which is of an operational or functional nature and is not quantified by a specific measurable parameter may be verified by demonstration.
- **Similarity [S]** This verification method may be used when there is proof that the item is similar or identical in design and manufacturing processes to another previously qualified to equivalent or more stringent criterion.
- **Test [T]** A requirement may be verified by test alone if the form of the specification is such that the requirement can be directly measured.

2.1.4. Activity Results

The outputs of the Acceptance Test phase is a signed Acceptance Test Report (ATR) which lists for each test scenario/test case whether it failed or was successful, and a general acceptance statement.

Three cases are possible:

- **Rejection:** the reasons are written in the report; the software is corrected according to the normal change control and configuration management procedures; a new factory acceptance test session is scheduled;
- **Conditional acceptance:** some problems have been found, but the factory acceptance is signed providing that they will be corrected.
- **Full acceptance:** the factory acceptance is signed.

3. Test Environment

In this chapter the software and hardware resources required to perform the Factory Acceptance Test sessions are listed.

3.1. Hardware & software Configuration

The test environment is made up of the HW/SW configurations for the GeoNetwork and TeamEngine systems.

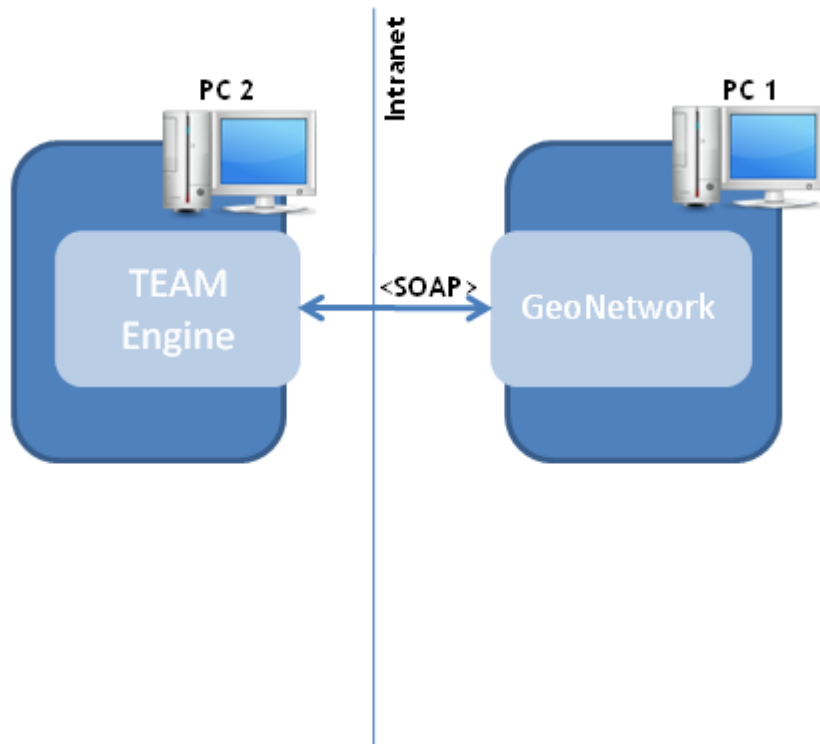
The HW/SW configuration for GeoNetwork is the following:

Host	Hardware	Software
PC1	Dual CPU AMD Opteron 246 (detected 1992.536 MHz processor), 4 GB of RAM	Linux (Fedora Core 9) or Windows XP Apache Tomcat (version 5.5 or greater) Java Runtime Environment (version 1.5 or greater) Postgres (version 8.3 or greater) with PostGIS extension GeoNetwork software

The HW/SW configuration for the TeamEngine is as follows:

Host	Hardware	Software
PC2	I586 Intel processor + 2GB RAM	Windows XP Apache Tomcat (version 5.5 or greater) Java Runtime Environment (version 1.6.x) Firefox 3.0.x TeamEngine tool software

A network connection is required between the 2 PCs, as shown in the following figure:



3-1 HW and SW configuration for ERGO GeoNetwork Test Environment

3.2. Test tools

The Test tool used for the tests described in this document is the TeamEngine, able to execute tests written in the CTL language [NR3]. The TeamEngine is a WEB application running as a Tomcat service, able to load, execute and log CTL test suites. Each test suite is made up an arbitrary number of tests.

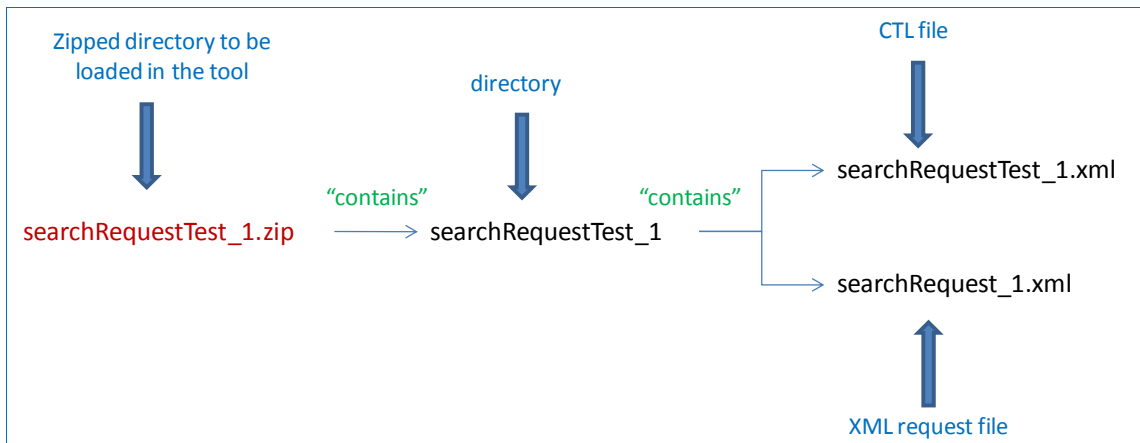
The TeamEngine is distributed as a “war” file to be deployed under Tomcat and it is accessible as http://tomcat_host:8080/TeamEngine

3.2.1. Steps to execute a CTL test suite

The user shall execute a test suite using the capabilities provided by the TeamEngine GUI to carry out the following steps:

- 1) Load the CTL test suite, which shall be provided as a zipped directory file, as in the example described in the following figure. Notice that the name of the directory and that of the CTL file [without suffix] shall be the same; the directory shall contain all of the resources needed to execute the tests:

- a. The CTL file is the main and mandatory file, which lists the steps to be executed to carry out the test suite; the tests are described using the CTL language.
- b. Other files are optional, but usually provided, such as files containing the actual XML requests to be sent to the ERGO ebRR server.



- 2) Execute the CTL test suite, by selecting the test suite just loaded in the “CTL Stored File List” tab of the GUI;
- 3) Inspect the response displayed in the output windows of the GUI, which will show the pass/fail result.

Given that these steps are the same for all the tests, they will not be repeated in the description of the test cases: they will be simply referred to, whereas details will be given about the specific request to be sent to the ERGO ebRR Catalogue Service.

3.2.2. General structure of a CTL Test Suite

A CTL test suite is made up of one or several tests to be executed by the Team Engine tool. A CTL test has the main following instructions:

1. Definition of the type (XML or SOAP) of the request;
2. Definition of the mandatory (URL of the ERGO ebRR Catalogue Service) and optional parameters of the request;
3. Inclusion of either directly the request or the link to the request, if this is provided in a separate file, as usually happens;
4. Check that a response is returned by the ERGO ebRR Catalogue Service;
5. Check that the response is compliant with what expected.

3.3. Test data

The GeoNetwork database shall be populated by ingesting:

- ISO 19115 Metadata, compliant with [NR11], in order to test the support of the CSW-ebRIM profile [NR12]

The ISO 19115 Metadata are of many different types:

- ESA EO dataset collections;
- Report - FAST Crop Yield Forecast from several African countries;
- Vegetation Productivity Indicator (VPI);
- Physiographic Map of North and Central Eurasia;
- Hydrological basins in Africa.

4. Test Specification

4.1. Test Design

The testing is divided into **Test Scenarios** and **Test Cases**.

Test Scenarios are group of tests, which have a common theme or objective (e.g. Installation, communication mechanism used etc). Each Scenario shall be divided into a number of sub-cases. Each sub-case is a **Test Case**.

Notice that the compliance tests to applicable OGC specification are provided in a separate documents [NR6], [NR7] and [NR8]. The current document does not include testing of requirements already covered by the ATS.

The test descriptions should be read as specifications for the corresponding test procedures. The tests are performed manually.

4.2. Test Scenario TS_01: Performance

This test scenario addresses performance issues of the Catalogue Service implementation

4.2.1. Test Case TS_01_01: Maximum response time for GetRecordById

This test case checks that the Catalogue Service is able to handle a search request within 3 seconds.

Prerequisites	The ERGO GeoNetwork service is installed and working; the database contains at least 50 and a maximum of 20.000 records.
Input	A CTL test handling a CSW-ebRIM "GetRecords" request with the following parameters: <ul style="list-style-type: none">• the GetRecords attribute "resultType" is set to "results";• the GetRecords attribute "maxRecords" is set to 20;• the "ElementSetName" element value is set to the "full" value;• A "BoundingBox" filter criterion is specified that allow to retrieve at least 20 records
Steps	The steps are those described in §3.2.1, where: <ul style="list-style-type: none">• the CTL test suite contains the test described in the "Input" section

Results	The test result displayed in the TeamEngine GUI
Test pass/failure criteria	The test is executed at least 20 times; it is passed if the response is returned (on average) in less than 3 seconds; the test is failed otherwise
References	ERG-SR-GNW-PER-060

4.2.2. Test Case TS_01_02: Ingestion of 20.000 records in DB

This test case checks that the ERGO GeoNetwork Catalogue Service is able to store at least 20.000 records.

Prerequisites	The ERGO ebRR Catalogue Service is installed and is working.
Input	The URLs of at least 20.000 records to be harvested.
Steps	Due to the large number of records to be harvested, the ingestion will be carried out using a procedure implemented ad hoc; this test foresees a unique step consisting in: <ol style="list-style-type: none"> 1) Launch the shell script which will be provided for ingesting the records
Results	The output of the shell script
Test pass/failure criteria	The test is passed if at least 20.000 records are successfully harvested; the test is failed otherwise.
References	ERG-SR-GNW-DES-190

4.2.3. Test Case TS_01_03: Number of records returned by GetRecords

This test case checks that the Catalogue Service is able to return 20 records to a search request.

Prerequisites	The ERGO GeoNetwork service is installed and is working ; the database contains at least 50 records and a maximum of 20.000. The result set of the search shall contain 20 records.
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Input	<p>A CTL test handling a CSW-ebRIM “GetRecords” request with the following parameters:</p> <ol style="list-style-type: none"> 1. the GetRecords attribute “resultType” is set to “results”; 2. the GetRecords attribute “maxRecords” is set to 20; 3. the “ElementSetName” element value is set to the “full” value; 4. generic filter criteria are specified that allow to retrieve at least 20 records
Steps	<p>The steps are those described in §3.2.1, where:</p> <ul style="list-style-type: none"> • the CTL test suite contains the request described in the “Input” section;
Results	The test result displayed in the TeamEngine GUI
Test pass/failure criteria	The test is passed if the response contains 20 records; the test is failed otherwise
References	ERG-SR-GNW-DES-190

4.3. Test Scenario TS_02

This test scenario addresses tests about the GUI.

4.3.1. Test Case TS_02_01

This test case addresses the ability to create a new catalogue through the GUI. It will be detailed in future versions of the document.

4.4. Test Scenario TS_03

This test scenario refers to user authorization; it is assumed that ERGO GeoNetwork supports the SAML Profile and thus relies on the authentication services of an external Identity Provider (according to [NR14], §10.2). The following scenario (compliant with the “Authenticated SOAP Requestor” scenario described in [NR14], §11.6.5) is envisaged:

- The Identity Provider (IdP) gives the user a SAML authentication token to be used for accessing the ERGO GeoNetwork services;
- The SAML authentication token contains the user profile information needed to ERGO GeoNetwork to check whether the user is authorized to access the service;
- The SAML authentication token is inserted in the SOAP header of the user request message, embedded in WS-Security tags.

4.4.1. Test Case TS_03_01

This test case checks that an unauthorized user cannot perform the required operation

Prerequisites	The ERGO GeoNetwork Catalogue Service is installed, has been correctly populated and is working The user is not authorized to perform the requested operation, as described by the authorization rules.
Input	A CTL test handling a SOAP request, which contains: <ul style="list-style-type: none"> • the SAML token released by the external IdP, in the SOAP header • a “GetRecords” request, in the SOAP Body
Steps	The steps are those described in §3.2.1, where: <ul style="list-style-type: none"> • the CTL test suite contains the request described in the “Input” section;
Results	The test result displayed in the TeamEngine GUI
Test pass/failure criteria	The test is considered passed if the response contains an Authorization failure response, the test is failed otherwise.
References	ERG-RB-GNW-SEC-200

5. Traceability matrices

For the sake of brevity, in the following table the following notations are used:

- **ATS of CSW-ebRIM** stands for the Abstract Test Suite of the CSW-ebRIM Registry Service [NR6]
- **ATS-CIM** stands for the Abstract Test Suite for the CSW-ebRIM Extension Package CIM [NR7] and [NR8]

Requirement	Test case
ERG-SR-GNW-FUN-010	Covered by ATS-CIM
ERG-SR-GNW-FUN-020	Covered by ATS-CIM
ERG-SR-GNW-FUN-021	Covered by ATS-CIM
ERG-SR-GNW-FUN-022	Covered by ATS-CIM
ERG-SR-GNW-FUN-023	Covered by ATS-CIM
ERG-SR-GNW-FUN-024	Covered by ATS-CIM
ERG-SR-GNW-FUN-025	Covered by ATS-CIM
ERG-SR-GNW-FUN-030	Covered by ATS-CIM
ERG-SR-GNW-FUN-040	Demonstration
ERG-SR-GNW-FUN-050	Covered by ATS-CIM
ERG-SR-GNW-PER-060	Test scenario [TS_01_01]
ERG-SR-GNW-INT-070	Covered by ATS of CSW-ebRIM [ATC 16] and ATS-CIM
ERG-SR-GNW-INT-080	Covered by ATS-CIM
ERG-SR-GNW-INT-090	N/A
ERG-SR-GNW-INT-100	Covered by ATS-CIM
ERG-SR-GNW-INT-110	Covered by ATS-CIM
ERG-SR-GNW-OPE-120	Demonstration
ERG-SR-GNW-OPE-130	Demonstration
ERG-SR-GNW-OPE-140	Demonstration
ERG-SR-GNW-OPE-150	Test scenario [TS_02_01]

ERG-SR-GNW-OPE-160	Covered by ATS of CSW-ebRIM and ATS-CIM
ERG-SR-GNW-OPE-170	Covered by ATS of CSW-ebRIM and ATS-CIM
ERG-SR-GNW-DES-180	Inspection
ERG-SR-GNW-DES-190	Test scenario [TS_01_02] and [TS_01_03]
ERG-RB-GNW-SEC-200	Test scenario [TS_03_01]
ERG-SR-GNW-QLT-210	Demonstration
ERG-SR-GNW-QLT-220	Inspection
ERG-SR-GNW-QLT-230	Inspection
ERG-SR-GNW-MAI-240	Inspection
ERG-SR-GNW-SCD-250	Inspection
ERG-SR-GNW-SCD-260	Inspection ¹
ERG-SR-GNW-SCD-270	Inspection ¹
ERG-SR-GNW-SCD-280	Demonstration
ERG-SR-GNW-SCD-290	Inspection
ERG-SR-GNW-SCD-300	Inspection
ERG-SR-GNW-SCD-310	Inspection
ERG-SR-GNW-SCD-320	Inspection
ERG-SR-GNW-VAL-330	Demonstration

¹ The SRD [[NR2] would require a test case; however, it seems more appropriate a verification by inspection